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GEOGRAPHY, ECONOMIC DEVELOPMENT
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DISSERTATION
Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By
Richard J. Darwin, B.A., M.A.

* * * * *

The Ohio State University
1974

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Dr. Henry L. Hunker
Dr. Wilford L'Esperance

Approved by

Adviser
Department of Geography
Since my departure from the classroom at the University, I have continued my education toiling in the vineyards of business research and economic development. My labor has been expended in several capacities, both in the public and private sectors. Experience gained during this period has taught me that every level of government and business move according to a plan of its own. The plan, in each case, is a working document of the goals and aspirations of the business enterprise or the government body. In one form or another, the document contains strategies, organizational plans, and standards of performance that become formalized as official policy. Once policy is set, the organization of the company or the government bureaucracy commits to meet the goals and objectives of the plan. Performance is measured by how closely benchmark observations meet expectations set by policy standards. Experience has also impressed on me the fact that policy, once set in motion, is difficult to change. From this exposure, I have come to believe that policy is conceptually a very powerful force for making things happen.

At the present stage of my professional career as a geographer, I have responsibility for the management of several programs designed to meet the economic development goals and objectives of the State of Ohio. As one who has found himself as part of an environment where debate over economic and political philosophies eventually results in economic development strategies, I have become intensely interested in economic policy. As I proceeded with the execution of my responsibil-
ities, I concluded that the basic framework of state economic development policy is made up of spatial building blocks. Regardless of the nature of the program or the strategy, the basic dimensions of space would eventually surface. Density, distribution, movement and distance appear to be the threads that hold the fabric of state economic development policy together. In fact, as my interest in policy matters sharpened, I observed that other agencies in state government, while attempting to stay in step with the pace set by administration policy, found themselves confronted by spatial type obstacles. If my interpretation of the observed "red flags" are correct, then clearly, those who are responsible for drafting policy for state government should be informed and aware of the spatial component in their decisions. In simple summation, the art of policy-making should include the science of geography.

Unfortunately, geographers have not often been placed in a position to influence public policy. Accordingly, I feel strongly that geographers have a responsibility to their profession and to society to demonstrate how some of the basic research of the discipline can be applied to solving real world problems. The research presented in this dissertation is a commitment to that objective. The overall theme of the study is an argument for the important role played by space in economic policy. More specifically, I have brought to bear the power of geographic theory and a spatial model on the problem of regional and local economic development. Through these I hope to improve the quality of decisions made by those charged with the design and implementation of economic development policy.

As a prelude to the main body of this dissertation, an excerpt from a monograph published by the Committee on Geography of the National
The translation of basic research into useable material for public and private policy development and decision-making is an important responsibility of the academic community. Although not all members of a particular discipline may feel inclined to perform this function, some should. A discipline that dwells primarily on its own internal problems to the exclusion of problems that are important to society as a whole will stagnate and become irrelevant to the current needs of society and the nation.¹

ACKNOWLEDGEMENT

I was fortunate indeed to be a graduate student during a time when the blend of faculty and students at The Ohio State University made it one of the more exciting centers of learning for the study of advanced geography. Several members of that distinguished faculty contributed significantly to my graduate education in geography. During the early years of my graduate work, I was exposed to the teaching of Professor Leslie King who believed that in the philosophy of science and the discipline of mathematics, one could find order and direction for spatial theory and analysis. Professor Reginald Golledge appeared always to be dissatisfied with the accepted geographic explanation of spatial behavior. From him I became acutely aware of man's perception of his environment and how it influenced his decisions about ordering himself in space. The presence of Professor Emilio Casetti made us all feel proud as students that he was a Geographer and not in the Department of Mathematics or Economics. From Professor Casetti, I gained a better appreciation of the multi-disciplinary approach to the study of geographic problems. He was always at ease with the complex problem and was only satisfied if he could break it down to simple dimensions. The model used in this study is only one of many ideas which flowed so easily from his mind. If one includes the good fortune of being exposed to the teaching of Professors Howard Gauthier and Edward Taaffe, the training and education I received in geography was priceless. Their influence on my thinking
is reflected throughout this dissertation.

Good fortune stayed with me when I left the University. In May of 1971, I joined the Ohio Department of Development and found myself in a situation where the economic development issues facing the state became the problems I addressed in my dissertation. For this opportunity I owe much to Dr. David C. Sweet, Director of the Ohio Department of Economic and Community Development and to Mr. C. W. Harple, Deputy Director for Economic Development.

I also wish to thank Professor Henry L. Hunker who gave me wise counsel and advice and then proceeded to open some doors in the Columbus business community that gave me my start in the field of economic and business development. To Dr. Wilford L'Esperance, whose research on state economic development policy has influenced the direction of my work, I owe a debt of gratitude for accepting a place on my reading committee.

Finally, a note of quiet thanks to my wife Mona and to my children, Eric, Karen and Laura, who accepted my absence from home and my academic temperament with understanding. In a very special way, I would like to express my deep appreciation to Mr. and Mrs. H. Steinig for their generosity. For those who still believe that the struggle for education can be gained strictly by individual effort, I offer my sympathy, for your life must be empty.
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Studies in Urban Geography. Professors Reginald G. Golledge and Leslie J. King

Studies in Economic Development. Professors Emilio Casetti and Barry M. Lentnek
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PREFACE</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>v</td>
</tr>
<tr>
<td>VITA</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xi</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xiii</td>
</tr>
<tr>
<td>Chapter I. GEOGRAPHY AND SPATIAL POLICY - THE PROBLEM STATEMENT</td>
<td></td>
</tr>
<tr>
<td>Design of Study</td>
<td>1</td>
</tr>
<tr>
<td>Chapter II. ECONOMIC DEVELOPMENT POLICY ISSUES: THE NATIONAL INTEREST</td>
<td>11</td>
</tr>
<tr>
<td>The Macro-Bias in Economic Policy of the United States</td>
<td></td>
</tr>
<tr>
<td>Economists, Geographers and Economic Policy</td>
<td></td>
</tr>
<tr>
<td>The Problem of Geographic Scale</td>
<td></td>
</tr>
<tr>
<td>Economic Growth and Economic Development</td>
<td></td>
</tr>
<tr>
<td>The Economists Models of Economic Development</td>
<td></td>
</tr>
<tr>
<td>The Myrdal Model of Circular and Cumulative Causation</td>
<td></td>
</tr>
<tr>
<td>The Hirschman Model of Unbalanced Growth</td>
<td></td>
</tr>
<tr>
<td>The Core-Periphery Theory - National Economic Policy - National</td>
<td></td>
</tr>
<tr>
<td>Economic Policy Alternatives</td>
<td></td>
</tr>
<tr>
<td>National Product</td>
<td></td>
</tr>
<tr>
<td>Alternative for Resource Development - Efficiency or Equity</td>
<td></td>
</tr>
<tr>
<td>Alternative for Public Investment - Highest Return or Worst First</td>
<td></td>
</tr>
<tr>
<td>Alternatives For Urbanization - Concentrated or Dispersed</td>
<td></td>
</tr>
<tr>
<td>Alternative For Population Distribution - Migration or Locational</td>
<td></td>
</tr>
<tr>
<td>Choice</td>
<td></td>
</tr>
<tr>
<td>Alternative for Intra-Urban Development - Highest and Best Use Control</td>
<td></td>
</tr>
<tr>
<td>Alternatives For Private Investment - Profit Maximization or Profit</td>
<td></td>
</tr>
<tr>
<td>Satisfaction</td>
<td></td>
</tr>
<tr>
<td>Economic Development Policy and the Decision Trace</td>
<td></td>
</tr>
</tbody>
</table>
TABLE OF CONTENTS  
(continued)

III. ECONOMIC DEVELOPMENT POLICY ISSUES: THE REGIONAL INTEREST 66

- Economic Space and Regional Economic Development
- The Regional Impact of Federal Policy
- The Federal Response to Regional Economic Development Policy
- Regional Development Strategies in Time and Space
- Regional Growth Center Strategy - The Theory and Practice
- The Evolution of a Growth Center Strategy - The Case of Appalachian Ohio

IV. ECONOMIC DEVELOPMENT POLICY ISSUES: THE COMMUNITY INTEREST 94

- The Role of the Community in Economic Development
- Leadership Decision Behavior and the Community Development Process
- The Responsibility for Community Economic Development
- Organizational Strategy for Community Economic Development

V. A REGIONAL POTENTIAL MODEL - THE OHIO VERSION 125

- Input-Output and Regional Economic Development Policy Models
- The New York Metropolitan Region Model (1956)
- The Upper Midwest Economic Model (1960)
- The Ohio River Basin Model (1964)
- The California Development Model
- The Oahu Hawaii Planning Model
- The Harvard Economic Research Project
- The Texas Model
- The Regional Potential Model - Phase One
- The Regional Industrial Model (RIPM)
- The Regional Industrial Allocation Model (RIAM)
- The Ohio-Regional Potential Model (O-RPM) - Phase Two
- Mathematical Formulation of (O-RPM)
- Supplier Factor - Industry Requirements
- Supplier Factor - Regional Potential
- Factor Three - Transportation Requirements
- Transportation Factor - Regional Potential
- Labor Force Factor - Industry Requirements
- Labor Force Factor - Regional Potential
- The Regional Factor Index
- The Regional Industrial Potential Index - Factor Weights

vix
TABLE OF CONTENTS  
(continued)

VI. THE ECONOMIC CHARACTERISTICS OF THE APPALACHIAN REGION AND APPALACHIAN OHIO. .......................... 177

The Appalachian Region - An Overview
Federal-State Partnership
The Role of the Local Community in the Federal-State Partnership
The Economic Geography of Appalachian Ohio
Urban Development
Population
Industrial Structure 1960-1970
The Ohio Appalachian Plan - The Investment Strategy in 1968 and 1974

VII. A FIELD TEST OF THE OHIO-REGIONAL POTENTIAL MODEL. ...... 198

The Appalachian Ohio Selective Development Program
Procedure for Field Implementation of Selective Development
An Economic Profile of Portsmouth, Ohio
Community Attitude Survey
Industrial Attitude Survey
Desirable Industry Profile
Report to the Community
Measurement of Locational Feasibility - A Field Test of O-RPM
Regional Market Index
The Supplier Index
The Transportation Index
The Regional Potential Index
Decision-Making and a Consensus Local Development Program

VIII. SYNTHESIS, PROSPECTS AND CONCLUSIONS ................... 236

Summary of the Major Findings
Prospects for Future Research

APPENDIX

A ................................................................. 252
B ................................................................. 257

BIBLIOGRAPHY ................................................. 261
<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Economic Policy Alternatives</td>
<td>29</td>
</tr>
<tr>
<td>2.</td>
<td>Goals And Alternatives For Economic Development</td>
<td>32</td>
</tr>
<tr>
<td>3.</td>
<td>The Decision Trace In Economic Development Policy</td>
<td>52</td>
</tr>
<tr>
<td>4.</td>
<td>Federal Funds Appropriated For Regional Development</td>
<td>75</td>
</tr>
<tr>
<td>5.</td>
<td>Growth Centers For The Appalachian Ohio Region</td>
<td>87</td>
</tr>
<tr>
<td>6.</td>
<td>Hierarchial Ranking Of Primary Growth Centers For The Appalachian Region of Ohio</td>
<td>88</td>
</tr>
<tr>
<td>7.</td>
<td>Expenditure For Area Development, 1957</td>
<td>106</td>
</tr>
<tr>
<td>8.</td>
<td>Suggested Factor Weights For O-RPM</td>
<td>170</td>
</tr>
<tr>
<td>9.</td>
<td>Population Growth In Appalachian Ohio</td>
<td>188</td>
</tr>
<tr>
<td>10.</td>
<td>Change In Education Level, Family Income And Unemployment In Appalachian Ohio, 1960-1970</td>
<td>189</td>
</tr>
<tr>
<td>12.</td>
<td>Employment By Industry Group, Scioto County, Ohio In Selected Years, 1950-1970</td>
<td>207</td>
</tr>
<tr>
<td>13.</td>
<td>General Problems Facing The Portsmouth Area, January 1972</td>
<td>211</td>
</tr>
<tr>
<td>14.</td>
<td>Positive Features Of The Portsmouth Area, January 1972</td>
<td>211</td>
</tr>
<tr>
<td>15.</td>
<td>Economic Development Preference Ranking Of Goals And Objectives, Portsmouth-Scioto County, January 1972</td>
<td>214</td>
</tr>
<tr>
<td>16.</td>
<td>Ranking of Desirable Industries Scioto County</td>
<td>218</td>
</tr>
<tr>
<td>17.</td>
<td>The Test Industries For The O-RPM</td>
<td>220</td>
</tr>
<tr>
<td>18.</td>
<td>The Market Index</td>
<td>220</td>
</tr>
<tr>
<td>19.</td>
<td>Scioto County, Market Requirements and Potential</td>
<td>222</td>
</tr>
<tr>
<td>Table</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>20.</td>
<td>The Supplier Index</td>
<td>223</td>
</tr>
<tr>
<td>21.</td>
<td>Scioto County, Supplier Requirements and Potential</td>
<td>225</td>
</tr>
<tr>
<td>22.</td>
<td>The Transport Index</td>
<td>226</td>
</tr>
<tr>
<td>23.</td>
<td>Percent Distribution Of Commodities By Means Of Transport</td>
<td>226</td>
</tr>
<tr>
<td>24.</td>
<td>Scioto County Labor Requirements And Labor Force Potential</td>
<td>229</td>
</tr>
<tr>
<td>25.</td>
<td>The Regional Potential Index</td>
<td>231</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>1</td>
<td>A Regional Approach To Economic Development Policy Transfer</td>
<td>57</td>
</tr>
<tr>
<td>2</td>
<td>The Basic Dimensions Of Regional Economic Policy</td>
<td>77</td>
</tr>
<tr>
<td>3</td>
<td>A Simple Model Of Rational Behavior</td>
<td>111</td>
</tr>
<tr>
<td>4</td>
<td>A Conceptual Model For Community Economic Development</td>
<td>113</td>
</tr>
<tr>
<td>5</td>
<td>The Conceptual Scheme For Community Decision-Making</td>
<td>117</td>
</tr>
<tr>
<td>6</td>
<td>Regional Industrial Potential Model</td>
<td>138</td>
</tr>
<tr>
<td>7</td>
<td>Steps In The Four Corners Suitable Industries Identification Process</td>
<td>143</td>
</tr>
<tr>
<td>8</td>
<td>Composition Of The Regional Industrial Potential Index</td>
<td>146</td>
</tr>
<tr>
<td>9</td>
<td>Distribution By Distance Of Shipment Selected Four Digit Industries</td>
<td>156</td>
</tr>
<tr>
<td>10</td>
<td>The Appalachian Region Of The United States</td>
<td>179</td>
</tr>
<tr>
<td>11</td>
<td>The Appalachian Ohio Selective Development Program</td>
<td>199</td>
</tr>
<tr>
<td>12</td>
<td>Ohio Appalachian Region</td>
<td>204</td>
</tr>
</tbody>
</table>
CHAPTER I

GEOGRAPHY AND SPATIAL POLICY

THE PROBLEM STATEMENT

Background and Introduction

Geographers hold a time honored position among a group of social scientists who have studied the process of economic development. As a discipline, geography has contributed research which seeks to identify and explain the process which initiates and transmits economic change over space. The traditional geographic approach to a problem of this type was to use methods to describe and interpret observed spatial phenomena.

For geographers, the traditional approach to research leaned heavily to the empirical-inductive methods of scientific inquiry. While geographers continue to address problems in this manner, others in the social sciences, most notably economists, developed theories and research techniques that led to a more precise explanation of economic behavior. As important, economic theory was also able to provide the foundation for methods of analysis that could predict and forecast future economic conditions. Armed with theoretical and analytical power, economists were thrust into the forefront of formulating economic policy for both government and business. Economic policy, adopted by either the federal government or private business, has significantly influenced the economic development of the United States.

The changing economic landscape has always been of major scientific
interest to the geographer. In contrast to traditional methods of inquiry, geographers have, in recent years, turned to theoretical-deductive methods to explain why man arranges himself as he does in time and space. Theories of location for example have given considerable precision to research methods that analyze the spatial arrangement of industries and individuals. At present, geographers are continuing to press forward with research efforts that will add more to the knowledge of our spatial behavior. Now that geographers have acquired the power of spatial theories and have developed a number of modeling techniques, the discipline is in a position to contribute research that will lead to a better understanding of the spatial dimension in economic policy.

Before any commitment is made toward involvement in policy formulation, geographers should consider some of the problems that can be encountered in this effort. By definition the expression "public policy" refers to any program of action set forth by the people or by their appointed representative in pursuit of some economic or social objective. In other words, public economic policy is basically an agenda of actions that addresses and solves real world problems. Solutions for real world economic problems are controversial because a proposed course of action is motivated by the values of society as expressed through the political process. Each position has political support and controversies will arise, for example, between conservative and liberal approaches to the problem. In the political process, controversies are resolved by compromise; and economic policy adopted for implementation by the government is a consensus program that represents a convergence of philosophical positions. Along the way to a consensus economic policy, theories are modified, model constraints are relaxed, and strategies for
implementation are reshaped. The economist moves freely in this environ-
ment because he contributes to policy matters not only with theory and
analysis, but is also able to assume a philosophical position with regard
to strategies of implementation.¹

Geographers who commit their energies to spatial policy research
will find that they stand equal with other social scientists presently
involved in the formulation of public economic policy. That geographers
have not been more involved in economic policy matters up to now, may be
due in part to a resistance by the discipline to enter an area where
economists have held sway for so long. Once a monopolistic position
becomes a way of life, it is difficult to alter what has become normal.
In defense of the economics profession, it is also fair to say, that to
an economists, the work of geographers in the policy sciences is virtually
unknown.² It serves no useful purpose to enter into a discussion of why
geographers have not pursued policy related issues in their research.
At this point, all we hope to establish is a base for the argument that
economic policy carries significant spatial implications. If that argu-
ment is true, geographers should play a greater role in decision-making
processes that establish economic policy. The very complex political
and economic problems brought forth by modern technology and social
change in a closed political space calls for involvement by those who
have knowledge of space relations.³

At present, economic policy in the United States is based on
principles of national income theory which by definition are concerned
with the level of income and employment, the rate of economic growth,
and the general price level. In theory, the benefits of this policy
will move downward and through all sectors of the economy and eventually
trickle down to the individual. The mechanism by which this movement takes place is through the successful operation of the price and market system. The theory assumes that factors of production can move freely across space without restriction, markets are competitive, and that consumers possess perfect knowledge of price and alternative economic opportunities. Unfortunately, the real world does not behave this way. Cursory observation of the economic inequities in this country provides sufficient evidence that some locations and certain groups of people are better off than others. This weakness of national income theory is an indicator that a spatial component does exist in public economic policy.

Economic policy based on social and welfare criteria can also be used to correct the spatial misallocation of wealth. However, this approach calls for tampering with the free market and price mechanism, fundamental to a conservative interpretation of economics. The alternative is to initiate a liberal economic policy which calls for a greater role of the government to institute policies of income redistribution and public investments to eliminate social and economic problems. Recognition of a liberal economic policy immediately raises the question as to where these investments and strategies are to be implemented. Again, a spatial dimension surfaces, only in this case much stronger and more pervasive.

The resolution of the struggle between advocates of a national economic policy based on efficiency and growth criteria, and proponents of a national economic policy based on equity and welfare, is made possible by negotiation and compromise. Once national economic policy is determined, a series of decision-making events is triggered through the business, government, and household sectors of the economy.
It is the consensus economic policy statement that is most eagerly awaited by the corporation and large business enterprises of this country. The business community establishes company policy based on whether the federal government decides to stimulate or control the economy. Investments in new plant and equipment, introduction of new products, expenditures for research and development, and the expansion or contraction of the workforce are all decisions that are influenced to a great degree by federal economic policy. In like manner, the planning of state and local government budgets and programs are a function of decisions made by both the federal government and the business community. For example, revenues for state and local government are tied directly to the economic health of the business community. Finally, the individual member of a household who is faced with earning a living must decide whether to move to a location that has greater economic opportunity, a reflection of past business decisions, or accept less income and remain at his present job.

This sequence of events assumes that the lag time between one decision level and another is very short. However, the downward movement of a policy decision through the government and business hierarchy suffers from the same friction problems that the "trickle down" concept does in national income theory. As inequities surface in the distribution of wealth, so do some locations and certain groups receive decisions better than others. Yet, one of the basic postulates of economic theory is that one possess accurate information so that choice can be made as to price, opportunity, and alternative actions. Thus, the real test of policy success can be measured by how well the strategy is implemented at the furthest point in the decision hierarchy. There are many
obstacles and barriers that prevent the successful transfer of policy actions through the decision network. The prime interest in this study is the influence space has on the implementation of economic policy strategies at the local level.

The Problem Statement

The problem simply stated, is to determine if a spatial component exists in economic policy decisions, and propose a method for improving the spatial policy decision-making capabilities of local economic development groups. Interest is focused on the community because it is here where the impact of economic development decisions is most visible. The leadership of the community is often placed in a position of deciding on whether to stimulate or control the growth of their community. As a result, the leadership of the community may not have the technical expertise to make such a decision. Indeed, no action may be taken which in itself is a decision with a spatial impact. In fact, goals for community development may be in conflict with national and state goals. The existence of this conflict suggests that the implementation of national and state public policy could be made more successful by increasing the quality of the decision-making of the community. From another view, community input into the establishment of regional and national economic goals has also been noticeably absent. Disregard of local feedback into the establishment of economic policy may be one reason why government development programs have such a high failure rate. The citizens of a community may perceive certain types of industries or economic activity as desirable. However, the economic feasibility of that activity or industry may not be justified. The gap between community desirability and economic feasibility must converge to consensus before a strategy can
To implement.

In order to reach that goal, this dissertation has established four main objectives.

1) To identify the spatial dimensions of economic development policy decisions at the national, regional, and local levels.
2) To develop a conceptual model for community economic development.
3) To present a computer model that will determine the economic potential of a region.
4) To implement a local economic development group based on the framework of the conceptual model for community economic development.

The Design of the Study

As an overview, the study is composed of three major research topics. The first section is concerned with identifying economic development issues at the national, regional, and community levels. Interest is focused mainly on isolating the spatial dimension of economic policy decisions as they move downward from one position in the hierarchy to another. Chapter II opens with a discussion of the roles played by economists and geographers in the study of economic policy and development. To support the argument that economic policy contains significant spatial implications, the economic development models of Myrdal, Hirschman, and Friedmann are reviewed. Based on a discussion of the relative merits of each model and a review of other research efforts, seven paired economic development policy alternatives are described. In each set, paired on conservative or liberal extremes, the spatial dimensions of each alternative choice is brought to the surface. The paired alternatives allow the geographer to assume a spatial policy position at
either point of the political spectrum with a consensus position strictly a matter of compromise. Finally, the last part of the second chapter presents a discussion of the decision trace in economic development policy. We are interested mainly in identifying the lead decision-makers who initiate decisions in economic development and those who react and adjust. A conceptual model of a regional approach to economic development ends the chapter.

Economic development policy issues at the regional level are discussed in Chapter III. Attention is centered on the role of the federal government and its response to the regional economic development problem. Economic development strategy is presented in a time and space framework with the basic dimensions of an investment strategy found to be "what," "when," and "where". Distinction is drawn between a growth center strategy and growth pole theory. The chapter then moves to a review of the growth center strategy adopted by the state of Ohio in the Appalachian portion of the state.

The role of the community in the process of economic development is the substance of Chapter IV. A number of questions are raised as to the individual or group responsible for the economic health of the community. Inquiry into the role of leadership, decision behavior, and community development is made, and hopefully some insight is gained as to their influence on economic development. It was necessary to search the literature of other disciplines such as sociology, city planning, political science, and business organization to provide the background material for this chapter. Research efforts in geography, economics, and regional science are a bit thin on this subject. The final section of Chapter IV offers an organizational strategy for community economic
development and ends with a presentation of a conceptual model for community economic development.

Chapter V forms a second major section of research in this study and focuses on the evolution of a regional potential model. A number of models based on input/output techniques used as tools for policy formulation at the state level are discussed. Review of the Regional Industrial Allocation Model formed the content of the middle section of Chapter V. Both models are of the same generic design and are classified as the Phase One effort of economic potential modeling efforts. The last section of Chapter V presents a detailed mathematical description of the Ohio Regional Potential Model. The Ohio RPM contains several significant structural changes that warrant the effort to be classified as a Phase Two version.

The last three chapters of the study form the third major section of the study which deals with the field implementation of a development program. A description of the test region, the twenty-eight southern counties of Ohio, is found in Chapter VI. The field implementation of the program is described in Chapter VII. A number of industrial development strategies are tested in three federally designated growth centers in Appalachian Ohio. Emphasis centers on the use of the Ohio RPM as a community decision-making tool. The objective is to reach consensus on the issue of desirable and feasible industrial development. An assessment is made on whether this effort has increased the decision-making capabilities of the community. Suggested avenues of future research on the subject of spatial policy, regional potential models, decision-making, and community development are discussed in Chapter VIII.
NOTES TO CHAPTER I

1. Professor Brian J. L. Berry has contributed significantly to policy and development strategies for regional economic development in the United States. He has conducted research for several federal departments and agencies including the Department of Agriculture, Economic Development Administration (EDA) and the Appalachian Regional Commission (ARC). In his research, Professor Berry has taken a position as to the spatial policy and implementation strategies that should be pursued for regional economic development. See for example, Brian J. L. Berry, Strategies, Models and Economic Theories of Development in Rural Regions, Agricultural Economic Report No. 127 (Washington, D. C.: Economic Research Service; U. S. Department of Agriculture, 1967).

2. Professor Leslie J. King offered his observations on this subject. "So far geographers have not contributed a great deal of information that might be useful in overcoming the different conceptual difficulties and technical problems now hindering the development of effective regional planning policies." However, King is also quick to point out that geographers have had a good record in identifying the critical control variables influencing urban systems and "...probably as good as that of any other discipline, including economics,...". Leslie J. King, "Spatial Perspectives on Economic Change Among American Cities," in Geographical Perspectives and Urban Problems (Washington, D. C.: National Academy of Sciences, 1973), p. 72.

ECONOMIC DEVELOPMENT POLICY ISSUES:  
THE NATIONAL INTEREST

The Macro-Bias in Economic Policy of the United States

Economic development occurs in a well ordered matrix of both time and space. Economists concerned with the study of economic growth process have concentrated on the time element with space almost totally ignored. In fact, traditional economic theory and analysis viewed the world as a point and prompted Isard to describe that view, "a wonderland of no dimensions".

Nowhere in the science of economics is a spaceless world more prevalent than in the "new economics" of modern income and employment analysis which in essence provides the framework for macro-economic theory. By definition, macro-economic theory"...is concerned with forces in the contemporary developed economy which are crucial in determination of the level of income and employment, the rate of economic growth, and the general price level". At the aggregate level, the principles of modern national income analysis appear to work best if the "nation" under analysis is spaceless, frictionless, and abstract. It is not surprising, therefore, that the cure for a national economic disaster such as the Great Depression can be traced to John Maynard Keynes, the leading proponent of the "new economics".

According to Keynes, the economic dislocations of the United States during the 1930's was due to lack of effective demand rather than
to shortages of supply. In order to stimulate demand, Keynes proposed more effective use of the fiscal, monetary, and budget powers of the federal government. Deficit financing, unbalanced budgets, tax and credit incentives, and other "pump priming" policies were instituted in order to generate a full employment economy. According to macro-economic theory, it is assumed that the benefits of a full employment economy (i.e., high incomes) would "trickle down" in some reasonably equitable manner among income groups and across space. Statistical evidence, on the other hand, indicates that inequalities in income distribution and regional wealth have been, and remain a visible part of the economic landscape.4

**Economists, Geographers and Economic Policy**

Whether national income theory and the Keynesian approach can be given full credit for the economic recovery from the Great Depression or for influencing the rapid economic growth of the United States since World War II remains a question for individual interpretation. Clearly, most economists concerned with policy feel that the performance of the national economy is of greater importance than problems with the spatial distribution of wealth. Richardson observed that, "the optimum location of economic activities and population seemed rather trivial compared with the questions relating to the growth and stability of the national economy".5 Although this attitude has changed during the past two decades, economists, riding on the crest of the Keynesian revolution, continue to dominate the establishment of economic policy in the United States.

The exclusion of geographers from the inner circle of policy-makers for economic development through the past quarter century can be
readily explained by an examination of the professional literature during the period. The phenomenon of process of economic development was apparently of remarkable little interest to geographers.\textsuperscript{6} Ginsburg reviewed the geographic literature published in the United States during the decade of 1949-59 and could find only two dozen studies which focus on problems that properly fall within the general area of economic development analysis.\textsuperscript{7} The background to this lack of interest can be traced to geography's traditional preoccupation with the individuality and uniqueness of areas rather than their general similarities. Traditionalists in geography have been satisfied with the description of unique areal phenomena while the discipline of economics demanded explanation and generalizations through the search for laws and theory. McNee characterized the historic roles of the disciplines of descriptive geography and analytical economics as examples of the idiographic versus the nomothetic approach to the analysis of economic phenomenon.\textsuperscript{8}

Analytical economics is based on a foundation of laws and theory that is ideally suited for the construction of various types of models. A model, which is the operational mechanism for testing a theory, presents a simplified structuring of reality where significant features or relationships are described in a generalized form. Both economists and geographers would subscribe to this definition. However, field verification is an important prerequisite for models in the empirical sciences but there are those builders of mathematical models who feel that internal consistency and logic is more important than the "real world" fit. On the other hand, most geographical model builders would judge the value of a model almost entirely in terms of its reapplicability to the real world.\textsuperscript{9} It is important to emphasize that the power
of a model is directly related to the quality of the theoretical foundation. If certain significant structural relationships are omitted, either through ignorance or design, the explanatory or predictive power of the model is substantially reduced. A major defect of the early model building efforts by economists was the lack of concern with the spatial dimensions fundamental to economic growth. Therefore, if theory does not recognize space, it is virtually impossible for the model to even approximate a real world situation. Despite the temporal and aggregative bias of non-spatial economic models, economists continue to hold a premier position in determining economic policy because they possess acceptable economic theory for explaining the process of economic growth and development.

The Problem of Geographic Scale

In reality, the degree of reliability one will accept when employing macro-economic theory is not related to spatial dimensions of the area, but is more directly a function of openness and homogeneity of the economy under investigation. Theoretically, macro-economic theory is most applicable and reliable when the degree of internal homogeneity of those factors influencing economic growth and development within an areal unit such as, government policy, laws, language, financial institutions, education, and communication systems are uniform. In reality, such a state is impossible to create.

Yet, economists who persist in focusing their attention on the national political entity continue to agree that in analyzing economic growth and structure, nations are the natural units of comparison. In summary, since macro-economic theory is spaceless and the natural areal unit acceptable by economists is the nation, it is not surprising that
the majority of models on economic growth and development are highly aggregative and non-spatial.

**Economic Growth and Economic Development**

To this point, economic growth and development have been used interchangeably. For the purposes of this study, economic growth as a process is to be distinguished from economic development as a policy mechanism. The economist's view of economic growth can be defined as "the expansion of a nation's capability to produce the goods and services its people want". The geographer, in a similar fashion, describes economic growth as an increase in the total output or volume of economic activity over time. Development on the other hand implies "...structural changes closely associated with per capita income or level of welfare". Friedmann makes a strong case for a clear distinction between growth, "...which refers to expansion of the system in one or more dimensions without a change in structure...", and development, "...which refers to the unfolding of the creative possibilities inherent in society".

The position taken in this study is to consider economic development as a process which attempts to induce structural changes in an economy. The distinction between economic growth and economic development is critical to a full understanding of the objective of this study which is to formulate an economic development program. Economic development program formulation is based on policy measures which are made extremely difficult to execute because there is no theory of development that can be readily translated into a development program. In the area of economic policy, the gap between theory and practice is widest when considering development problems. In his overall assessment on the
state of development planning, Meier makes the following observation about economic development program formulation.

All the theories of development - classical, Marxian, Schumpeterian, neo-Keynesian - are simply ways of looking systematically at the general development process. They relate to the "economics about development" - the way one looks at development in the abstract and from the outside. But this is far different from the "economics for development" - the economics that the development practitioner needs in formulating and administering an actual program... the local practitioner of practical programming now realizes that a planning model - if it is to serve as a basis for assessing policy alternative - must be far more complex and comprehensive than any development theory.  

This study, therefore, is concerned more with the economics for development and less about the economics of growth and development.

The Economists Models of Economic Development

The most elaborate attempt to model the process of economic growth and development was attempted by Rostow and has attracted remarkable attention. Although his formulation is not universally accepted as a theory, he does develop a "stage" model that generalizes the dynamics of modern economic history. As a model, it is considered to be conceptual, historical, national in scale, and non-spatial. The stage model has considerable intuitive appeal and scarcely a text on economic development is written without reference to Rostow's terms of "take off," "the drive to maturity," and the "age of high mass consumption". Unfortunately, most scholars have dismissed the "stage" theory of economic development because it simply ignores the complexities of reality. Perhaps the most serious criticism leveled at the Rostow model is the failure to specify any mechanism which links the different stages. Therefore, the value of the Rostow model for explaining the process of economic growth and development is most likely to remain as a heuristic device. Attempts by geographers to transform Rostow's stage theory
into a spatial model of economic development would probably have a low rate of return on research investment.

The widely accepted traditional theories of national economic growth are usually credited to Harrod-Domar, Hicks, Solow, Kaldor, Duesenberry, and Arrow, to mention but a few who have contributed formal models of the economic growth process. Unfortunately, each model suffers from the "Anglo-Saxon bias" of treating space as a point and concentrating on the time element and dynamics. For the geographer who is concerned with attempting to explain the spatial dimensions of the economic development process, the models are of limited utility. However, economists as well label growth models as "...too abstract and limited by unrealistic assumptions and irrelevant to the concrete problems of developed as well as developing economies". Therefore, the transformation of existing non-spatial growth models to include the critical spatial variables may prove to be difficult. However, considering the structural weakness of non-spatial models, geographers may be further ahead pursuing new avenues of research.

As could be predicted, the long awaited shift by economists to a recognition of the spatial component in the economic development process was accomplished, but not without certain negative side effects. Economists who recognized the sub-national variations in economic development used theories, analytical procedures, and models which were designed for national or international conditions. The macro-bias still persisted. For example, regional income disparities became the first problem to interest the economist. However, spatial variations in income proved difficult to explain in terms of traditional models of international trade which were modified to treat interregional economic
relationships. It was logical to assume that if factors of production could move freely across regional boundaries, over time these movements would bring about an equalization of income among regions. Any differences between actual and expected observed at a point in time was reasoned to be only temporary due to a slight lag in equalization. It is the "slight lag" which has remained stubbornly persistent over time and has made trade models of little value for analyzing spatial variations in economic development.\(^{21}\)

The first significant break from the traditional approach used by economists in studying national economic development occurred in the 1950's when several new conceptual models distinctly spatial in character appeared in the literature. However, only those models central to the objectives of this study will be discussed in detail. First to be considered is Gunnar Myrdal's "cumulative causation" model.\(^{22}\) During approximately the same period, Albert Hirschman formulated a model of economic development built on his theory of unbalanced growth.\(^{23}\) Finally, the core periphery model of John Friedmann will be discussed.\(^{24}\)

The common thread that weaves through the models of Myrdal, Hirschman, and Friedmann is that economic progress did not appear everywhere at the same time and that once development had appeared, powerful forces would make for spatial concentration of economic activity at the initial starting points.\(^{25}\) This conceptual theme of spatial variation in the economic landscape lends powerful support to the opening line of this chapter which states that economic development occurs in a well ordered matrix of time and space. More detailed discussion of each model will emphasize those features that influenced the economic development strategies proposed in a subsequent chapter of this study.
The Myrdal Model of Circular and Cumulative Causation

One of the fundamental arguments made by Myrdal in his attempts to explain spatial variations in the economic landscape is that the notion of stable equilibrium is normally a false analogy to choose when constructing a theory to explain changes in a social system. In a free market economy Myrdal argues that,

...in the normal case a change does not call forth countervailing changes but, instead, supporting changes, which move the system in the same direction as the first change but much further. Because of such circular causation, a social process tends to become cumulative and often to gather speed at an accelerating rate.26

This observation meant that equalization or trade models, which assume free mobility of the factors of production, are of little use in explaining economic spatial variations. Furthermore, the principle of circular and cumulative causation also called attention to the concept of "initial advantage" which is an important factor in development of certain types of regions and economies.27 Again, it is important to note that the basic cause of regional economic disparities is due to the play of the forces in the market that tends to increase, rather than decrease, the inequalities between regions.28 Therefore, spatial concentrations and not static equilibrium are the normal course of events in a free economy.

Expanding on the process of cumulative causation, Myrdal goes on to show how differential regional growth is transmitted through space. Once a region establishes initial advantage, factors flow inward to support the growth of that area. In effect, such positive spatial flows create a "backwash effect" upon the remaining sections of the country.
Myrdal also makes a strong case for considering non-economic factors in the economic development process, "...as they are among the main vehicles for the circular causation in the cumulative processes of economic change, this represents one of the principal shortcomings of economic theory". Therefore, "backwash effects" include both economic and non-economic factors which is a major reason why the Myrdal model is difficult to operationalize. Over time, the backwash effect tends to increase the urbanization process in selected areas and cause economic distress in the rural hinterlands - a sequence of events not unlike that experienced by several regions in the United States during the 20th century.

Operating contrary to the forces of spatial concentration is a centrifugal force which Myrdal terms the "spread effect". It is assumed that the region surrounding a dynamic nodal center will gain from the expanding markets for their goods, mainly agricultural and mineral products. However, beneficial spread effects will only occur if the demand for goods in the nodal center can be supplied economically by the surrounding region. If the agriculture goods and raw materials produced in the surrounding hinterland are marginal in quality or costly to ship, then the hoped for benefits from spread effects will not be realized.

Finally, the role of the state in the cumulative and circular causation process is considered. A basic assumption of the Myrdal model is that government non-intervention in the economic development process will be reflected in the prevailing price system, "...they (prices) are not the outcome only of the forces in the market; they are in a sense 'political prices' depending also on the regulatory activity of the
state of quasi-public and private organizations and of private business." By recognizing the power of market forces and arguing for the economic development process to occur under the guidance of the price system, Myrdal distinguishes his approach to development economics by contributing an interregional income inequality model that operates under laissez faire conditions.

In summary, the concepts of initial advantage, backwash and spread effects and government non-intervention in the economic development process, influenced the formulation of the economic development program proposed in this study. In addition, the pioneering effort by Myrdal into the spatial dimensions of the economic development process provides a bridge and a link to the Hirschman model.

The Hirschman Model of Unbalanced Growth

Disagreement and dissatisfaction with doctrines and theories in economic development prevalent in the 1950's motivated Hirschman to pursue a radically different course to development planning. Existing theories, reasoned Hirschman, were not very helpful to the decision-maker in an underdeveloped country who is faced with the formulation of a strategy for development planning, such as the assigning of sector or area priorities or the kind of industrialization effort to be pursued. He attempted to evolve some new ways of thinking about these problems. However, what was thought by Hirschman to be the pursuit of an independent course in development economics, turned out to be remarkably similar to the work of Gunnar Myrdal.

To most economists, the distinguishing feature and most discussed items of the Hirschman thesis is his theory of unbalanced growth as a strategy for economic development and the concept of industry
linkages. Hansen on the other hand, recognizes Hirschman for the first systematic treatment of growth centers in the American literature. With regard to this dissertation, Hirschman's influence is most noticeable in the areas of decision-making, motivation, industry linkages by input/output analysis, regional transmission of growth, and the role of government policy in regional economic development. Perhaps the most pervasive influence of Hirschman on this author is his statement, "...our foray into the theory of development has thus left us with a heightened consciousness of the importance of a theory of development strategy". A subtle theme underlaying this study is to explore the possible existence of a theory for establishing economic development strategy.

Since the economist brands Hirschman as the leading proponent of the unbalanced growth thesis, it is fitting that a brief overview of this concept be presented. In addition, many state development agencies pursue a balanced growth economic policy. It was the experience of finding himself so much at variance with the balanced growth theorists that prompted Hirschman to react with his unbalanced growth theory. In short, the balanced growth theory stresses the need for the different parts of a developing economy to remain in step to avoid supply difficulties. The balanced growth proponents argue for a series of simultaneous programmed projects to include new industries which will buy from and sell to each other. The theory is associated closely with Rosenstein-Rodan's "theory of the big push". Hirschman states emphatically that balanced growth fails as a theory of development because to be applied it "...requires huge amounts of precisely those abilities (entrepreneurial and managerial) which we have identified as likely to be in
very limited supply in underdeveloped countries".  

In explaining his theory of unbalanced growth, Hirschman uses terms such as disequilibrium, uneven advances, structural stress and sectoral imbalance to describe the normal sequence of events in the development process. By capitalizing on the natural features of unbalanced growth, the basis for a development strategy evolves, Hirschman argues,

The advantage of this seesaw advance over "balanced growth" where every activity expands perfectly in step with every other, is that it leaves considerable scope to induced investment decisions and therefore economizes our principal scarce resource, namely genuine decision-making.

In line with the theory of unbalanced growth, Hirschman believes that development strategies should choose selected sectors for investments and shy away from any consideration of widely dispersed projects. The key sectors singled out for consideration would be determined by measuring the backward and forward linkage effects bases on input/output relationships. According to Hirschman,

...development policy must attempt to enlist these well known backward and forward effects; but it can do so only if there is some knowledge as to how different economic activities 'score' with respect to these effects. Ordinarily economists have been content with general references to the advantages of external economies, complementarities, cumulative causation, etc. But no systematic effort has been made to describe how the development path ought to be modified so as to maximize these advantages even though the existence of input/output statistics supply us with a few tools for an analysis of this kind.

One of the objectives of this study is to present a model built on an input/output framework that has the capability to compute a "score" for several chosen development paths.

In support of his theory of unbalanced growth, Hirschman takes the position that during the course of economic development, inter-
national and interregional inequalities or imbalances are an inevitable condition of the economic growth process. The inequalities in growth can be observed on the surface as regional centers of economic growth. With support from the work of the French economist, Perroux, the regional centers of economic growth are termed "growth points" or "growth poles". Therefore, both Hirschman and Perroux have been cast as supporters of the unbalanced growth school of thought. However, while the existence of a growth pole reveals unbalanced growth at work, from an equity point of view, it may be unacceptable. For example, if all the growth points fall into the same growth space, the transmission of growth to the rest of the region may be weak.

Hirschman offers an interesting explanation for the spatial concentration of economic growth around a growth pole. Investors, operating on the principle that "nothing succeeds like success", spend all their time looking for economic opportunities in a spatial setting most familiar to them and fail to recognize possibilities elsewhere. According to Hirschman "...what appears to happen is that the external economies due to the poles, though real, are consistently over-estimated by the economic operators". In other words, investors perceive the growth pole (i.e. a metropolitan area) to offer a satisfactory rate of return and provide security on their investment decision. Economic opportunities for investment on the periphery are perceived to have possible high rates of return but with an attendant high risk factor due to poor knowledge and information. This condition suggests that more effective and profitable decision-making by the investor can be achieved if only he could be made aware of economic opportunities in the hinterland. Therefore, one essential factor of a development strategy would
be the transmission of investment opportunity information from the periphery back to the growth pole. Another objective of this dissertation is to build a model that determines economic potential of a region. The economic potential of locations on the periphery can be evaluated, and that information can be used by economic operators at the pole to evaluate several possible investment opportunities. In this manner, resistance by investors in unknown locations can be reduced, and the beneficial spread effects of development can be made to reach more locations on the periphery.

Despite the space preference of the economic operator, once a growth pole is established certain forces are set into motion that pulse through the spatial network. Using a hypothetical two region country where the north is described as progressive and the south as a lagging economy, Hirschman outlines the spatial forces in operation. Beneficial or favorable effects consist of the "trickling down" of northern progress in the form of purchases and investments in the south. Working against the beneficial "trickling down" effect is the unfavorable force of "polarization", which tends to depress the south because of the initial advantage of the north. For example, the south will suffer from selective out migration and over concentration in basic raw material production which flows to the north. Note that Hirschman's "polarization" and "trickling down" effects correspond exactly to Myrdal's "backwash" and "spread" effects. However, the similarities end at this point and the two men diverge in their emphasis and conclusion on the course of economic development theory and policy. 42

In contrast to Myrdal, Hirschman believes that over time, trickling down forces will overcome polarization effects. Economic pressures
surface in the north - diseconomies of urbanization, shrinking markets, obsolete plant and equipment, etc.; while the south will be facing new economic opportunity - growing markets, rising incomes, etc. Therefore, from a spatial point of view, Hirschman sees a convergence of regional incomes as development progresses over time. If, however, economic analysis indicates that market forces are still favoring polarization over the trickling down effect, it may be necessary to set in motion deliberate economic policy to correct the situation. For Hirschman, deliberate economic policy is expressed through the regional distribution and allocation of public investment in social overhead capital (SOC) projects. Investment strategies will be discussed in more detail in an upcoming section on economic policy and industrial development. Before proceeding to policy implications, it is necessary to discuss the Friedman core-periphery model.

The Core-Periphery Theory

At a national scale, Perloff and Wingo isolate initial and cumulative advantage as fundamental factors that generate a center-periphery relationship. In this manner, the center-periphery concept is used to explain the evolution of the Middle Atlantic and Great Lakes regional economies of the United States. At the sub-national level, the core-periphery relationship has also been used to explain the economic development of urban complexes. Schultz argues that economic development occurs at a location which is primarily urban and industrial because it is at that point in space where factors are employed at their highest and best use, and thus have the highest rate of return. In the research efforts described, the analysis is conducted within the guidelines and principles of a free market system where change is influenced only
by the price mechanism. To summarize, the authors present an analysis derived from empirical observation that economic growth and development is concentrated in relatively few points in space. No attempt was made to formalize their hypotheses into a theory that could be tested by a generalized model.

Against this background, John Friedmann took the core-periphery concept to a higher plane as he attempted to model the structural relationships for an economy that is in transition from a colonial to an industrial society based on experiences gathered in a study of the Venezuelan economy. Since this initial effort, the core-periphery analysis has been refined to a level where the formulation has now been distinguished as *The General Theory of Polarized Development*. The most important feature of Friedmann's efforts is his attempt to bring about a better understanding of the process by which core regions initiate and then consolidate their dominance over peripheral regions. Whether global, national, or regional, Friedmann observes that "...the center-periphery hypothesis appears on all relevant scales of explanation simultaneously as cause and as effect of economic transformation". Using the core-periphery concept, Friedmann concludes that at least three implicit structural relations appear to govern the behavior of the "two regions". First, there is a flow of the principal factors of production from the periphery to the center, suggesting that marginal productivities at the core are higher than investment opportunities on the fringe. Second, interregional trade balance is tipped toward the center because raw materials are processed into higher value added goods generating higher incomes at the core. Third, political pressure applied by citizens located on the periphery will force bureaucrats in the center to consider
a national economic policy of equity in the regional distribution of national income. However, the political strength of the periphery could lead to resource misallocations. In Friedmann's words, "...an unprincipled redistribution of resources in favor of the periphery would significantly retard progress at the center and, consequently, for the country as a whole". A red flag is raised by Friedmann urging caution and discipline in the formulation of a national policy that does not sacrifice national efficiency for the sake of regional equity.

In his Venezuelan study, Friedmann takes a strong position that "...the solution of specifically regional problems is an integral part of a general policy for the development of all regions that is pointed toward the attainment of national goals for the spatial organization of the economy". In other words, Friedmann sees a strong link between spatial policy and the implementation of national growth objectives. This would suggest that the apparent barriers between equity and welfare at the regional level, and efficiency at the national level, need not be a deterrent in formulating economic policy. For example, in a post-industrial society such as the United States, controversy rages between proponents of interregional equity and those who advocate national efficiency and economic growth. This heated debate could be quelled if both camps would pursue an economic growth policy where efficiency and economic growth is the sum of all regional investment and development plans. It is an objective of this dissertation to develop a local economic development program that is in harmony with national development goals and operates with the principles of a free market system.

Whether the conflict between the core and periphery be caused by social, political or economic tensions, it is necessary to reduce and
resolve the tensions in order to achieve national goals and objectives. Therefore, there is a need for a course of action to be followed which finds its expression in the form of national growth policy. It is within the context of a national growth policy that goals for spatial organization must be considered, and therefore, regional development objectives should be consistent with national aspirations. The next section will discuss the alternate choices that face the policymaker interested in addressing the regional development problem.

National Economic Policy Alternatives

In order to create development policy, the goals and objectives set for economic development must take into account the current phase in the evolution of a national economic system. Development policy established for colonial economies contrasts sharply with policy designed for guiding industrial or post-industrial societies. No matter the phase or level of economic development, policymakers face several sets of polarized policy alternatives. Some examples of paired alternatives are presented in Table 1.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OPTION A ECONOMIC-CONSERVATIVE</th>
<th>OPTION B SOCIAL-LIBERAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. National Product</td>
<td>Maximum Growth</td>
<td>Welfare</td>
</tr>
<tr>
<td>2. Resource Development</td>
<td>Efficiency</td>
<td>Equity</td>
</tr>
<tr>
<td>3. Public Investment</td>
<td>Unbalanced</td>
<td>Balanced</td>
</tr>
<tr>
<td>4. Urban Development</td>
<td>Market Forces</td>
<td>Planned</td>
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</tbody>
</table>
Examination of Table 1 indicates that support for achieving a maximum rate in the growth of national product would come from those who lean toward a conservative economic philosophy. The "hard line" school would more than likely support a policy of maximum growth of national product, the efficient use of national resources, the highest rate of return on public investments, and an urban system that evolved according to market forces. Proponents of this conservative economic policy favor an economic system based on non-interference in the free market principle and the price system.

Advocates of an economic development policy, addressing primarily social and welfare objectives would, on the other hand, support economic development policy that would maximize net social product in reaching national income goals. In addition, the social welfare school would favor income redistribution, public investments to eliminate social problems, and an urban system that is planned.

The economic policy alternatives presented in Table 1 have significant spatial implications when considered from either the conservative or liberal philosophical viewpoints. Those who adopt a conservative economic policy (Column A, Table 1) create an economy where resources have moved to those points in space of "highest and best use". In contrast, those who favor welfare economic policy (Column B, Table 1) observe inequities in the conservative spatial distribution of wealth and counter with policy based on equity and welfare criteria. Thus, the welfare-economic policy objectives in Column B have been closely associated with the regional development school. Those interested in addressing the problem of economic development from the regional point of view find that their policy position is philosophically to the left of
the conservatives and tend to propose an opposite alternative to address the same development issue. Although the policy reaction of the regionalist is usually opposite, it is not necessarily equal in power to the economic conservative. Nevertheless, Table 1 indicates that two very distinct policy positions are possible when economic policy is considered.

No matter the economic policy objectives to be considered, certain economic development interpretations are possible for any type of economic policy decision. For example, the position of the dollar in the international money market has an effect on the decision-making of firms to locate production facilities. Inflation may cause the federal government to cut back on public works programs, thus curtailing investments in projects affecting industrial development. However, if only those objectives that have direct spatial implications are considered, it is possible to isolate the economic development component of economic policy. As a step in that direction, seven major policy objectives have been identified as key factors influencing the spatial distribution of economic development. The seven development objectives are presented in Table 2.

Alternatives for National Product

It is recognized that there cannot be any satisfactory solution to the regional development problem except in the context of a prosperous and full employment economy. In a recessionary phase of the business cycle, business is not expanding and any new investment will be in the form of cost cutting improvements in existing plants. Plants in marginal locations may even be closed down. Thus, there is strong agreement that the regional development issue can be addressed best when the
TABLE 2

OBJECTIVES FOR ECONOMIC DEVELOPMENT

<table>
<thead>
<tr>
<th>POLICY OBJECTIVE</th>
<th>A. NATIONAL</th>
<th>B. REGIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Product</td>
<td>High Performance</td>
<td>Redistribution</td>
</tr>
<tr>
<td>Resource Development</td>
<td>Efficiency</td>
<td>Equity</td>
</tr>
<tr>
<td>Public Investments</td>
<td>Highest Return</td>
<td>Worst First</td>
</tr>
<tr>
<td>Inter-Urban System</td>
<td>Concentrated</td>
<td>Dispersed</td>
</tr>
<tr>
<td>Population Distribution</td>
<td>Migration</td>
<td>Locational Choice</td>
</tr>
<tr>
<td>Intra-Urban Land Use</td>
<td>Highest Use</td>
<td>Control</td>
</tr>
<tr>
<td>Private Investments</td>
<td>Profit Maximization</td>
<td>Profit Satisfaction</td>
</tr>
</tbody>
</table>

- national economy is healthy and expanding.\(^{53}\) Therefore, the regionalist would more than likely accept the role of the national policymaker as one who guides the economy to higher levels of performance while controlling such critical variables as unemployment, inflation, balance of payments and money supply. In addition, the national policymaker is concerned with real income growth and improving the distribution of income among income groups. If the economy performs well, then the benefits of this growth will "trickle down" to the regional level, and finally to that point in space occupied by an individual household.

It is the failure of the real world to conform to theory that has given regionalists substance for argument. Under ceteris paribus conditions, assuming perfect information, and unhindered movements of labor and capital, an equilibrium condition is reached after a period of initial disturbance. The equilibrium model and the trickle down theory suggest some form of interregional convergence of wealth is at work. However, historical evidence does not support the theory. Friedmann feels that the equilibrium model is bankrupt.\(^{54}\) Therefore, the regionalist...
would support economic policy that emphasizes performance goals but would not accept the process of partial equilibrium as a solution for the misallocation of national wealth.

**Alternative for Resource Development - Efficiency or Equity**

Another major issue in the controversy surrounding regional economic development policy is based on equity arguments. National policymakers favor an efficient use of national resources in contrast to the regional development school which favors a more equitable spatial development of national resources. In a capitalistic society, the mechanism for setting priorities for the development of national resources is accomplished through the market and price system. The location a businessman will choose to operate his firm is guided in large measure by the principle of profit maximization. Labor, on the other hand, acting in its own best interests, will move to those locations where wages are highest. Thus, factors have moved to that point in space of "highest and best use". In this form, efficiency is achieved according to the nineteenth century ideal of the unfettered market or laissez faire as a principle of economic organization. Although the laissez faire argument has been subject to modification and change over time, the market mechanism as an instrument of development remains paramount in establishing economic policy.55

Advocates of interregional equity, on the other hand, believe that the federal government should promote economic development in all the regions of a country.56 The position of the regionalist is based largely on social and welfare criteria and argue that it is the duty of government to provide economic opportunity in a place of a person's choice.57 In reference to Table 2, supporters of regional development
policy, their arguments resting on welfare and social criteria, would choose equity over efficiency as an objective in the spatial development of national resources.

While proponents of national economic policy based on efficiency criteria are supported by a body of theory, the regionalist on the other hand finds himself arguing from a much weaker theoretical base. Consequently, the champion of the regionalists cause is the practitioner who is much more interested and responsive to the demands of a vocal constituency. Since goals of equity and welfare are unlikely to be met by the market mechanism in the short run, regional policy has been expressed best through government programs. Politicians are quick to capitalize on social unrest and economic misery and promise to seek a remedy for the inequities if elected.

Once seated either in the executive or legislative branches of government, coalitions of voting power produce programs that produce immediate benefits to those affected in a region. The most immediate and powerful tool available to the elected public official is the appropriation of monies for public works projects. Therefore, influence and control over the expenditure of public dollars for government programs is a very powerful weapon for advocates of either efficiency or regional equity.

Alternative for Public Investment - Highest Return or Worst First

Historically, government expenditures for public works projects in the United States have been allocated to those programs designed to accelerate the economic development of the country. Operating within the information and knowledge available at that time, the expenditures were made according to the principle of highest return on public invest-
ments. Thus, public investment in the Erie Barge Canal was accepted by the people as a wise use of public funds. Construction of the National Road was another acceptable expenditure of taxpayer dollars. Throughout the economic development history of the United States, public works investments have been made according to the principle of highest return on the dollars of public money invested.

Although regional misallocation of wealth has always been part of the economic landscape in the United States, the "regional problem" did not surface for academic discussion until the 1950's. Politically, the regional problem became a national issue in the Presidential election of 1960. Several pieces of legislation with a distinct spatial overtone came into existence as a result. Congress passed four major items of legislation between 1961 and 1965. The Area Redevelopment Act (ARA) was passed in 1961 to alleviate conditions of substantial unemployment. In 1962, Congress passed the Public Works Acceleration Act to supplement the public works component of ARA. In 1965, two pieces of legislation with far reaching impact on regional development policy in the United States were passed by Congress. They were, the Public Works and Economic Development Act (EDA), and the Appalachian Regional Development Act (ARDA). However, the investment strategies employed by the two acts are different and contrary to each other.

The ARDA invests monies according to efficiency criteria. EDA, on the other hand, followed an investment policy based on a principle of worst first. The confrontation between highest return and worst first policy is a classic example of the clash between the principles of efficiency and equity. During the 1960's, economic development strategy in the United States polarized between these two investment strategies.
However, as time progressed, neither efficiency or equity proved to be acceptable, and a political solution was reached somewhere in the center of the spectrum where consensus was possible. Although the investment strategies advocated by ARDA and EDA have had only a short life cycle, the investments made had an effect on the shape of the economic landscape. However, for now, it is important only to realize that the federal government reached an economic development strategy through political compromise. Had the policies been pursued with more vigor and funded at higher levels, the decision facing policymakers would have been whether to follow a strategy of advocating dispersed or concentrated urban development.

Alternatives for Urbanization—Concentrated or Dispersed

As presented in Table 2, the urbanization policy issue appears to be a choice between few densely populated areas and many equally spaced population centers. More precisely, the issue is defined as one of choosing between an urban system that develops and evolves according to laissez faire economics, or one that is planned according to welfare and social criteria. The ideal urban system that would develop under free market and price principles could be explained by the spatial theories of Lösch or Christaller. Nourse employs the theory of the firm to explain urban development. "Thus, the producer can be viewed as a rational man seeking out the most profitable location by economic analysis of alternative sites, prices and output, assuming that he will choose a site where he will minimize costs and maximize profits." Using the models of either geographers or economists, the abstract and theoretical world is a far cry from reality. As an example, the "real world" entrepreneur, does not act rationally, is plagued by uncer-
tainties, and has certain psychological biases. Spatial models assume that the size and location of cities are dependent on their functions, and a hierarchy of cities results. Even here, differences occur because of the uneven distribution of resources, uncertainties, and psychological preferences. Thus, a group of cities and central places in a region is in fact a system of systems of cities.66

In reality, the issue to be resolved in terms of economic development strategy is whether an alternative form of urbanization is possible that operates within free market guidelines, yet addresses itself to metropolitan overcrowding and the regional problem. Dissatisfaction with the present development or urban systems has caused many urban scholars to delve more deeply into the role of cities in economic development. Hansen has probed the issue of diseconomies of large-city development and has concluded "...they are too big in terms of alternatives available to individuals and firms in intermediate size cities".67 Gabler has studied the delivery of public services in urban areas and reached the conclusion that large cities continue to experience diseconomies of scale in providing urban public services.68 One of the few scholars voicing optimism for resurgence of the big city is Alexander Ganz. However, Ganz suggests that the big city may need some financial assistance from big government.

Federal policy should be explicitly designed to favor the large cities and their ghetto through expenditure, grant, loan guarantee and regulating problems, in accordance with a measure of their need and their potential contribution to national growth and welfare.69

Another urban optimist is Wilbur Thompson who assumes that under spatial wage equilibrium, managers will prefer urban amenities and decide to locate in large cities.70 Despite the research evidence produced by
Ganz and Thompson, there are a substantial number of urban scholars who are concerned about the future viability of big cities. Rodwin calls for a better understanding of the urban growth process as a step toward solving the urban problems. "If somehow we could determine the best locations for urban growth, and could steer economic activities and families into those areas away from less desirable ones, we would have powerful weapons for changing our environment." In other words, Rodwin takes the position that research into the causal factors of urbanization would allow for input into the establishment of national urban policy. In the United States we lack not only an urban policy, but government programs tend to reinforce or sustain metropolitanization. Thus, government supported, quasi-laissez faire urban economics, has produced a form of concentrated urban system and associated problems. Is the alternative to concentration a dispersed urban system?

Policy implication of a dispersed urban system has not been a major subject of inquiry for urban scholars. However, the issue of decentralization has sparked some research interest as to the minimum size requirements necessary for urban viability. Berry found that a population of 250,000 appears to have the necessary conditions for self-sustaining growth. The 250,000 critical minimum size is identical to the Thompson urban size ratchet. Based on experience in Australia, Neutze found that many firms will maximize their profits in locations with populations between 200,000 to 1,000,000. Hirsch found that the greatest urban scale economies were realized in cities of 50,000 to 100,000 population. Robinson found the successful minimum size point to be around 100,000.

The list could include several more contributions to the minimum
size debate, but the available evidence strongly points to the 100,000 level as the minimum size requirement for viable growth point in an urban system. With this evidence as background, how realistic is economic development policy which calls for redistribution of wealth through a more dispersed urban network? How effective will the spread effects of investments be in a region where urban size requirements do not meet the minimum level? The issue of alternative urbanization as a choice between a concentrated or dispersed system is difficult in a free market oriented society. The goal appears to be the establishment of a consensus urban policy that recognizes the inviability of small towns as growth centers and the diseconomies of large urban areas for urban growth.

A leading proponent of a decentralized urban policy is Hansen. He has devoted considerable research in exploring the capabilities of intermediate-size cities to perform as growth centers. Directing economic and population growth to the target cities, argues Hansen, can only be accomplished through a national regional development policy. Since the target cities are by definition economically healthy (growth centers) Hansen calls for more emphasis on programs that will appeal to growing industries and less emphasis on incentives and subsidies for marginal and slow growing industries. Growing industries matched with growth centers provide the appeal for immediate acceptance of this type of development strategy. In addition, more effort should be made to "...equipping relatively sophisticated industrial sites and less to building water and sewer lines, which may be sorely needed in rural areas but which should not be a primary concern of an agency whose purpose is to stimulate or accelerate growth". 77

Coupled with some well placed infrastructure investments, espe-
cially human resource development programs, Hansen feels this strategy could produce more employment opportunities in the target growth center because of the external economies present. The intermediate size city strategy is offered as a viable consensus policy alternative for an urban system policy compared to the concentrated or dispersed choices presented in Table 2.

The subject of "new towns" as an urban place alternative must be mentioned. First, a clear distinction between a new town and a growth center must be kept in mind. A new town is a totally new urban center based on the principle of total systems design. Growth centers and associated development strategies are based on urban centers already in place. Although the "new towns" urban design has great intuitive appeal, the concept has been fully implemented in only two areas in the United States - Columbia, Maryland and Reston, Virginia. Since they are located in close proximity to large metropolitan areas, they perform a function of providing residential choice for the local population. In terms of large scale impact on economic development strategy in the United States, the new town concept must be given a higher priority in both public and private sector investment plans if it is to become a feasible alternative urban system design.  

Alternative for Population Distribution-Migration or Locational Choice

The issue here is whether people should move to employment opportunities, or jobs move to people. One can recognize the already discussed issue of whether government policy should be directed toward place or people prosperity. In the following discussion on population distribution, emphasis will be placed on the people mobility factor, in contrast to the discussion on public investments, (Objective 3, Table 2)
which stressed the strategy of selecting locations for investments. Nevertheless, a certain amount of overlap with other development objectives will be apparent.

Research of the scholarly geographic and economic journals reveals no academic support for a "place prosperity" development strategy. As mentioned previously, moving jobs to people and providing opportunity for persons in places of their choice is mainly a political strategy. In 1967, a presidential advisory committee endorsed a policy to give residents of rural America equal opportunity with all other citizens in the United States. "This must include access to jobs...without regard to race, religion or place of residence." In response, Bowman quickly assumed this recommendation as a "...prescription for national disaster."

It is impossible to dismiss the place prosperity option as an alternative for economic development strategy due to its tremendous political appeal, despite its lack of theoretical foundation. In one form or another, locational choice will always surface as an alternative when regional development policy is discussed and cannot be lightly dismissed. From the viewpoint of the geographer and the economist, place prosperity is contrary to the theoretical design of models which assume mobility of labor and rational reasoning.

In pure economic terms, mobility and the freedom to migrate are a cornerstone principle of a free market system. Migration is the solution to regional inequalities and will bring about spatial equilibrium faster than any other mechanism if all other factors are equally mobile and information is available for determining opportunity costs. Again, the real world does not behave according to the principles of theory.
Pockets of unemployment dot the landscape of the United States while employment opportunities in other areas go unfilled. The unemployed who migrate are usually young, well-educated, and skilled. Those who remain are the old and less educated. The highly mobile migrant has the reason to use information concerning opportunities in arriving at a decision to seek employment elsewhere. However, the groups most likely to suffer from unemployment are also the least mobile, and as a result become the target of a political "place prosperity" strategy. Thus, out-migration is a highly selective process running in favor of the intelligent, and against the poorly trained and educated. Yet, selective out-migration continues to occur, resulting in places of substantial low skilled labor surplus pools for which little demand exists.81

One possible solution to the problem of persistent unemployment is to upgrade the skill level of the resident population through a strategy of human resource development. Support for this type of economic development strategy is strong in both academic and political circles. In fact, Meier feels that investment in human capital has replaced the accumulation of capital as a central objective of economic development.82 Hansen wondered why it took so long to recognize the importance of the quality of human capital as a factor in economic development.83 Investment in human resource projects produces some positive spill-over benefits for a depressed community. As the skill and education levels rise, the community becomes more attractive for business investment. At the same time, improved placement services and job information helps people move to jobs. This "double action" impact is one of the great virtues of a human resource development strategy.84 Unfortunately, the human resource strategy does have a drawback. If a community remains unattrac-
tive for private investment despite expenditures for human resource programs, migration may still occur and the community is no better off, and may be worse off in the short run.

From this discussion on migration, it is clear that there are two alternatives for population movement, either to migrate or to stay spatially fixed. In a free market system, it is just as difficult to convince people to leave lagging areas as it is to compel industry to move to areas of persistent unemployment. "But it is a question of giving people viable alternatives...and therefore of giving them the possibility of genuine choice."³⁵

**Alternatives for Intra-Urban Development-Highest and Best Use Control**

In the previous section, the discussion centered on the absence of a national urban land policy, the confusion government programs have on the distribution and mobility of people, and the size and density of urban areas. Despite the lack of direction from the federal government, local governments have made attempts to control land use through the power of zoning and land use regulations. However, the absence of a national land use policy places tremendous pressures on communities, especially those that are growing rapidly. A well designed set of zoning ordinances as the base for urban land policy requires knowledge of the mechanics of the urban land market. A number of forces, internal as well as external, influence the operation of the urban land market. Thus, the allocation of functions and people over urban space calls for a basic understanding as to how the land market functions under normal conditions, and how it should operate under ideal conditions. Knowledge of the empirical and abstract operation of the urban land market allows local government officials the opportunity to establish rational land
use policy. In a situation where the federal government provides little
guidance and direction for land use policy, it is even more important
for local officials to strengthen their technical decision-making capa-
bilities.\(^86\)

A number of theories on the operation of the urban land market
have been developed during the past two decades. The Alonso and Wingo
models are particularly well suited to provide the urban policymaker
with a technical explanation of "highest and best use" under ideal con-
ditions.\(^87\) As outlined in Table 2, two policy alternatives are possible
for the development of intra-urban space, according to market forces.
(Column A) or controlled (Column B). According to the Alonso model, for
example, intra-urban location is determined by the bid rent price offered
for each location, with the highest bid capturing each location. Each
bid is related to a most preferred alternative through the use of bid
rent curves. Most important, "...the locations are determined by
assigning to each successive user of land the location available nearest
the center of the city after the assignment of land quantities to the
higher and more central bidders".\(^88\) The Alonso theory of the urban land
market is a static economic model assuming perfect competition and ra-
tional economic men making rational economic decisions. In this manner,
land use is determined under ideal economic conditions allowing for one
method of determining "highest and best use".

In reality, the urban land market does not behave precisely in
this manner. Market forces, the prime generator of change, are no more
perfectly competitive in urban space than they are at the national level.
Because of imperfections such as the presence of monopolists, Campbell
and Burkhead argue that, "...the market rather obviously fails to yield
anything resembling the highest and best use of land". In other words, local government officials attempting to establish rules and guidelines for guiding urban growth react imperfectly to forces over which they have little understanding and knowledge. Campbell and Burkhead isolate three major forces that influence urban policy; the private market, metropolitan government, and the political structure. The authors pose an interesting dilemma, "...if the private market and increased productivity do not automatically contribute to the solution of urban ills, it follows that intervention is necessary and wise. But to intervene in a process requires certain capabilities". Therefore, this evidence suggests even under conditions where the urban policymaker attempts to manage the development of his area of jurisdiction, land use control decisions are made based on inadequate knowledge and poor information. Thus, urban policy is established not only by incapable and poorly informed technicians, but in addition, is forced to react and adjust to decisions made at higher levels in the decision hierarchy.

The ability to guide and control the use of urban space is important for another reason. Perhaps, the primary functions of local government is to supply citizens with essential public goods financed by tax revenues. According to Netzer, "The primary purpose of subnational public finance is the support of goods and services which for one reason or another will not be provided in adequate quantity and quality in the absence of government action". The location of functions and people in urban space, and the subsequent cost of overcoming distances in the delivery of public services indicates that a functional relationship exists between land use planning and the budget. For example, Hirsch sees the following events occurring in the process of urban development.
"In terms of timing and sequence of activities, government usually arrives first on the scene. It plans, zones, provides certain social overhead that helps prepare parcels of urban land for development."92 In this role, local government continuously participates with the private sector in creating urban space through the power of land use control and expenditures for urban goods and services. That the production of urban goods is sometimes of low quality, and that urban space is misallocated, is more a function of poor urban management than any other factor. The inability to employ new tools, techniques, and quality personnel has far reaching implications for urban-regional development. To understand, explain, and predict the forces that are shaping urban areas, requires personnel who are able to realize that urbanization is actually a functional part of national economic policy.

Obviously, the problem is more regional than local in scope. The strength of the market forces affecting the regional-urban growth cycle are so great that it may be better to adopt a regional-urban policy than to resist. This suggestion is right in line with Hoover's recommendation that, instead of designing policy that is contrary to national and regional trends, there may be a higher payoff in "...meeting the problems as they raise and exploiting opportunities they create".93 If the local policymaker accepts this role, he must realize that he will most likely be in a position of awaiting decisions made at the federal and corporate business level, and then reacting or adjusting to those decisions. Thus, the federal government, because of the commitment it has to meet national economic and social aspirations, will always be in a lead position regarding the establishment of public economic policy.
Alternatives for Private Investment—Profit Maximization or Profit Satisfaction

The motivation underlying a private business investment is to invest in those opportunities which have the highest rate of return and the least risk. If that business investment decision involves the production of a good or a service, the return on his investment will be a profit, which are his receipts minus his costs. Many factors influence producer receipts, such as, outlays for marketing and advertising, prices of competing products, and changes in income. Production costs are also affected by new technology, labor and management productivity, substitute raw materials, and market shifts. Changes in location may also affect the receipts and costs, and therefore the profits, of the producer. According to the theory of the firm, the producer's primary goal is to maximize his profits. Economic theory, however, focuses mainly on the non-spatial factors that influence a producer's profit. Yet, his location is as important as his price and output.

Profit maximization by the producer and the efficient use of resources by the federal government are closely associated economic policy goals that would insure high performance of the national economy. In fact, all of the alternatives in Column A of Table 2 would lead to maximum growth in national income and gross national product. However, profit maximization as well as the other alternatives outlined in Table 2 are only possible if we are speaking of rational men, with perfect knowledge operating under ceterus paribus conditions. In reality, decisions are made with poor information causing uncertainty. Because of the element of uncertainty, the assumption of the profit maximization in the theory of the firm has been under attack. According to Wolpert, the
presence of uncertainty eliminates the possibility of profit maximization. More specifically, Stafford argues that, "...those who actually locate factories could not possibly act in a completely profit maximizing way because they could not know how". The observations by Wolpert and Stafford indicates that business decisions are arrived at in another way. None other than Lösch states that firm location decisions are made, not by scientific and rational procedures, but that the solution is "...only a practical one, the test of trial and error". If profit maximization is held in such low esteem, is the alternative profit satisfaction?

The case against optimal economic behavior has been stated by Simon who argues, "Most human decision-making whether individual or organizational, is concerned with the discovery and selection of satisfactory alternatives; only in exceptional cases is it concerned with optimal alternatives". Margolis interprets profit satisfaction as that level which is equal to the profit aspirations of the firm. Several forms of the "first acceptable alternative satisficer model" are proposed by Isard. Finally, Sweet argues for the development of problem regions based on the satisficer concept.

Many of our nation's development regions would rarely be the optimal location for a given industry; yet such areas as Appalachia, Coastal Plains, Upper Great Lakes, and others, are attracting - in varying degrees - new industries to their regions. Thus, the concept of the satisficer location is relevant in the development programs of these regions.

Support for the satisficer concept is strong and has been used to explain many types of economic space.

The criticism against profit maximization, however, may be premature due to a misunderstanding on the intent of the theory. Perhaps
the reasons an entrepreneur makes a sub-optimal decision is because of the poor timing and the low quality of the information used in arriving at a decision. This does not mean that the firm or the entrepreneur is making intentional sub-optimal decisions. It does indicate that he may be attempting to optimize with whatever information he has available, gathered and analyzed at a cost that he is willing to pay. According to Webber, "We must separate the intentions from the consequences of an act; such a view again requires that our concept of maximum profits be enlarged and refined". Information, therefore, whether perfect to satisfy profit maximization models, or partial as in the case of satisficer models, appears to be the critical variable in location theory. The information problem leads Webber to conclude, "...that if location theory is to predict patterns more accurately, it must adopt the assumption that entrepreneurs are uncertain".

A better understanding of uncertainty, however, may not be the answer for insuring improved industrial location models. If uncertainty can be reduced by gathering quality information, but is expensive to gather and analyze, then the size and financial strength of the firm may be the key determinants in understanding optimal decision-making. Intelligence gathering and analysis is expensive, and small firms do not have the financial capacity for this activity. Uncertainty enters into their location decisions because of a high degree of reliance on chance or personal reasons. As a firm grows in size, personal reasons are subordinated to higher authorities - the stockholder, the potential investor, and the competition. Hamilton observes, "Large firms endeavor to compare location costs because of the greater risks they run on account of their scale". Therefore, there may be less uncertainty, a
higher probability of attempting to maximize profits, and more predictability to the behavior of large corporations than small newly formed enterprises.

Again referring to Table 2, Column B, if profit satisfaction is given as a policy alternative for business decisions, can profit satisfaction also be equated with regional development policy, especially in regard to depressed or lagging regions? If national economic policy were committed to interregional equity, it could be assumed that firms would operate within this environment and attempt to reach a satisfactory profit level. Should national economic policy be guided by growth and efficiency criteria, firms would locate only in those areas where profits would be maximized. In reality, firms do locate in depressed and stagnant regions, and according to the requirements of management are able to reach a satisfactory profit level. Recent research into the location decision-making process of firms recently located in Appalachian Ohio indicates that uncertainty exists when investments are committed to depressed areas. Thus, private investment decisions in depressed or stagnant areas may be viewed as satisficer solutions to the locational search.

Economic Development Policy and the Decision Trace

In a modern capitalist industrial economy there exists two main initiators of economic change, the national government and the corporate business community. Policy and investment decisions made by the public and private sectors determine the level and the pace at which the economy will operate. In the United States, the initiator of economic change is a role that is increasingly shifting to the federal government. The federal government by wielding fiscal, budgetary, and monetary powers,
can either stimulate or control the performance of the economy.

By taking liberty in describing what is obviously a very complex process, it is possible to hypothesize a decision trace to assume the following sequence of events. Federal expenditures as outlined in the President's budget is an eagerly awaited event, especially for those firms interested; for example, defense spending. Anticipated changes in federal tax rates or new legislation affecting environmental protection or occupational safety will have a significant effect on how a business will operate. Now that revenue sharing is making fiscal federalism a reality, state and local governments attempt to forecast the federal allocation formula for their budget determinations. The individual household looks to government for new or changed social programs. The small businessman attempts to predict the behavior of government, corporations, households, and individual consumers. This brief description of hypothetical sequence of events indicates that the federal government influences decision-making at all levels of society. In all sectors outside of federal government, decisions are made in reaction or adjustment to national policy decisions.

A similar sequence of events is assumed to occur when the development component of economic policy is analyzed. The economic alternatives outlined in Table 2 have been expanded to include five principal decision-makers in the economic development policy decision trace and is presented in Table 3. Inspection of Table 3 shows that the federal government initiates all policy decisions with regard to growth in national product, development of national resources, public works and infrastructure investments, and the type of urban system. Corporate business will in turn react with a set of policy and investment decisions designed to
<table>
<thead>
<tr>
<th>Development Objective</th>
<th>Economic Policy Alternatives</th>
<th>Decision Trace</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A National</td>
<td></td>
</tr>
<tr>
<td>1. National Product</td>
<td>Growth</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>2. Resource Development</td>
<td>Efficiency</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>3. Public Investments</td>
<td>Unbalanced</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>4. Inter-Urban Development</td>
<td>Concentrated</td>
<td>1, 2, 3, 4, 5</td>
</tr>
<tr>
<td>5. Private Investments</td>
<td>Profit Maximization</td>
<td></td>
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<tr>
<td></td>
<td>Profit</td>
<td>2, 3, 4, 5</td>
</tr>
<tr>
<td>6. Population Distribution</td>
<td>Migration</td>
<td>3, 2, 4, 5</td>
</tr>
<tr>
<td>7. Intra Urban Development</td>
<td>Highest Use</td>
<td>4, 2, 3, 5</td>
</tr>
</tbody>
</table>

THE DECISION-MAKERS

1. National Government
2. National Industry
3. Individual Household
4. Local Government
5. Local Business
meet any business climate. Should the federal government choose a very conservative economic development policy (Column A), than corporations could, under model conditions, maximize profits. If the federal government shifts to a regional development policy, corporate business would more than likely formulate plans to accept a "satisfactory" return on investment. A member of the individual household responding to decisions at the corporate and federal government levels is faced with two choices. One alternative is to move to a location where he can maximize his real income. The other alternative is to choose a location where he can maximize his psychic income. Under theoretical conditions, however, the individual would migrate if the federal government and corporate business adopts a "hard line" economic development policy. In contrast, a regional development policy would allow for a choice in location and employment.

Perhaps the most difficult position in this decision trace falls to local business firms and government. Local government officials must choose whether to allow the location of functions and residents to take place under planned or no control situations. To control intra-urban development implies that a land use plan can be enforced by zoning laws and regulations. Allowing an urban area to develop, guided only by market forces, implies that local government officials have some knowledge of how urbanization occurs under free market conditions. In either planned or unplanned urban development, the local government official is faced with the task of predicting where growth will occur in order to guide him in making decisions as to the allocation of monies for capital improvement projects. Finally, the local businessman reacts to decisions made by the federal government, corporations, individual
households, and local government. His decision to operate a business will depend on how well he can predict the buying and supplying behavior of the other sectors under either Column A or Column B conditions. Again refer to Table 3 and note that local business, local government and individuals are either reacting or adjusting to policy decisions made initially by the federal government and then by corporations.

The main purpose of presenting this scenario is to emphasize the lead role played by the federal government in producing the forces that cause economic change. The impact of federal and corporate policy decisions on local decision-making units may be overwhelming. Indeed, the desired reaction necessary for successful policy implementation may be lost due to the inability of local decision-makers to react and adjust to these high level decisions. Both federal government and corporate officials assume that the local citizenry has the capabilities to accept their policy decisions and then move toward successful local implementation of the plan. Even economic models make the implicit assumption that there will be instantaneous reaction and adjustment by all sectors located in economic space. It is perhaps because of their location at different distances in economic space, equipped with poor decision-making tools, that local decision-making units tend to deviate so widely from the expected model behavior. The existence of this policy "implementation gap" indicates that there may be a need for an intermediary in the decision trace that can aid in the transfer of policy from national to local levels. For example, Smith sees the intermediary role as an advisory function filled by a professional planner. "The ultimate task of the planner is to identify the optimum course of action in pursuit of stated objectives, to indicate the consequences of not adopting
this strategy and to offer all this to society for its consideration." Advisory intervention of this type could be one way of making the free market mechanism work more efficiently.

According to Smith, the planner as economic advisor would be part of a central government that would intervene in the interests of locational efficiency, and at the same time, indirectly increase social welfare. By making employment or investment opportunities known in areas where growth is possible makes the market mechanism work more effectively while at the same time insuring a more efficient use of social overhead capital. Smith suggests another method whereby the central government can enhance the efficiency of the space economy.

It can operate some kind of monitoring system detecting trends making for disequilibrium, such as decreasing returns to scale in congested urban regions, as well as investment opportunities which can be brought to the attention of private business. The government can also reduce the uncertainty in which location decisions are made by the dissemination of information and by creating conditions of stability in which investments can be made with a minimum of risk.

Thus Smith sees the role of the central government as one of economic advisor, information broker, and locational planner.

To this point in the study, it has been argued that every economic development strategy alternative has significant spatial implications. In addition, the study has also established a case for the existence of a decision-making gap between national and local levels. Since most economic development issues can be best understood from a regional point of view, this study will focus on a regional approach to economic economic development policy transfer. Therefore, the logical choice for filling the intermediary role between national and local levels of decision-making units is a state or regional agency. The agency would be able to accept as input, policy decisions from the federal government
and corporations, to perform technical analysis on that input and, to produce high quality information that will improve local decision-making. In return, the agency would provide the policy intelligence feedback to the federal government and corporations as to the effectiveness of their decisions. An agency armed with a regional policy model would improve the information flow in the network of economic space, and provide a monitoring device that would lead to a more rational economic development policy. The critical position of a regional agency in the transfer of economic development policy is presented in Figure 1. Based on the arguments presented, it is apparent that the region is an important spatial unit in the economic development process. Therefore, the state or regional agency can play a vital role in aiding the efficient transfer of economic development policy from a national to a local level.
FIGURE 1
A REGIONAL APPROACH TO ECONOMIC DEVELOPMENT POLICY TRANSFER

Regional Policy Intelligence

National Economic Policy

Corporate Business Policy

National Policy Analysis

Regional Policy Research Center

Regional Policy Analysis

Local Government

Local Industrial Base

Local Consumers and Households

Local Policy Reaction

National Regional Local Decision Space
NOTES TO CHAPTER II


2. Isard makes the statement in reference to the research procedures of a leading economist, "Hicks, to be sure, begins by formulating the problem in a manner pregnant with spatial implications...but actually he confines himself to a wonderland of no spatial dimension...he assumes markets to be perfect...transport costs are assumed to be zero...everything within the economy is in effect compressed to a point, and all spatial resistance disappears", *Ibid.*, pp. 25-26.


16. Ibid.


32. Hirschman, *op. cit.*, p. V.


42. Hirschman disagrees with Myrdal on the following issues. a) Myrdal fails to recognize that the emergence of growing points and therefore of differences in development between regions and between nations is inevitable and is a condition of further growth anywhere. b) Myrdal is preoccupied with the mechanism of cumulative causation which hides from him the emergence of the strong forces making for a turning point once the movement toward North-South polarization within a country has proceeded for some time. c) The picture Myrdal paints of international transmission of growth is too bleak in my opinion. As he overlooks that, the polarization (backwash) effects are much weaker between nations than between regions within the same country. Hirschman, *op. cit.*, p. 187.


45. Since 1967, several versions of Professor Friedmann's work on refinement of the core-periphery model has been in circulation. His latest effort appears in, Niles M. Hansen, (ed.), Growth Centers in Regional Economic Development (New York: The Free Press, 1972), pp. 82-107.


50. In addition to the economic policy objectives presented in Table 1, the list could be expanded to include alternatives for inflation, monetary matters, balance of payments, and international trade. Table 1 simply attempts to make the point that economic policy alternatives run the spectrum from liberal to conservative resulting in two clearly identified schools of thought.


57. Hoover, op. cit., pp. 259-260. Also see,


59. Friedmann, 1966, op. cit., p. 49. Also see,

60. Ibid., pp. 6-7.


64. A. Lüscher, The Economics of Location (New Haven: Yale University Press, 1954). Also see,


84. Hoover, *op. cit.*, 275.


90. Ibid., p. 580.


97. Lösch, op. cit., p. 29.


103. Ibid., p. 109.


105. There is even some evidence to indicate that the uncertainty in industrial location decision-making can be attributed to any business firm under single ownership. Few private capitalists undertake comparative cost analysis to justify or refute their "hunches."

106. Howard Stafford, "Industrial Location Decisionmaking in Appalachian Ohio," Appalachian Selective Development Program (Columbus: The Ohio Department of Economic and Community Development, 1973), pp. 54-89.


108. Ibid., p. 513.
CHAPTER III

ECONOMIC DEVELOPMENT POLICY ISSUES: THE REGIONAL INTEREST

Economic Space and Regional Economic Development

Although the regional concept and regional methods are closely associated with geographic investigation and inquiry, the regional approach is by no means uniquely confined to the research efforts of geographers. Political scientists, sociologists, agronomists, and plant ecologists have used the regional method with great success in their investigations. Recent research indicates that the regional concept has taken on renewed importance as geographers attempt to better explain spatial variations. For example, the region provides the setting for a study of growth poles. Brown and Holmes see the region as "...fundamental to the formulation of an implementation of contemporary sub-national economic planning policy". Berry's analysis of commuting patterns and labor market participation in a regional setting has considerable implications for the establishment of spatial economic policy.

Continuing this line of inquiry, this chapter will focus on the important position of the region in the transfer of economic development. In most instances, public policy concerned with economic development is clearly problem oriented. For example, regional development receives greatest attention when an area is either depressed or congested. Only then does regional development become an issue calling for public policy to deal with the "problem". For example, in the United
States, regional public policy was established to address flooding problems in the Tennessee Valley and poverty in Appalachia. Yet, advanced economies should also be concerned with establishing economic development policies that will insure a more efficient use of national resources through a more fully integrated spatial economy. Therefore, public policy for economic development must be shaped not only under post mortem crisis situations, but also under conditions where time permits the establishment of policy that will shape the future course of events. In this regard, Friedmann and Alonso have identified two concerns of public policy for spatial organization.

Where economic development occurs unequally across the nation's territory, regional differences in the level of welfare may become an urgent political issue. And where the manner in which economic space is organized affects the pace and structure of economic growth, national policy must turn to strategies of spatial evolution to further the general development objective of the economy. The former is addressing a crisis situation and is rooted in the past, while the latter presents a problem that is goal and future oriented. Policy for stagnant or depressed regions has been pursued mainly by politicians and welfare academicians. The corporate business community has been noticeably absent from these efforts. In contrast, national policy to further the economic growth of the national economy is brought by a blend of federal and corporate policy goals. In a similar manner, regional development policy must also be accepted as a case of achieving national economic goals and objectives through the proper blend of federal and corporate policies. Does the federal government assess the impact of its policies on regional economies? As important, do corporations realize that their policies have an impact on regional economies?
The Regional Impact of Federal Policy

The decentralized or district approach to the administration of federal government policies has had a long history in the United States. As the United States developed westward, the government in Washington found that certain government activities were delivered more efficiently at a sub-national level. National security, for example, cannot be properly or efficiently delivered from Washington. Thus, the United States was eventually divided into military districts in order to insure citizens that national defense services would be available wherever needed. The district boundaries were drawn somewhat arbitrarily and could not be considered either homogeneous or functional regions. The administration of federal banking laws is accomplished through the delimitation of the United States into 12 federal reserve districts. Again the districts cannot be described as functional regions. Similarly, administering the collection of corporate and personal income taxes is made possible by Internal Revenue Service district offices.

Perhaps the federal service that reaches the people most directly is the Social Security Administration. This agency is organized on district, municipal, and neighborhood lines because of the type of service delivered and the distribution of their constituency. Additional examples of federal districts could be cited but it should be clear that the delivery and administration of federal public services was accomplished through an arbitrary spatial division of the country into districts. However, despite the arbitrary nature of the districting methodology, it is important to emphasize that the economic development of the United States was influenced less by the lines of the districts and more by the investment strategy and level of monies expended in
In contrast to the acceptance of districts as a mechanism for administering federal policies, the United States has a long history of rejecting formalized planning concepts. By rejecting formal economic planning, government officials were also rejecting the regional method and supporting the American method of "non-planning". Friedmann sees American planning practice as,

...almost completely devoid of ideologic overtones; it is, for the most part, loose and informal; and it is closely linked to operations. As such, it is congenial to the American pragmatic temperament and well adapted to the federal system of decentralized government and administration.7

The historical record of economic development under "non-planning" conditions is quite impressive, and a tribute to the American system. However, conditions facing America in the future may not be identical to those of the past, and policy planning may become necessary, even vital, for survival. The indictment of policy planning methods in the United States by Friedmann and others may be somewhat harsh and unfair. Planning does exist in the United States; governments, businesses and individuals all do some type of preparation for the future, but it is piecemeal, uncoordinated and crisis oriented. In short, planning in the United States are experiments in problem solving.

The formalized public policy planning function has a longer history at the municipal and metropolitan level of government than at the national level. Also city planning evolved from conditions different than those experienced by regional planning. Armed with land use controls and the power of eminent domain, city planning was structured to maintain land values and improve the movement of people and goods.8

In comparison, regional planning in the United States was born
tinued in this manner until economic and political conditions in the 1960's forced a departure from this approach.

The Federal Response to Regional Economic Development Policy

Federal reaction to the plight of certain depressed or stagnating areas came about in 1961 when Congress saw fit to enact the Area Re-Development Act (ARA). This was the first piece of legislation that provided federal funds for stimulating economic activity in depressed areas. The spade work for this Act can be traced to the work of Senator Paul Douglas (Democrat-Illinois), a professional economist who during the 1950's fought for federal intervention into the depressed area problem. By 1962, economic and political conditions were such that additional legislation was passed in the form of the Accelerated Public Works Act which was designed to finance the construction of public facilities in depressed areas.

By 1964, the political debate over whether the Federal government should pursue regional development policy or encourage out-migration of surplus labor shifted to a discussion of the conditions necessary for generating a process of area redevelopment. In a study of the federal role in regional economic development, Cameron found that Congress and the administration were guided by three program goals in drafting legislation to address the problem of depressed areas.

1. To favorably alter the supply characteristics of the depressed communities by investment in public infrastructure.

2. To encourage new private investment and induce self-generating growth.

3. To prevent the re-emergence of the depressed area problem by creating joint federal-multistate institutions with powers to initiate and coordinate regional plans and advise all levels of government on cooperative devices for promoting a satisfactory rate of regional economic growth.
in a crisis period, created to address an immediate problem, and is a design of the federal government. A 1935 federal government report carried a definition of regional planning that described the objective of regional planning to be mainly the development of physical resources. For example, control of the Tennessee River was made possible by the Tennessee Valley Authority Act and implemented through the Tennessee Valley Authority (TVA). Although TVA was designed to control a raging river, there was underlaying optimism by Congress that the problem would build new electrical generating capacity and create flood-free land for industrial and agricultural purposes. As a result, the investments and programs of the TVA had a profound impact on the economic development of an underdeveloped region.

Based on the success of TVA, similar programs were designed to control and develop the basins of the Columbia, Snake, Colorado, and Arkansas rivers. A number of characteristics common to all of these development schemes are worth noting. The prime motivation for funding the project is usually flood control which in turn produces increased navigation capabilities, electric power, irrigation, recreation opportunities and other minor spin-offs such as pollution control and reforestation. However, noticeably absent from federal river basin planning was any consideration for the regional impact of urbanization, industrialization, migration, circulation, infrastructure investments, and human resource development. In most instances, state and local decision-making units were by-passed, mainly because the project followed water basin boundaries and therefore was regional in nature. River basin development, more accurately, regional economic development, con-
Clearly, the first goal identifies the role of the federal government as the initiator of investments into public works projects. The second goal recognizes the need for private sector investments in order to sustain regional economic growth. The third goal is to create a mechanism for the transfer of economic development policy from the national to local levels across existing political boundaries.

Based on the three regional economic development goals outlined above, Congress and the administration passed into law The Appalachian Regional Development Act of 1965 (ARDA). The agency charged with implementing the provisions of the ARDA was designated as the Appalachian Regional Commission (ARC). The statement of purpose of the ARDA indicates clearly the commitment of the federal government to regional economic development.

The purpose of this act is to assist the region in meeting its special problems, to promote economic development, and to establish a framework for Joint Federal and State efforts toward providing the basic facilities essential to its growth, attaching its common problems and meeting its common needs on a coordinated regional basis.12

According to this statement of purpose, investments could be placed anywhere in the region. This omission did not go unrecognized. During final discussions on the bill, an efficiency clause was added to the statement of purpose.

The public investments made in the region under this act shall be concentrated in those areas where there is a significant potential for future growth, and where the expected return on public dollar will be the greatest.

By adding an efficiency clause to the Act, proponents of the bill hoped to silence critics who argued for criteria in the location of investment. In addition to the concession on investment strategy, the administration promised additional legislation to aid depressed areas in other parts of
the nation in order to gather support for ARDA. The ARDA became law on March 7, 1965 and Congress moved on to consider another type of regional economic development legislation that would aid depressed areas in other parts of the United States.

Referring to the three program goals previously outlined, the Public Works and Economic Development Act of 1965 authorized funds for the establishment of the Economic Development Agency (EDA) as the executive agency for implementing provisions under this Act. The preamble states in straightforward language the purpose of the legislation.

To provide grants for public works and development facilities, other financial assistance and the planning and coordination needed to alleviate conditions of substantial and persistent unemployment and undevelopment in economically distressed areas and regions.13

Locational criteria to guide investments in the Public Works and Development Act of 1965 are much more general than that found in the Appalachian Regional Development Act. According to the Public Works Act (Section 403), each development district must contain an economic development center.14 This criteria indicates that it was the purpose of the legislation to have public investments guided by a growth center strategy. No doubt, the authors of the Act felt that the selected centers should have the critical mass necessary for "spreading" the fruits of economic growth to other parts of the district. Since the locational criteria for growth center strategy was unclear in the Act, it became the task of EDA staff members to provide specific spatial criteria that would guide investment strategy.

After almost a year of deliberation, the staff of EDA chose a method of selecting areas or "centers" according to the severity of the economic conditions and to concentrate federal spending within such
This method was quickly identified as a "worst first" policy that was to guide the investment strategies of EDA. The "worst first" policy adopted by EDA is an example of a "place prosperity" development strategy. However, there were those on the EDA staff who argued for an efficiency clause similar to that found in the ARDA. An uneasy coexistence of strategies was evident among the staff of EDA, but clearly the "worst first" policy dominated the investment strategy of the agency. Intra-agency conflict over development strategies eventually led to inter-agency confrontation between EDA and ARC. Although the two agencies disagreed over "the location" of investment strategies, both EDA and ARC found common ground as to the type of project that was to be funded. At one point in time, both ARC and EDA believed that the key element of investments in infrastructure should be primarily composed of public works projects. The "bricks and mortar" base of the two agencies is readily apparent by examining actual budget appropriations for major project classification for the two agencies (Table 4). Note that during the first years of operation, ARC allocated 76.9% of the total budget to highway construction while EDA invested 76.6% of the budget to public works.

Careful examination of Table 4 indicates a heavy dollar commitment to outlays for Economic Overhead Capital (EOC) over investments for Social Overhead Capital (SOC) projects. A number of scholars have been particularly critical of the SOC/EOC mix of the Appalachian program. Hansen argues for more investment by ARC into human resources despite the prospect of possible increased out migration. Caudill believes that Appalachia needs "...comprehensive and effective system of public education". Several others have looked into the operation of the
### TABLE 4

**FEDERAL FUNDS APPROPRIATED FOR REGIONAL DEVELOPMENT**

<table>
<thead>
<tr>
<th>I. Appalachian Regional Commission Budget*</th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Highways and access roads</td>
<td>$840.0</td>
<td>76.9</td>
</tr>
<tr>
<td>2. Health</td>
<td>69.0</td>
<td>6.3</td>
</tr>
<tr>
<td>3. Conservation</td>
<td>17.0</td>
<td>1.6</td>
</tr>
<tr>
<td>4. Timber development</td>
<td>5.0</td>
<td>0.5</td>
</tr>
<tr>
<td>5. Mine restoration</td>
<td>36.5</td>
<td>3.3</td>
</tr>
<tr>
<td>6. Water Resource Survey</td>
<td>5.0</td>
<td>0.5</td>
</tr>
<tr>
<td>7. Vocational education facilities</td>
<td>16.0</td>
<td>1.5</td>
</tr>
<tr>
<td>8. Sewage treatment</td>
<td>6.0</td>
<td>0.5</td>
</tr>
<tr>
<td>9. Supplements federal grant-in-aids</td>
<td>90.0</td>
<td>8.2</td>
</tr>
<tr>
<td>10. Administrative costs</td>
<td>7.9</td>
<td>0.7</td>
</tr>
<tr>
<td><strong>Total Appropriations</strong></td>
<td>$1,092.4</td>
<td>100.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>II. Economic Development Administration Budget b</th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Public Works (Sewage and Water Facilities)</td>
<td>$431.6</td>
<td>76.6</td>
</tr>
<tr>
<td>2. Business Loans</td>
<td>93.9</td>
<td>16.7</td>
</tr>
<tr>
<td>3. Working Capital Guarantees</td>
<td>10.1</td>
<td>1.8</td>
</tr>
<tr>
<td>4. Planning Grants</td>
<td>4.8</td>
<td>.9</td>
</tr>
<tr>
<td>5. Technical Assistance</td>
<td>17.9</td>
<td>3.2</td>
</tr>
<tr>
<td>6. Research</td>
<td>5.4</td>
<td>.9</td>
</tr>
<tr>
<td><strong>Expenditures for 1966 and 1967</strong></td>
<td>$563.7</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*In millions of dollars

**Sources:**


regional agencies attempting to evaluate program performance. 19

According to Widner, the ARC has shifted more to non-highway investments and cites, "...measurable improvements in health, economic development and housing" 20 as significant accomplishments of the agency during his tenure as director of the agency. The original hope of the Commission mechanism was to provide a new federal-state system for avoiding the pitfalls of other federal development programs. Some of these obstacles were overcome by ARC, but Widner leaves the reader with the impression that there still is a lack of a comprehensive regional strategy causing a scattering of project funds, and a subsequent reduction in benefits from federal investments.

Regional Development Strategies in Time and Space

Once a decision has been reached to address a regional development problem, strategies must be established that will alter the existing spatial distribution of economic wealth. Whatever the reason for regional intervention, this decision answers the fundamental question "why" in the decision-making sequence of events. The next step in the intervention process is for the agency in charge of implementation to consider the type of investment, the location to be applied, and when the strategy should begin. In general terms, economic development policy can be visualized as a problem composed of three basic dimensions (See Figure 2). Therefore, regional economic policy must address the questions of "what," "where," and "when" simultaneously.

The development strategy pursued will be determined by the goals and objectives that have been set for the region. If the short run objective is to raise median family incomes, then the development strategy decision may call for an industrial development policy that will
FIGURE 2
THE BASIC DIMENSIONS OF REGIONAL ECONOMIC DEVELOPMENT POLICY

COMPONENTS

\[ I_N = \text{DEVELOPMENT POLICY} \]
(1) Industrial Development
(2) Human Resources
(3) Infrastructure
(4) Highways

\[ L_N = \text{SPATIAL FACTORS} \]
(1) Size of Place
(2) Geographic Location
(3) Accessibility
(4) Structure and Function

\[ T_N = \text{TEMPORAL FACTORS} \]
(1) Economic Time
(2) Political Time

\[ a \ldots d = \text{The Economic Development Strategy in Time and Space} \]
attract footloose, labor intensive, male oriented, high wage industries. The mechanisms to accomplish this objective could be incentives such as a tax moratorium, interest free loans, or free land. Mechanisms of this type would constitute a "subsidy" to industry in order to achieve a spatial redistribution of economic growth. From a free market position, subsidies to industry represent a misallocation of resources, are clearly a sub-optimal choice, and are short-run in effect. In contrast, Rodwin takes the position that a balanced development policy should be a blend of incentives and controls. However, the record is unclear whether incentives and subsidies have been effective as a means of reversing regional economic disparities in the United States.

Another approach would be to adopt an industrial development policy that operates within the existing free market and pricing system. Since no subsidies are involved, a policy of this type would be based on providing business firms with "incentive information". For example, this approach would provide the decision-maker of a company with specific data on the locational attractiveness of an area as to such factors as labor, raw materials, markets, and transportation. If this market intelligence is made accessible to the businessman and in turn causes him to locate or expand his production facilities in an area, then the "information incentive" industrial development policy approach has achieved a regional policy objective within the free market system.

There is also a situation where industrial development is hampered by a development "bottleneck" such as inadequate municipal utilities, accessibility, or lack of land for industrial expansion. To correct these conditions, investments in public works such as a municipal water and sewage plant, an inter-state highway, or private investment in
industrial parks would be proper. Should the economic development bottleneck be one of low skill levels or poor health conditions, public investments in educational or health projects would be in order. A development strategy of this type could be considered a long run commitment and would be optimal, dependent on the choice of location for the investment. Even more important, will the location selected for an investment today, insure that the goals for regional development be met in the future? It is apparent that the spatial dimension of a regional development policy is a critical factor in determining "where" a project will be located.

Whether the investment strategy is based on welfare criteria, such as the EDA "worst first" policy, or the ARC efficiency criteria, it can be argued that certain locations will meet development goals better than others. Obviously, what is needed is a method for selecting a location that provides highest investment return under either welfare or efficiency investment guidelines. In both the Public Works Act and the ARDA, spatial guidelines were provided by a "growth center" strategy. Architects of the legislation hoped for a "spread effect" of economic benefits from public investments. In reality, the designers of the Public Works Act and the ARDA accepted a growth center strategy for very pragmatic reasons; past experience had shown that regional equanimity in the distribution of development funds was not very productive.

Pragmatism may lead to some serious distortions from legislative intent. EDA moved from a growth center strategy calling for the designation of centers with "significant growth potential" (efficiency) to a "worst first" policy (welfare). Similarly, the ARC staff in first round deliberation on the growth strategy called for investments in a few
selected centers. A selective growth center strategy was found not to be politically acceptable, and it was decided by the ARC that growth center selection would be left entirely to the states. This decision took the growth center strategy concept out of development economics and threw it into the political arena. Under this arrangement, it was found that the Appalachian region had approximately 125 locations with at least one growth center with high potential for future growth where the expected return on public dollars would be greatest. Despite the departure by EDA and ARC from the original program goals, the spatial dimension "where" of a regional investment strategy may be the most critical factor in regional development policy.

The time element, or "when" a program or strategy is to be implemented, is the third element to be considered a regional development policy. For example, in order to raise regional income levels through industrialization, it may be necessary to first invest in manpower development programs in order to upgrade the labor supply. The decision in this case would be to invest in human resources before funding a public works program. At the same time that expenditures are made in manpower, another agency may call for funds to be expended in highway development in order to improve the accessibility of the region. On the other hand, health officials may site high infant mortality due to poor nutrition or incidence of TB among workers as the critical development bottleneck in the region. In short, the time element forces a consideration of how resources are to be allocated over time, and in turn determine the priorities of regional development policy.

The economist appears to have the theory and the tools to take the lead in determining the "what" and "when" dimensions of the regional
development policy matrix. It is also clear that geographers can also contribute significantly to regional development policy through spatial analysis. More specifically, geographers can be instrumental in establishing regional economic development policy by lending precision to a growth center strategy that would be capable of selecting those locations where the return on public investments would be highest.

**Regional Growth Center Strategy - The Theory and Practice**

There is a belief among those practitioners laboring in regional economic development that a growth center strategy should operate much like growth pole theory. Unfortunately, at a time when more academic research should focus on this issue in order to clarify the confusion, there appears to be growing disenchantment with both the strategy and the existing theory.\(^{22}\) No doubt, the dissatisfaction over the theory is due in most part to the lack of agreement by scholars on whether a growth pole process exists. The practitioner, on the other hand, has seized what to him is intuitively appealing, applied the concept in a real world situation and is disappointed with the results. This unhappy state of affairs produces the worst of both worlds, a theory that cannot explain, and a strategy that is faulty. It is obvious that before a growth center strategy can be implemented, its strength and weaknesses should be assessed. This calls for a better knowledge and understanding of growth pole theory. Recent analysis on the status of growth poles indicates that the literature on the subject is confusing and according to Hansen, "...development pole theory is badly in need of a thorough semantic reworking; the concepts and the language which characterize it need more precise definition and more consistent usage".\(^{23}\)

In an extensive review of growth poles and growth centers, Darwent
found that field to be "ill-defined and confused" inferring that the explanatory value of the growth pole and growth center notions to be severely limited. His critical distinction between the two are worthy of note.

Growth pole discussions have tended to be somewhat myopic, concentrating on the direct links between a hypothetical industry and a few others in an economy assumed to be closed, to the total neglect of the enormous amount of background variation and indirect linkage taking place. Similarly, growth center notions tend to concentrate on a particular aspect of the central place system and attempt to treat it in isolation.  

The first definition suggests a form of inter-industry linkages occurring in a closed economy. The second definition of growth center "notions" is an attempt to bridge location theory and urban geography with central place theory. Again, as a matter of emphasis, regional economic development policy in the United States relies on the second definition to the almost total exclusion of the first.

Despite the shaky theoretical foundation of the growth center concept and the paucity of empirical verification there is, "...nonetheless a great deal of intuitive appeal in the notion of a growth center in which economic and social development is initiated and transmitted to an area around it".  

For those concerned with establishing regional development policy and determining the spatial-temporal dimensions of investments, the appeal of a growth center strategy is obvious. It certainly does provide investment guidelines and implies rather directly that expenditure of funds are better if they are focused on centers of potential growth (unbalanced) rather than distributed evenly in pursuit of equity (balanced). Therefore, the acceptance of a growth center strategy by the designers of the Public Works Act and the ARDA can be better understood and perhaps accepted. This by no means exempts the practi-
tioner from using wisely a concept that is only partially a developed theory of regional economic growth.

According to Darwent, the growth center idea, has great value. This lies in two main areas.

Firstly, it provides what promises to be a dynamic theory of growth and development which can greatly enhance our static models, such as central place theory and, as a corollary, it provides a basis for giving to development theory a spatial dimension. Secondly, growth center ideas are robust—if not rigorous; that is they are addressed squarely to planning problems, and while they do not by any means answer these problems, they do provide the directions in which further research can proceed.

For some, the association of growth pole theory with the growth center notion is tantamount to academic heresy. Others like Rodwin accept the close association with no difficulty.

To make my position clear on this score, let me say I find it intriguing, rather than scandalous, and helpful rather than harmful, that growth poles have become synonymous in some quarters with growth centers.

Many of the practical problems in selecting growth centers for the investment of public funds for development was encountered by state development agencies. The differences between theory and practice can best be seen by examining a case study of growth center strategy application. Since this dissertation is concerned with testing economic development strategies in Southern Ohio, the next section will discuss the growth center strategy developed by the State of Ohio in 1968.

The Evolution of a Growth Center Strategy - The Case of Appalachian Ohio

In order to pursue the efficiency guidelines outlined in ARDA, the ARC staff was set to operate with ten major urban centers, mostly metro areas. Reaction from less urbanized Appalachian states was immediate, and critical of this approach. Using efficiency guidelines, a state such as Kentucky did not have a single area in Appalachia considered to
have growth potential. Congressional representatives from these states made clear to the ARC staff that the ARDA was designed to address itself to economic problems typical to those found in Kentucky. After reconsidering the problem, it was decided that the determination of growth centers was to be left entirely to the states.\textsuperscript{28}

Within the approximately 60 local development districts into which the Appalachian region was divided, each state was asked to identify areas where future economic growth would probably occur.\textsuperscript{29} During the start-up period, central place theory was used as a basis for classifying places. A 1968 ARC report provided the following description of a growth center as guidelines for the states.

By a 'growth center' or 'centers' is meant a complex consisting of one or more communities or places which, taken together, provide or are likely to provide, a range of cultural, social, employment, trade, and service functions for itself and its associated rural hinterland. Though a center may not be fully developed to provide all these functions, it should provide, or potentially provide, some elements of each, and presently provide a sufficient range and magnitude of these functions to be readily identifiable as the logical location for many specialized services to people in the surrounding hinterland. A 'growth area' is an extension of the growth center itself. It is the adjoining area likely to experience residential and employment growth because of proximity to a center or location between centers. The hinterlands are surrounding rural areas which rely upon the growth center and growth area for services and employment. The hinterlands contribute resources and manpower to the overall district economy.\textsuperscript{30}

One of the key factors considered in analyzing the relationship between a center and a hinterland was the commuting pattern and related transportation networks. Careful reading of the above passage indicates that the definitions of growth centers and growth areas are based on the performance of functions that give rise to a growth area.\textsuperscript{31} The ability to determine growth should also provide the mechanism for dealing with problem or non-growth situations. Constraints or bottlenecks are equally important as factors affecting the growth potential of an area.
In summary, the definition does not allow for either determination of a growth center or a problem area. This unsettling state of affairs is one of the major factors leading to the use of diverse procedures by Appalachian states in designating growth centers. However, this fact has not deterred the efforts of the ARC staff to classify growth centers into three types: regional centers, primary centers and secondary centers.

Regional Centers are important metropolitan centers providing specialized services and employment opportunities that extend well beyond the boundaries of the district in which they are located. Investments made in these centers are mainly "region-serving," i.e., they help improve services and employment prospects for a large area of the Appalachian Region embracing several state planning districts.

Primary Centers are communities or a complex of communities where preliminary analyses indicate a major portion of the future employment base of a district is likely to be located. Investments in these centers will develop their competitive advantages by providing the public facilities and services needed to make the area attractive to increase private investment and growth.

Secondary Centers are communities from which it is necessary to provide services to a large surrounding rural hinterland if isolated populations are to be given the skills and training they need to compete for opportunities wherever they choose to live and work.

The definitions and guidelines provided by the ARC staff indicated clearly that the growth center strategy in Appalachia would be tied closely to the urban hierarchy and central place theory. This "growth center" selection procedure also indicated a rejection of the Perrouxian theory of growth poles which was too abstract for practical planning situations. After the decision was made to delegate the growth center selection process to the states, it was even more important that the strategy be practical and not theoretical. The decision to allow Appalachian state agencies to determine the location for investments led to a proliferation of areas designated as growth centers. Ohio, for example,
chose a four tier classification which in addition to the proposed ARC system included an "activity" center category.

Classification of Appalachian Ohio communities into a hierarchical order was accomplished through a set of ranked indexes. The five component indexes selected for this task was population, community services, transportation, housing and industry-commerce. The reason for choosing the composite rank-index method was more for the convenience of the research team rather than scientific explanatory power of the technique. According to the Appalachian Ohio Development Plan, "The five component indexes selected for this operation were selected because they were believed to be as predictive as any other information that might be brought to bear on this situation". An example of the composite rank index method used in determination of primary growth in Appalachian Ohio is presented in Table 5. The composite rank-index method is a static analysis that fails to consider any causal relationship between sectors of urban and regional functions. In addition, there is disregard for interindustry linkages and relationships that are a fundamental part of the urban hierarchy. Criteria for ranking is arbitrary and subjective, and interpretation of the results is less than objective. Finally, the composite rank-index method is based on ordinal data which means that standard mathematical operations are not defined.

Based on the composite rank-index method, it was determined that Appalachian Ohio is surrounded by 4 regional growth centers and contains 11 primary growth centers, 15 secondary growth centers, and 6 activity centers. Thus, 32 locations in Appalachian Ohio were classified by this system to have some form of growth potential. Growth centers for the Appalachian Ohio region are presented in Table 6. Some type of "growth"
<table>
<thead>
<tr>
<th>Regional Growth Centers</th>
<th>Primary Growth Centers</th>
<th>Secondary Growth Centers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cincinnati</td>
<td>Athens</td>
<td>Cadiz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pomeroy</td>
</tr>
<tr>
<td>Huntington</td>
<td>Cambridge</td>
<td>Crooksville</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Waverly-Piketon</td>
</tr>
<tr>
<td>Parkersburg</td>
<td>Chillicothe</td>
<td>Gallipolis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Woodsfield</td>
</tr>
<tr>
<td>Wheeling</td>
<td>Coshocton</td>
<td>Greenfield</td>
</tr>
<tr>
<td></td>
<td>Dover-New Philadelphia</td>
<td>Hillsboro</td>
</tr>
<tr>
<td></td>
<td>Ironton</td>
<td>Logan</td>
</tr>
<tr>
<td></td>
<td>Jackson-Wellston</td>
<td>McConnelsville</td>
</tr>
<tr>
<td></td>
<td>Marietta</td>
<td>Millersburg</td>
</tr>
<tr>
<td></td>
<td>Portsmouth</td>
<td>Nelsonville</td>
</tr>
<tr>
<td></td>
<td>Steubenville</td>
<td>Newcomerstown</td>
</tr>
<tr>
<td></td>
<td>Zanesville</td>
<td>New Lexington</td>
</tr>
</tbody>
</table>

TABLE 6
HIERARCHICAL RANKING OF PRIMARY GROWTH CENTERS
FOR THE APPALACHIAN REGION OF OHIO

<table>
<thead>
<tr>
<th>Community</th>
<th>Total Cumulative Index</th>
<th>Population Index</th>
<th>Community Services Index</th>
<th>Transportation Index</th>
<th>Housing Index</th>
<th>Industry Commerce Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dover</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Athens</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Marietta</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Chillicothe</td>
<td>7</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>New Philadelphia</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Coshocton</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Cambridge</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Steubenville</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Zanesville</td>
<td>9</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Ironton</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Jackson</td>
<td>10</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Portsmouth</td>
<td>11</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Wellston</td>
<td>11</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

center was identified in each of the 28 counties of Ohio. If the existence of "growth" centers are as numerous as the Ohio Plan believes, then the strategy in Appalachian Ohio is one of moving people to growth center opportunities and there may be little need for a full scale development program. Hansen makes a similar point, "If each district really has a genuine growth center, it would seem that there would be no need for out-migration from Appalachian nor for commuting to outside metropolitan areas". Hansen also questions the existence of at least one primary growth center per development district. For example, the 28 counties in Appalachian Ohio are divided into three districts. At most, there should be one primary growth center in each district. In Appalachian Ohio, one district has five, another four, and a third has two primary growth centers.

The proliferation of growth centers in Appalachian Ohio can lead to some significant problems, some economic and others psychological. Under this classification system, a center could qualify for investment under either efficiency or welfare criteria. Either way, investments are spread over many locations, decreasing the probabilities of success for any project being successful. By indiscriminantly designating a central place as a growth center, the expectations and desires of the community may be raised to unrealistic levels. Unfulfilled expectations from the fruits of economic development can, perhaps, result in serious damage to the psyche of the community. A pessimistic attitude toward economic development by residents of the community can present as significant a barrier to economic growth and change as the lack of utilities or the absence of a freeway interchange.

The ability to set goals and objectives for community leaders is a
difficult task even under conditions where information is available. In a situation where uncertainty is due not only to poor and distorted information but to psychological barriers as well, decision-making for government, business, and households is a case of frustration and leads to indecision. Economic development programs must be implemented at the micro or community level. If community leadership is weak, confused, and pessimistic, little success for regional development policy can be forecast. Therefore, the community interest is an important, perhaps vital, dimension in assuring successful transfer and feedback of economic development policy. A discussion of the role of the community in the economic development process follows in the next chapter.
NOTES TO CHAPTER III


6. The Army Corps of Engineers is organized into districts based on watersheds and river basins and is therefore unique from other federal districting schemes. Engineering districts can be clearly distinguished as a homogeneous region.


10. The spatial implication of the TVA are significant for not only a region, but also for increasing national product. See: John Friedmann, The Spatial Structure of Economic Development in the Tennessee Valley, Research Paper No. 1, Department of Geography (Chicago: The University of Chicago Press, 1955).


   Title I - Grants for Public Works and Development Facilities
   Title II - Other Financial Assistance
   Title III - Technical Assistance, Research and Information
   Title IV - Area and District Eligibility
   Title V - Regional Action Planning Commission
   Title VI - Administration
   Title VII - Miscellaneous

14. Ibid., Sect. 403
   (a) In order that economic development projects of broader geographical significance may be planned and carried out, the Secretary is authorized--
   (2) to designate as "economic development centers," in accordance with such regulations as he may deem appropriate, if--
   (A) the proposed center has been identified and included in an approved district overall economic development program and recommended by the State of States affected for such special designation;
   (B) the proposed center is geographically and economically so related to the district that its economic growth may reasonably be expected to contribute significantly to the alleviation of distress in the redevelopment areas of the district; and
   (C) the proposed center does not have a population in excess of two hundred and fifty thousand according to the last preceding Federal Census.

15. Ibid., Title V, Section 504 (1). This section of the Act is much more explicit on this issue. "...the relationship of the project or class of projects to overall regional development including its location in an area determined by the state to have a significant potential for growth."


26. Ibid., p. 21.


29. A local development district is composed of several counties which represents an attempt by ARC to foster regional cooperation and gain economies of scale.


32. The growth center policy of the Appalachian program is constrained in principle by its district program. Instead of beginning by delimiting a select number of growth centers, the Litton method, it was found necessary to define centers so that each of the districts has at least one. Under this scheme, the states have designated some 125 areas presumed to have "significant potential for future growth".


CHAPTER IV

ECONOMIC DEVELOPMENT POLICY ISSUES: THE COMMUNITY INTEREST

The Role of the Community in Economic Development

This study defines the community or urban place as that point in space where visible evidence of government, business, and individual location decisions take on physical and organizational form as a result of urbanism. This definition of urbanization is similar to Harvey's. Urbanism may be regarded as a particular patterning of the social process as it unfolds in space, and cities are the tangible expression of that process in the form of a physical built environment which exists in geographic space.¹

It is not the purpose of the study to discuss in any detail the location factors which have given rise to the phenomenon of urbanization. Social science research has produced many theories and descriptions of the urbanization process.² The research presented in this chapter will focus on the role played by urban areas in the economic development process and the response of the community to government and corporate policy decisions. The research will be directed mainly toward analyzing the ability of the community to generate and sustain income producing functions as they respond and react to government and business decisions. The objective of the research will be to develop a conceptual model for community decision-making.

The ability of a community to organize itself for self-sufficiency is an important factor in the urban development process. Again, Harvey's position on the subject of urban organization is appropriate.
Whatever else a society may be, the condition of self-sufficiency requires that the group adopt a mode of social organization which facilitates the production and distribution of material goods and services.  

As further evidence for support of the community in the urban development process, the following observations are presented. According to Nixon,  

A community first of all is a voluntary assemblage of factors of production such as labor, real estate, transportation facilities, water supply and business leadership. The community provides a market place for these factors of production.  

Income producing functions in a community are generated not only as a result of "basic" industrial activities, mainly manufacturing, but also by "non-basic" activities such as trade, services, and construction.  

Decisions made by the private sector affect the spatial organization of a community in a number of dimensions and intensity of impact. As an example, the decision by a major corporation to locate a new facility in an area transmits a pulse of activity and change throughout the community and the surrounding region. The placement of a new facility into a community creates forces that produce both positive and negative side effects. Most likely, the decision to locate a new facility was made in corporate headquarters outside of the affected area. As a result, the community was placed in a position of reacting to a high level business decision. If the community anticipated this decision and was able to respond with a land use and physical plan, economic benefits will be maximized and net social costs will be minimized. In this case, the decision by the corporation had an overall net benefit on the community. Had the community not been prepared for the event, the addition of a new facility may not only increase community social costs but produce negative externalities resulting in a reduction in the quality of
life. Thus, the community role in economic development is associated
closely with industrial location and significantly influences city and
regional planning. Smith echoes this view.

At the micro-level, industrial development planning becomes largely
a problem of land use, involving such questions as the projection
of industrial land requirements, the siting of industrial plants,
zoning, and the relationship between industrial areas, residential
areas and other functional units within the city. Therefore, the response of a community to a positive business decision
is best accomplished through the planning process and controlled by the
power of zoning and land use regulations.

There are some communities who are considering the adoption of the
most extreme form of development control - a nongrowth policy. The
title of a recent planning publication, "Nongrowth as a Planning Alter­
native" indicates that the nongrowth economic development alternative
in an urban area is being seriously considered by communities. Although
nongrowth may be associated with the Zero Population Growth (ZPG) and
stationary-state economics movements, it is more realistically an effort
to force consideration of "limited growth," "growth control," or "selective development" policy alternatives. The report indicates that several
communities in the United States have implemented some form of growth
control mainly through the power of land use zoning. As a matter of
clarification, urban nongrowth policies deal mainly with controlling the
allocation of urban space for population. Thus, issues such as "open
space," "greenbelts," and "planned unit developments" are the lexicon of
the urban policymaker concerned with nongrowth. The ZPG advocates on
the other hand are concerned with control of fertility and reproduction.

It is obvious from the outpouring of literature on the subject
that nongrowth as a development alternative has captured the interest
and imagination of academicians and politicians. Of course, it is only the economically healthy community that can afford the luxury of weighing either a growth or nongrowth development alternative. Growth versus nongrowth as development strategy is sometimes posed as an "either, or" situation. Unfortunately, the choice is not that simple. The mechanics of either controlling or accelerating intra-urban growth is very complex. In miniature, it is similar to the decision impact when a business decides either to expand or close.

A negative decision by the business sector can also have a significant impact on the economic well-being of the community. The decision to close a plant is based primarily on economic and cost factors, with secondary consideration given to the resultant impact on the community. Reasons for the decision may be many, but shifting markets, changing technology, foreign competition, and high costs of production are cited most often as justification for closing a business. The immediate reaction by a community to a situation of this type may be to organize an effort to promote the surplus factors of the area. However, if a prolonged time period is involved, and the promotional campaign fails to uncover new income producing functions, the community is faced with the task of formulating an alternative strategy.

The next level of effort is to consider investment in those projects that will correct the deficiencies and development bottlenecks, and restore the locational attractiveness of the community. However, the cost of corrective public works projects may be of such magnitude that the fiscal capacity of the community will be unable to provide the monies necessary from local public revenue sources. At the same time, a declining tax base due to economic stagnation may have reduced the
borrowing capability of the community in regional or national financial markets. A reverse process of circular and cumulative causation results in the community being designated, in order of severity, a problem, stagnant, depressed, or declining area.\textsuperscript{9} When an area is no longer considered economically viable, and local corrective measures have been exhausted, the fate of the community becomes a concern of the local political decision-making process.

The decision to intervene in the economy of a community or region is essentially a political consideration and can be justified on social-welfare criteria. At issue here is the problem of the community reacting not only to changing macro economic forces, but also adjusting to the business decisions of corporations and policy decisions of government. The impact of these forces and decisions on the community affects the ability of the local leadership, both private and public, to respond and react with local policy and strategies. It is apparent that there is a need for increasing the decision-making capabilities of the leadership in the community.

\textbf{Leadership, Decision Behavior and the Community Development Process}

The need for upgrading the decision-making capabilities of the community is a well-documented problem in the social sciences. By necessity, the city planning profession has historically shown a high degree of interest in understanding the process of community behavior as it relates to public planning.\textsuperscript{10} During the past decade, city planners have been forced by "the urban crisis" to adopt a new role of "advocacy planning" which calls for a better understanding of community behavior.\textsuperscript{11} Other disciplines, such as sociology and political science, are interested in the community behavior process but have focused major attention
on narrow case studies, or have been preoccupied with concepts of power and influence. According to Bolan, noticeably absent from the research on the decision process in the community is "...the quality and effects of the decisions themselves and the planning process that contributed to such decisions". Investigation of the spatial implications of community decision behavior has drawn even less attention. However, Wheaton recognizes that,

...metropolitan areas grow and take their peculiar form as the result of decisions to invest by public, private and nonprofit agencies of widely varying types and the decisions to move by individual business and others.

In contrast, geographers who have rarely been placed under policy pressure, have developed a body of research that carries important implications for understanding the behavior of communities. Research on the internal urban spatial processes such as migration, retailing, consumer behavior, industrial, commercial location, and perception have contributed significantly to the literature on the urban process. During the past few years, geographers have turned to a behavioral approach in their attempts to analyze urban spatial decisions. The research has produced better insight and knowledge of the mechanics and process underlaying the decisions made by individuals and business units as they go about choosing locations in urban space. However, there appears to be a void in geographic literature on the broad issue of community goal setting and decision behavior which is an important dimension affecting urban form. Goals, objectives, and plans are all important components of the policy mechanism; and in an age beset with urban problems, geographers have been conspicuous by their absence and neglect in this important area of research.
The first significant contribution to the research on this issue was put forth by Wolpert, Mumphrey and Seley. Although the spatial unit under investigation is the neighborhood, the authors present a discussion of the decision trace by means of "scenarios" to portray the process of community goal setting and conflict resolution. The authors discuss the formulation of both formal and informal strategies, policy implications and alternatives, and most important the need to recognize community power groups and the ever present problem of politics. In addition, they call for direct involvement by the community in the planning process. "Effective and intelligent community participation can be made an integral part of the planning process, with significant gains in efficiency and a fallout of benefits to other parties." Recognizing the complexity of the spatial planning process, the authors see a vital need for a locally based and operating planning unit that would provide analytic support for community decision-making. The unit called a "Community Technical Services" (CTS) would perform a number of tasks, such as evaluate public policy proposals, perform basic community research, and formulate goals and objectives. In addition, CTS would be a training ground for improving the skills of concerned citizens.

Assuming the establishment of a CTS, or a regional policy analysis center as proposed in Chapter II, the implementation of policy becomes the task of local leadership. Again, Wolpert recognizes the vital role of local leadership in affecting community change.

Leadership is of paramount importance to a community group; if it does not have to answer to its community, it fails to generate new leadership; if it fails to make relevant assignments for its staff and task force, and if it shirks its own responsibilities for community-improvement projects, then the community group will probably be ineffective. A good community leadership or lack of it will set the scene for community-agency discussions. When poor community
leadership exists, an agency will determine its own destiny in that community.\textsuperscript{26}

A similar point was made by Friedmann several years ago in his study of regional development policy in Venezuela.

Local leadership is decisive for successful adaptation to external change. Yet the quality of leadership depends on the regions development experience. Opportunities have to be perceived by someone. Foresight and the willingness to assume calculated risks are hallmarks of imaginative leadership. To the extent that a region's economic growth hinges on successful adaptation to external changes, local leadership must display these qualities to a high degree.\textsuperscript{27}

Closely associated with the problem of local leadership identification is the concept of citizen participation in the community development process. Those traditionally laboring in the field of community development, i.e., social workers, sociologists, anthropologists, view the involvement of individuals in the decisions which affect the destiny of the community as a vital and necessary prerequisite for progress. The definition of "community development" are legion, which is not unexpected in an area where so many disciplines overlap their activities. Biddle and Biddle view community development as a social process where human beings can control a small part of a complex and changing world.\textsuperscript{28} Others, such as Mezirow, view the community development process as the exercise of basic individual rights.\textsuperscript{29} During the past decade, the participation of citizens in community planning, public as well as private, has increased dramatically. Due mainly to federal government legislation, citizen participation is a mandated requirement in virtually all urban projects. Examination of the legislation which created Model Cities, the Office of Economic Opportunity (OEO), and the Community Action Program (CAP), reveals the commitment to the democracy of citizen participation. Projects funded by private agencies such as the Ford
Foundation have also made citizen involvement an important element of their urban involvement. Although still not fully developed, business is beginning to recognize the power of the consumer and the citizen.

Yet, citizen participation in the community development process can lead to frustration and delay in the implementation of action programs. To date, the record of citizen participation in the community development process can be best described as one of confusion and conflict. A recent analysis of the Model Cities Program reveals that after five years of the program's existence, it has not yet achieved legislative objectives concerning "quality of life" improvements in the disadvantaged areas of our cities. The report cites the inability of target cities to meet federal guidelines as one of the main reasons for the failure of the program to achieve its goals and objectives laid out in 1966. A number of recommendations are suggested in the report which would correct past deficiencies and pull the Model Cities Program back on course. According to one recommendation, the Model Cities Program will again rely on the quality of citizen participation in the future.

Establish a meaningful, coordinated and consistent federal policy with respect to resident involvement in local decision-making; such strategy to be based on at least initial reliance on local chief executives to initiate "reasonable man" efforts to secure resident participation in policy, planning and priority determination.31

The requirements for citizen participation in the community development process is a dilemma for those concerned with establishing urban policy. One can argue quite logically that citizen participation is part of our democratic heritage and is explicit recognition of the citizen as the ultimate voice in community decision-making. With justifica-

one can also argue that citizens cannot participate in all community
decision-making functions because of a lack of technical competence or appropriate experience. Herein lies the basis of the dilemma, "...the demand both for participatory democracy and expertise in decision-making". At this point in time, it seems safe to predict that citizen participation in community development will continue to be a force that must be recognized by the urban policymaker. By assuming this position, it is not meant to imply that citizen participation in community development programs leads automatically to conflict, confusion and stalemate. It is more a question of developing a citizen participation strategy for every type of community problem or opportunity. According to Burke,

...to imply that citizen participation is a single, undifferentiated and overriding strategy is misleading. It is more accurate to speak of several strategies of citizen participation, defined in terms of given objectives.

Since community planning and development operates through formal organizations, any strategy developed will be influenced by organizational demands in both time and space. For example, the community development strategy of the black community located in the inner city is operationally different from strategy designed by residents in suburbs. In addition, the constituency normally served by community development programs has expanded dramatically over the past two decades. Moreover, community development programs have become increasingly complex and call for the highest quality decision-making capabilities. The number of citizens capable of participating in advising on public policy issues is limited.

In summary, research has been presented to show the importance of citizen participation in the community development process. It has been argued that strong local leadership is needed for adapting to external
change. The task, therefore, is to choose a strategy of citizen participation that matches quality of leadership to the complexity of the community development program. It is proposed that this is one method that will upgrade the decision-making capabilities of the community. The next section will attempt to identify the community organization responsible for economic development.

The Responsibility for Community Economic Development

Who is responsible for the economic development of the community? From an economist's viewpoint the answer is, those economic entities who stand to either gain or lose profit as a result of economic change. However, this explanation assumes that the individual businessman makes decisions that take into account impact on the rest of the community. In reality, the businessman is concerned primarily with the successful operation of his firm. Yet, economic growth in the United States is achieved mainly as a result of aggregate individual private business decisions, to purchase or sell, invest or save, to expand or contract existing operations.

In the United States, the organization most closely associated with economic and business development is the United States Chamber of Commerce and their state and local affiliates. More precisely, the Chamber is organized to promote and sustain a "healthy business climate" in a community. Although, early history reveals that some chambers were organized to "protect" rather than promote the interests of the local business community. By 1962, the Chamber of Commerce was forced by changing economic and social conditions to embrace a new set of guiding principles. Based on these guidelines, it could be assumed that the local chamber of commerce is the organization that should be responsible
for the economic development of the community. However, investigation indicates that the entrance of the chamber into local economic development efforts has a very short history. According to Gilmore, most local chambers did not formally organize for the promotion of local economic development until after World War II. Gilmore's research also revealed that over 14,000 economic development programs were in existence in 1957-58. More than half were established since 1950, and three-fourths since World War II. The survey showed that almost 70 percent of these agencies responding were privately financed programs. In addition, the survey revealed that up to 31 organizations or agencies could be involved in area development in a community at any one time.

Expenditures for area development by both private and public organizations are shown in Table 7. If dollar commitment to area development is an indicator of interest in the economic health of a community, then the list of organizations drops from 31 to 22.

By proceeding in this manner, a community economic development program could be developed that relies on "group participation" rather than "citizen participation". Operationally, this approach should make decision-making for community economic development more manageable and less susceptible to the conflict and turmoil found in other citizens participation programs. Hopefully, this select group will have the technical knowledge and experience in business development, as well as the motivation to accept responsibility for the economic health of the community. This requirement is in line with at least one student of community organization.

Broadly based decision-making must be replaced by decision-making by a few, who then sell the task objective to others. The process of encouraging people to make their own decisions as to what is
### TABLE 7
EXPENDITURES FOR AREA DEVELOPMENT, 1957<sup>a</sup>

<table>
<thead>
<tr>
<th>Type of Organization or Program</th>
<th>Expenditures</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Reporting</td>
<td>$219,780,000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Privately Financed Programs</td>
<td>$126,751,000</td>
</tr>
<tr>
<td>Railroads</td>
<td>65,000,000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Community Development Corporations</td>
<td>19,000,000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Local Chambers of Commerce</td>
<td>11,307,000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Development Credit Corporations</td>
<td>9,298,000</td>
</tr>
<tr>
<td>Electric and Gas Utilities</td>
<td>8,004,000</td>
</tr>
<tr>
<td>Air, Highway and Water Carriers</td>
<td>5,607,000</td>
</tr>
<tr>
<td>Tourist Development Agencies</td>
<td>3,200,000</td>
</tr>
<tr>
<td>State Chambers of Commerce</td>
<td>2,244,000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>State and Local Development Councils</td>
<td>766,000</td>
</tr>
<tr>
<td>Area Development Associations</td>
<td>671,000</td>
</tr>
<tr>
<td>Banks</td>
<td>656,000</td>
</tr>
<tr>
<td>Local Industrial Development Groups</td>
<td>553,000</td>
</tr>
<tr>
<td>Regional Development Groups</td>
<td>346,000</td>
</tr>
<tr>
<td>Telephone Companies</td>
<td>99,000</td>
</tr>
<tr>
<td>Publicly Financed Programs</td>
<td>$ 93,029,000</td>
</tr>
<tr>
<td>State Planning and Development Agencies</td>
<td>27,861,000</td>
</tr>
<tr>
<td>Local Planning Organizations</td>
<td>23,213,000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Revenue and Municipal Bonds for Financing Plants</td>
<td>13,337,000</td>
</tr>
<tr>
<td>Local Redevelopment and Renewal Agencies</td>
<td>15,223,000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Port Authorities</td>
<td>6,475,000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>State Industrial Financing Authorities</td>
<td>4,431,000</td>
</tr>
<tr>
<td>Tourist Development Agencies</td>
<td>1,647,000</td>
</tr>
<tr>
<td>Municipal and County Development Agencies</td>
<td>842,000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup>Based on Appendix Table 2  
<sup>b</sup>Estimated total from reported expenditures.

good for them thus gives way to the process of convincing them of what a change or small group of leaders thinks is good for them.36

The approach is in line with the theories of business organization and administrative behavior proposed by March and Simon.37

By adopting a self interest organizational strategy for community development, one possible solution to Burke's citizen participation-decision-making expertise dilemma may be provided by the self-interest approach.38 With this problem resolved, we will now attempt to develop an organizational strategy for community economic development.

Organizational Strategy for Community Economic Development

The "self interest" approach is in line with Katona's theory of behavior,39 and the theory of the firm according to Chamberlain.40 The "exchange theory" of social behavior also appears to lend support to the self interest hypothesis. The theory was formulated by Homans on the basic assumption that social behavior occurs as an effort to maximize "profits". Profits are defined as personal rewards minus personal costs gained by exchanging resources with other persons.41 The exchange theory was applied with success by Clavel who attempted to organize a rural county planning board in upstate New York to undertake an economic development program.42

Assuming that the behavior of a local economic development group would resemble to some degree the planning board studied by Clavel, several of his conclusions are presented. First, he found that the board was lacking in technical resources which in turn affected their ability to make decisions. Second, he noted the existence of a close relationship between goal determination and the relative availability of technical resources. These observations prompted him to suggest four possible
community decision-making environments.

1. Consensus on goals and scarce technical resources. This might be termed the traditional rural situation where the population is relatively homogeneous and specialized skills are scarce.

2. Consensus on goals and plentiful technical resources. A few selected communities of small and medium size approach this level of capability.

3. Conflict and plentiful technical resources. This is the typical situation found in large urban areas.

4. Conflict and scarce technical resources. This situation is perhaps most descriptive of the decision-making environment found in most small and medium size cities.

Clavel's research suggests that spatial factors influence community decision-making. Thus, the decision process can be described as a problem of conflict resolution, where reaching consensus is a function of size and location of the community, and the level of human and technical resources. This observation suggests that the group selected for establishing and implementing economic development goals and strategies be allocated decision-making resources based on the location and size of the community. Unfortunately, Clavel could not isolate the process of conflict resolution necessary for achieving group consensus.

A prerequisite for achieving consensus is the adoption of a group participation strategy. The strategy selected is a function of group characteristics, community environment and spatial factors. In a study on citizen participation, Burke was able to identify five strategies for application in the planning process. They are education-therapy, cooptation, community power, staff supplement, and behavioral change
strategies. Although all five organizational strategies are attractive, only the behavioral change and staff supplement strategies appear applicable to community economic development issues.

The staff supplement strategy is vital for the survival of voluntary organizations. In reality, this strategy recruits individuals in the community for assignments that cannot be carried out by the staff. The objective of this strategy is to exploit the benefits of voluntarism in order to achieve the goals of the organization. Managers of chambers of commerce are proven masters of this strategy as are Boy Scout leaders and other community organizations. Although the price of voluntary community resources is attractive, the cost of their decisions may be very high. If the volunteer has little to lose, his decision may be treated as just another opinion and of little benefit for achieving the goals and objectives of the organization.

The behavioral change strategy is deliberately oriented to change and is aimed at influencing individual behavior through group membership. The objective is to induce change in a system by changing the behavior of either the system's members or influential representatives of the system. Change is accomplished by involving group members in the decision-making process which can lead to a commitment to new objectives. Behavioral change in the group calls for a "clear and open" communications network with undistorted information flows that can be shared by the group. Furthermore, groups that are highly motivated produce high quality decisions because of the several mechanisms available for reaching consensus. Burke believes that the behavioral change strategy appears to be a highly effective model for planned change. The use of "model" might imply that there is a theory of community organization.
Unfortunately, this premise must be discounted immediately. "There is at present no theory of community organization as such nor is such a theory eminent."45

Despite the lack of a theoretical base for organizing communities, there appears to be sufficient empirical evidence to support testing a community economic development strategy. According to Burke, "The behavioral change and the staff supplement strategy appear to be the most appropriate for planning."46 The approach appears also to be applicable for community economic development planning. Both strategies emphasize the need for high quality human and technical resources, highly motivated individuals, and group consensus. However, whether the community economic development process operates in the same manner as community planning or not, is an issue that must await further empirical research.

As a final step in the process of organizing for community economic development, a conceptual scheme for community decision-making is presented. A classical model of individual rationality was constructed by Bolan as an attempt to describe how community decision-making may occur in reality.47 A simplified version of that model is presented in Figure 3. In simple terms, the individual is faced with either a problem or an opportunity. His response is determined by the nature of his environment and the values he has acquired from prior experience and cultural or social traditions. Should he desire to act (see Figure 3) he establishes a goal or objective (step 1). Realizing that he has limited resources and time, he weighs a set of alternatives and tradeoffs (step 2). The consequences of each alternative is predicted. An alternative is chosen that will achieve the desired goals with minimum
FIGURE 3
A SIMPLE MODEL OF RATIONAL BEHAVIOR

1. Establish a Goal or Objective
2. Evaluate Alternatives and Consequences
3. Implement Decision Strategy
4. Goal Satisfaction
5. Decision Evaluation
6. Problem or Opportunity
cost and effort (step 3). In this manner, a method of goal achievement is selected and acted upon (step 4). The degree of goal satisfaction is evaluated and becomes a part of the individual's history of experience (step 5). Based on this process, there is a re-evaluation of past decisions that serve as a guide to the next decision situation (step 6).

It is assumed that the individual will follow each step with precision and logic. In reality, rational decision-making is an imperfect process. The literature is quite explicit on this point.\(^{48}\) If the decision process is imperfect for an individual, then this would suggest that the decision-making process is even more complex for a group or a community. Yet, many of the same elements and process steps appear to be present in both individual and group decision-making situations.\(^{49}\) It is assumed that any community attempting to resolve an issue must go through a similar process in order to reach a decision and undertake action. Based on this conceptual scheme, we are now in a position to offer a more precise method for developing a strategy for community economic development.

**A Strategy for Community Economic Development**

This section will develop a conceptual model for establishing a strategy for community economic development. The model is designed to replicate a process believed to be necessary to produce a decision to implement a strategy that will change the economic health of a community. The model of this process is presented in Figure 4. It is immediately apparent that the model bears a strong resemblance to the simple model of individual rational behavior found in Figure 3. In this version, we have an aggregate model depicting the behavioral response of a group to changes in local economic conditions.
FIGURE 4
A CONCEPTUAL MODEL FOR COMMUNITY ECONOMIC DEVELOPMENT

A

Economic Inventory Analysis

Community Economic Health

Community Development Goals

Development Potential Model

Community Development Policy

Development Consequences and Alternatives

Yes

No

Community Development

B

Policy

Evaluation

Yes

No

C

Community Marketing Program

Community Economic Development

[Diagram showing the flow of concepts and decision points related to community economic development, including inventory potential, analysis, planning, and evaluation processes.]
Briefly, the sequence of events begins when the group most concerned with the economic health of the community decides to intervene in the development process. Based on an inventory and assessment of the community economy (step 1), a set of development goals and objectives are determined (step 2), from which a community development policy will emerge (step 3). Policy alternatives will be weighed for possible consequences. If a policy alternative is assessed to produce negative or very marginal results, the group can decide to return and restructure the goals and change the policy (step 4). Should the policy alternatives be positive, the decision to implement a development strategy is made (step 5). After implementation, the strategy is evaluated as to the impact of the decision on the economic conditions of the community (step 6). If the strategy has failed to accomplish the objective, then the goals of the community must be restructured based on the strength of the negative feedback (step 7). In other words, the economic health of the community is the dependent variable where change is a function of community development policy. Thus, the model is conceptually neat, logical, and provides a description consistent with a real world process.

Unfortunately, the process of economic development is subject to the demands of time and the friction of space. The results of an economic development strategy may only be observed after a period of time has elapsed. Each strategy has a gestation and maturation period of varying lengths of time. For example, a policy of development control can be accomplished in a relatively short period of time. Policy to stimulate economic development, on the other hand, evolves over a longer time period. If a community establishes a policy of stimulation and the strategy is proven to be incorrect, several years may have passed
between the decision to implement and the realization of failure. In contrast, development control strategies are accomplished through the power of zoning and can be made either more restrictive or permissive through the political process. Therefore, there is a greater need for increasing the decision-making capabilities of communities with respect to economic development stimulation strategies rather than economic development control strategies.

In addition to the time problem associated with economic development policy, there are other factors that present significant obstacles to community development goal satisfaction. To repeat, a local economy is functionally dependent on changes in national economic conditions. In Chapter II of this study, it was argued that communities are reactors and adjustors to decisions made by the federal government and corporations. The impact of these decisions can generate economic conditions that could result in a community being classified as congested, because of rapid economic growth, or depressed, due to economic stagnation. Thus, not only must the present level of economic health in a community be determined, but there must be an understanding of why the present condition exists. Armed with the results of an analysis of the economic condition of the community, a group can begin to consider development goals and establish development policy. However, the process of setting goals and policy for a community is also subject to the stresses and strains of the socio-political environment of the community and the character of the group engaged in decision-making. Community decision-making that disregards these factors is subject, at a minimum, to frustration, and ultimately to failure.

To elaborate on this important point, a more specific form of
Bolan's community decision-making model is presented in Figure 5. Four independent variable sets are assumed to influence decision outcomes. Variable set 1 calls attention to the importance of the character and quality of the "actors" involved in the process role. Recognition of actor capability creates the potential for specialization of process roles which in turn will aid in reducing conflict. The decision field characteristics outlined in variable set 2 also has substantial impact on community decision-making. Here the important roles of functional specialization, social differentiation, and the degree and character of leadership and power structure in the community are recognized.

For the moment, bypass variable set 3. The character and origin of issues or problems that permeate the social fabric of every community is considered in variable set 4. Ideological tensions and controversy due to polarized views on economic philosophy can present a significant barrier to the process of community decision-making. Finally, for the purpose of establishing community development policy, variable set 3, planning and action strategies, is critical. It is at this point in the sequence where technical methods for problem solving must be applied if decision-making in the community is to be upgraded. To accomplish this task, it will be necessary to insert three technical stages to the conceptual model previously presented in Figure 4. To begin, the first technical state (A) that enters into the model is an inventory and analysis of the strengths and weaknesses of the local community. The economic health of a community can only be determined by conducting an economic inventory and survey to determine the strength of the economic base of the community.50

A key element in the task of upgrading the ability of local
FIGURE 5
THE CONCEPTUAL SCHEME FOR COMMUNITY DECISION-MAKING

<table>
<thead>
<tr>
<th>Initial Premises</th>
<th>Process Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Structuring and defining ideas as proposals</td>
<td></td>
</tr>
<tr>
<td>II. Identifying the properties of alternatives</td>
<td></td>
</tr>
<tr>
<td>III. Structuring the decision field</td>
<td></td>
</tr>
<tr>
<td>IV. Engaging in the overt decision-making process</td>
<td></td>
</tr>
<tr>
<td>V. Carrying out the consequences of decision process</td>
<td></td>
</tr>
</tbody>
</table>

Independent Variable Sets Influencing Decision Outcomes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Process role measures</td>
<td>Formal structure</td>
<td>Relation to decision focus</td>
<td>b. Distribution of effects</td>
</tr>
<tr>
<td>Actor motivation</td>
<td>Informal structure</td>
<td>Method strategies</td>
<td>c. Flexibility</td>
</tr>
<tr>
<td>Actor opportunity</td>
<td>General policy structure</td>
<td>Content variables</td>
<td>d. Action focus</td>
</tr>
<tr>
<td>Actor skills</td>
<td></td>
<td></td>
<td>e. Predictability and risk</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Decision Outcomes</th>
</tr>
</thead>
</table>

leaders and groups to make decisions is the assumption that needed information is available in sufficient quantity and quality. A regular flow of sound economic information analyzed in such a manner that it provides the intelligence that will contribute to the quality of decisions made at the local level is vital. At a minimum, studies at the local level might be directed to provide information for informed public and private decisions in three broad areas, (1) the sources of current income and employment, (2) the prospects for economic growth or decline, and (3) relationship of land use and community services to economic growth or decline. Even by itself, the addition of stage A into the model will have a significant impact on the decision-making qualities of local business and community leaders.

At about the same time the economic base approach was introduced into the community economic process, some local groups began to implement their development strategies through advertising and marketing techniques (see Figure 4, stage C). Although the marketing of a community is a necessary ingredient to the community development process, it will not be discussed to any degree in this study. Marketing and advertising and promotion can also be classified as a "place prosperity" strategy and is one way of expressing locational preference in the spatial distribution of economic activity. In this dissertation, promotion and advertising is held to be a non-productive effort and an inefficient method for allocating resources in space because it fails to account for the power of national and regional economic forces. However, it is also the position of this study that a community marketing program can contribute to the efficient allocation of resources and add to total national product if the marketing strategies are based on sound analysis
of community development potential.

Toward this objective, a third stage is added to the conceptual model for community economic development with the capability of assessing the development potential of a community (see Figure 4, stage B). The economic development potential of a community is subject to a number of influencing forces such as national and regional shifts in production, employment and population. The locational position of the community in relation to these shifts and changes will have a significant impact not only on the present economic health of the community, but also development potential. From another point of view, the development potential of a community is a function of, the quality and quantity of human resources, infrastructure investments, and physical resources. Yet, despite the complexity of the economic development process, it is essential for government and business leaders of a community to have a method for determining economic development potential.

The task, then, is to build a model that will determine the economic development potential of a target area. The economic potential model is a key element in the community decision-making process. The model will be used as a decision-making tool that allows community leaders to set realistic economic development goals, assess the consequences and alternatives of their strategies, and evaluate the possible impact of policy decision on the economic health of the community. The next chapter will discuss the evolution and mathematical development of a regional potential model.
NOTES TO CHAPTER IV


2. The process of urbanization has attracted the attention of many scholars in the social sciences. A few sources can be cited. A compilation of articles prior to 1960 can be found in:

Harold M. Mayer and Clyde F. Kohn, Readings in Urban Geography (Chicago: The University of Chicago Press, 1959). See also,


3. Harvey, op. cit., p. 3.


7. Eight case studies and local examples of applying nongrowth principles can be found in:


8. A few examples on the subject are in order. Probably the best but most controversial is:

Also see the following for other versions of the problem:


9. Smith, op. cit., pp. 442-444. Also see,

Hoover, op. cit., p. 261.


38. Geographic inquiry into community organizational behavior is a bit thin but the following sources by regional scientists appear to treat the subject in depth.


44. Burke, *op. cit.*, p. 293.


48. March and Simon, *op. cit.* See especially Chapter Six, "Cognitive Limits on Rationality".

49. Meyerson and Banfield, *op. cit.*, pp. 312-322.


Perhaps the best single source on industrial development marketing is:

Dick Howard, Guide to Industrial Development (Englewood Cliffs: Prentice Hall, 1972). The following sections are relevant to this issue:


Input-Output and Regional Economic Development Policy Models

This chapter has two objectives. The most important is a discussion of the evolution and mathematical development of a regional potential model for the State of Ohio. The second objective is a brief review of past research efforts in building mathematical and computer models for determining state and regional economic development policy. The models selected were chosen because of their design characteristics, assumptions, and the resultant problems that may be encountered in policy situations. Recognizing the strength and weakness of complex economic development models is vital and necessary for those using computer models to establish regional development policy. The discussion of the models in this chapter by no means completely covers the field, nor is it an exhaustive search of the literature on the subject. The purpose of the first part of this chapter is to highlight some of the technical problems that are inherent to model building which may have an effect on policy.

Several economic development models were reviewed in Chapter II of this study. Since the model used in this dissertation is based principally on the input-output methods, this section will discuss models that use industry transaction tables as a means of determining inter-industry flows and linkages. This technique is known by some as inter-
industry economics,\textsuperscript{1} and by others as national input-output analysis.\textsuperscript{2} Isard and Cumberland were instrumental in stimulating the use of input-output techniques for regional analysis.\textsuperscript{3} However, Isard stated pessimistically that because of data shortcomings, "We find that no inter-regional input-output table has yet been completed which has enough detail within it to be of use for studying a region's economy".\textsuperscript{4} Perhaps Isard's statement was a signal that stirred interest in developing sub-national input-output models to be used for establishing regional policy. In any case, a number of such studies were undertaken and several have been selected here for discussion.\textsuperscript{5}

The New York Metropolitan Region Model (1956)

The New York model was designed to forecast employment, output and value added for 43 industrial groups for the years 1965, 1975, and 1985. The 43 selected industries were divided among those serving local markets (10), export only (8), and those serving both (25).\textsuperscript{6} Factors influencing the location of the national market industries in the New York area were assumed to be outside the projection model. Local firms serving national markets were assumed to have national market shares relatively unaffected by internal factors within the region or by the rise of competitive location sites elsewhere in the national economy. Price levels within the region were assumed to retain a constant relationship to national price levels. Based on these assumptions, one could rule out interregional movements of capital or investments. These assumptions are highlighted mainly to draw attention to the obvious. A model that is used for projections or policy decision-making reflects, not only the quality of the data and the mathematical design, but is also influenced by the operational assumptions of the researcher.
Since the New York model is based on input-output economics, it is also subject to the weaknesses of that technique. For example, the inter-industry coefficients used in the model were taken from the 1947 national input-output table. As a result, the model used 1947 fixed input-output coefficients to forecast economic conditions two decades into the future. Another problem was the use of national coefficients at the regional level. Depending on the size and composition of the region, there exists an inverse relationship between regional and national coefficients. The smaller the region, the greater the disparity. However, despite recognition of these disparities, national coefficients were still used in the New York model. Therefore, the model builder may be perfectly aware of technical imperfections, but the model is still used because there is no other alternative. The technical compromise in the New York model is an example of the science and art of model building.

The Upper Midwest Economic Model (1960)

The purpose of the Upper Midwest regional study was to develop basic data for 1960 and to make projections of employment, income, population, and migration in 1975. Basically, the model is of the interregional multiplier type except that the determination of the demographic variable does not come out of the economic model itself. It was assumed that 1975 would see zero out-migration, regional industries maintaining 1960 national market shares, and income increased in the region at national rates. These assumptions are somewhat constraining from a policy viewpoint as they are presumably the components most models attempt to predict.

The input-output portion of the model uses 38 income generating
sectors or industries plus exogenous estimates for agricultural and military income. In contrast to other models, the Upper Midwest model uses interregional trade flows to specific regions instead of sales to industries. Income flows by state and industrial sectors were estimated from data found in the 1958 U.S. Census of Manufacturers. This approach is an example of an attempt to calculate production coefficients based on data taken from a secondary source. However, the true test of the model is based on whether the Upper Midwest region will indeed have, national market, employment, and income shares in 1975 similar to those existing in 1960. Economic development policy established as a result of the output of the Upper Midwest model should take these assumptions into account before implementing economic policy.

The Ohio River Basin Model (1964)

The model was designed to provide projections to the year 2010 for employment and income as part of a comprehensive study of water development related activities in the Ohio River basin. Designers of the model assumed that 1958 input-output coefficients would be available for use. The tables were not released in time and it was necessary to update the 1947 coefficients by using a form of shift-share analysis to derive new coefficients. In this example, the problem is one of using dated and estimated national production coefficients at the regional level. Adding to the design problems was the explicit assumption by the designers that water would be available in sufficient quantities at all times to support the projected economy. This produces a river basin model that does not contain a water sector. Therefore, the Ohio River basin model is hampered not only by the standard input-output technical difficulties but also by the use of "updated" coefficients and expedient
short cut techniques. Those using a model design of this type should be aware of the shortcomings before using the results to establish regional economic policy.

The California Development Model

The California Development Model was built to forecast personal income and employment on a quarterly basis by major state industry groups from 1960 to 1975. This effort is an example of model building developed subject to changing methodological procedures by model builders. As a result, the California model was built in two phases. To account for the spatial component of regional development, the designers attempted to use input-output analysis and the export base theory into the econometric structure of the model. The phase one effort was quickly abandoned because the three types of analysis were operationally incompatible. The lesson learned here is that technical compromise, in order to justify spatial components in a regional development model, can result not only in operational difficulties, but also lead to problems in the interpretation of output.

The phase two version of the model attempted to correct these problems and produce a truly interregional economic model. According to the preliminary design, the state was to be divided into four regions plus another "region" representing the rest of the world. To accomplish this task, data was required from individual firms doing business in California. However, the final form of the model resembled more the phase one version rather than an interregional model. Apparently the designers encountered data problems that made it impossible to design a regional model, and were forced to compromise with the earlier version. The phase two experience highlights the data problems encountered in
the construction of regional economic development models. Even with adequate survey data and the availability of a suitable technique for analysis, the problem of reconciling the spatial component in regional models is extremely difficult.

The Oahu, Hawaii Planning Model

In contrast to the modeling efforts previously described, the Oahu Model stands out as uniquely different in several ways. Most important is the conscious attempt by the designers to specify and include planning goals within the model structure. The model was designed to project economic growth as a function of exogenous spending that would achieve four planning goals. In quantitative terms, the goals were to be expressed in terms of income distribution, desired population level, trade deficits, and non-federal government budgets. The demand for labor was divided into three groups, with income used as a proxy measure for skill levels. Although proxy assumptions are an acceptable method of operationalizing models, interpretations of the output must be made with caution, especially if the results are to be used to set state policy.

Often researchers, in their desire to correct the structural weaknesses of a model and to improve the quality of the output, resort to the practice of "fine tuning". By fine tuning, is meant that the designers will relax certain features of a model in order to achieve a desired result. For certain critical industrial categories in the Oahu Model, an effort was made to assign weights to variables to account for certain non-linearities such as scale economies and relative price changes. Relaxing model constraints and correcting for fixed input-output coefficients is a commendable goal, but more problems may have
been created than solved. How are the weights to be determined? What sectors of the economy are critical? The Oahu model designers also used an estimating procedure for determining certain industrial coefficients that were not covered by the normal survey method. Coefficients were estimated from local sales data.

The use of proxy variables, the relaxation of model constraints, and the use of data estimating procedures are acceptable techniques used to operationalize and fine tune economic models. However, taken from the perspective of those responsible for establishing economic policy, the user of an operational model of this type must be made aware of the "real" quality of the output. In short, how valuable is the output for decision-making? From a slightly different view, should a model be used for decision-making solely because it is operational? A possible answer to this dilemma may be found from the Hawaiian experience with the Oahu Model. In the State of Hawaii, the model is employed as a planning and learning device. For example, the model is used to test the possible effects of alternative policies dealing with fiscal matters, exports, and public expenditures. Applied in this way, the model may lead to a better understanding of the Hawaiian economy and reveal areas for future study. Thus, the experience of Hawaii suggests that in addition to their explanatory and predictive powers, models have educational value that could be beneficial for establishing regional economic policy.

The Harvard Economic Research Project

Perhaps one of the more ambitious efforts to construct an inter-regional input-output model was undertaken in the Harvard Economic Research Project (HERP).14 Five major sets of multi-regional input-output data were compiled for each state: base year outputs for employment and
payrolls, 1963 inter-industry flows, 1963 interregional trade flows, base year final demands, and 1970 and 1980 projected final demands. The HERP was able to compile a consistent set of multi-regional input-output tables for each state of 1963. For all except the interregional trade flows, the data was assembled for 86 industries in 51 regions (50 states plus the District of Columbia). The HERP effort has produced the first truly multi-regional input-output (MRIO) model in the United States. Despite the breakthrough of HERP, multi-regional input-output computations are still considered to be in an experimental stage.

The HERP was able to demonstrate that it is feasible to implement MRIO models with a large number of industries and regions, produce inverses, and get quick solutions through iteration. However, considerable work needs to be done on several important structural problems. These problems include more research on the gravity model concept, effects of data manipulation, and interregional trade data.

Perhaps, most importantly, economic understanding of the entire MRIO system of accounts must be acquired, so that altering any part for computational reasons will become something more than an expedient method of obtaining results. In short economic theory, the theory of linear algebra, and computational practice must be integrated if the MRIO model is to be used for analysis of regional economic policies.15

The Texas Model

The Texas Model was designed to be used as a tool to provide information about the economy of the state, and for the evaluation of economic effects of alternative public policies and programs. Thus, the Texas Model is explicitly policy oriented.16 Recently, the Texas Model was used to assess the impact of the energy crisis on the economy of Texas.17 It appears that with the anticipated greater role of states in resource allocation problems (i.e. the energy crisis), greater
interest and support can be expected in the construction of regional input-output models.\textsuperscript{18}

There is little doubt that the input-output technique lends itself nicely to the assessment of impacts of economic policy measures. The key element that makes input-output analysis possible is the inter-industry tables of data. The basic set of data is termed "transactions data for detailed industries" which shows the dollar values of the transactions among the various industries.\textsuperscript{19} Based on the transactions data, a direct requirements table is constructed which relates each of the inputs of an industry to its total output. By tracing the flows and the interconnections through the direct requirements table, the total output required from each industry needed to produce $X$ number of dollars of a product can be derived. This procedure can be time consuming and laborious. Therefore, a third table is usually constructed called the "total requirements" table which makes it possible to calculate the impact on the various industries of the economy which result from stipulated changes in demands.

In summary, the models selected for discussion were chosen because they were thought to be fairly representative examples of the methods and techniques used to apply inter-industry economics to the study of state and regional economies. A conscious effort was made to highlight the techniques and assumptions that were used to operationalize the models. As part of that effort, it was intended that the user be made aware of the problems and subsequent impact that these methods could have on policy efforts. The models discussed in this section by no means exhausts the efforts and the use of input-output techniques for analyzing sub-national economies.\textsuperscript{20} To date, the main applications of input-output
in regional analysis has been local impact studies, regional balance of payment studies, and interregional flow studies. Only recently has the input-output technique been used to determine the regional industrial potential of an area. This approach will be discussed in the following section.

The Regional Potential Model - Phase One

Assessing the economic potential of an area has been a major concern for those individuals interested in the start-up of a new business enterprise or for the established business concern interested in expanding their operations to meet expected market opportunities. Responsibility for economic or market potential analysis has traditionally fallen to the entrepreneur or business organization. The problem has been viewed as a task of analyzing the potential market for a product or a service, or determining the locational feasibility for a new or expanded production facility. In either case, the analysis was undertaken with full knowledge of company requirements and needs. One task is to screen the many possible areas in the country that satisfy the requirements of the firm. For the large corporation or firm, this type of location potential analysis can be readily undertaken by staff within the organization. Smaller firms, on the other hand, attempt similar analysis but with less resources resulting in possible inaccurate determination of potential. However, even the large corporation or firm could make a poor analysis of potential if the information and data on a region are of poor quality. It appears that accurate assessment of potential is a function of the quality of the information available in the firm and the quality of the data on the areas under consideration. Therefore, the objective of economic potential analysis is to match the requirements
Another way of analyzing the problem of economic and market potential is to focus on the economic development needs of a target area. In this situation, the task is to search for the firm with requirements that are satisfied by the resource base of the target area. This method is a reverse of the procedure followed by a firm. Unfortunately, a community or a region conducting an analysis of this type is faced with a number of obstacles. Most important, data on the requirements and operating characteristics of a specific individual firm are almost never available. Therefore, local economic development programs more than likely address themselves to the search for certain types of broad industry groups such as steel, chemicals or automobiles. In addition to the lack of data on an individual firm, a community may not have a proper inventory of their own resource base, the technical expertise for performing the analysis, the financial resources to implement a development program, and may be critically lacking in talent able to make decisions concerning economic development priorities. In short, a community may lack the analytical, financial, and managerial capabilities necessary for decision-making.

The Regional Industrial Potential Model (RIPM)

The inability of a community or a region to assess the economic potential of their area is what led Sweet to develop an industrial potential model that could identify satisficer locations for industries. The first design of the model was suggested by Dr. Emilio Casetti to David Sweet, then a student at the Ohio State University, Department of Geography. Dr. Sweet developed and tested the model for his Ph.D. Dissertation. Dr. Leslie King contributed much to the operationalization
of the model and to the development of the distance algorithm used in it. In simple terms, the model is designed to compare a matrix of industry orientations or requirements with a resource matrix defined for a spatial unit such as county, region, or state. An algorithm operates on the matrices producing output which provides a quantitative measure for describing the level of potential for an industry in a prescribed spatial unit. Each industry can be ranked from highest to lowest potential for that area.

The foundation for the analytical method used by Sweet to measure potential evolves from a spatial analytic technique described in the literature as "nearest neighbor" analysis, where distances between points in space are analyzed as patterns. This method is described by King who views the procedure as a measure of similarity when the points are described in two dimensional or Cartesian space. As such, the distance measure between any two points is given by the Pythagorean theorem. Mahalanobis is recognized for having derived a generalized distance statistic known as the $D^2$ statistic. His methodology called for the distance statistic $D^2$ to be derived from calculations based on the difference between group means for the same variate. Geographers have employed the $D^2$ method mainly as a means of classification and regionalization of spatial information. King used the method to analyze changes in urban groupings over time, and then applied the $D^2$ to measure differentiation between urban growth categories in two separate geographic areas. Here again, the analysis was performed on distances representing the same type of observation units.

The method suggested by Dr. Casetti makes a radical departure from these efforts by proposing to determine potential by measuring distances
between two different types of points. According to this method, a point representing a vector of industry characteristics and a point representing a vector of subregional characteristics is plotted. The distance between these points is interpreted as a measure of industry potential. However, potential includes multiple factors that are used in characterizing the industry requirements and regional resources so that the vector points must be plotted in N-dimension space. A grouping algorithm is used to operationalize the model and provides the distance measure which will express potential. The use of the \( D^2 \) statistic and the grouping algorithm as a method to achieve a measure of potential raises a question whether the \( D^2 \) statistic is the best technique to measure potential in space. In order to answer this question properly, a brief overview of the regional industrial potential model is necessary.

The conceptual model is presented graphically in Figure 6. Two matrices are developed representing industry requirements and sub-regional resources. Based on a review of the literature, Sweet chose markets, suppliers, transportation, and labor forces as the four most significant factors considered when a plant location decision is made at the regional level. Fifteen equations are used to estimate the industry matrix and fifteen equations are used to estimate the subregion matrix. The industrial requirements matrix \( X \) is defined when each element of \( X, x_{ij} \), denotes the requirement of industry \( i \) for resource \( j \). Where, \( (i = 1, \ldots, I) \), and \( (j = 1, \ldots, R) \). In like manner, the subregion matrix \( Y \) is defined when each element of \( Y, y_{kj} \), denotes the availability in subregion \( k \) of resource \( j \). Where, \( (k = 1, \ldots, S) \) and \( (j = 1, \ldots, R) \).
FIGURE 6
REGIONAL INDUSTRIAL POTENTIAL MODEL

Define Industries (4-Digit OBE Classification)

Determine Industry Requirements

Market Orientation
(1)Intermediate
(2)Consumer

Supplier Orientation
(1)Raw Materials
(2)Intermediates
(3)Other Services

Transportation Orientation
(1)Rail
(2)Highway
(3)Air

Labor Force Orientation by Education Level

Industry Requirements Matrix

Operational Algorithm

Define Subregions (Multicounty units)

Determine Subregion Resources

Market Potential
(1)Intermediate
(2)Consumer

Suppliers Available
(1)Raw Materials
(2)Intermediates
(3)Other Services

Transportation Available
(1)Rail
(2)Highway
(3)Air Terminal

Labor Pool Available by Educational Level

Subregion Resources Matrix

Rank Potential Industries

With the requirements and resources matrices calculated, it was necessary to standardize the data in each matrix column so that data can be compared on equally scaled axes. Sweet accomplished standardization by scaling each factor from a value of 0.0 for the lowest value and 10.0 for the highest value in each sector. The exception is the transportation data in the subregion matrix where the largest distance value is scaled at 0.0 and the smallest distance value at 10.0.

The model is made operational by calling into the procedure the $D^2$ statistic grouping algorithm. The distance, or "match" between the requirement vector and the resource vector is expressed by,

$$d_{ik} = \left[ (y_{k1} - x_{i1})^2 + (y_{k2} - x_{i2})^2 + \ldots + (y_{kR} - x_{iR})^2 \right]^{\frac{1}{2}}$$

$$= \left[ \sum_{j=1}^{R} (y_{kj} - x_{ij})^2 \right]^{\frac{1}{2}}$$

This "basic" version, however, was found to be unsatisfactory for two reasons, (1) the relative importance of one requirement may not be the same as that of another, and (2) a subregion with an excess of a resource should not be treated in a similar fashion as a subregion with a deficiency. To correct these problems, a weighting factor was introduced where $W_{ij}$ represents the relative weight of the requirement of industry $i$ for resource $j$, and ($i = 1 \ldots I$) and ($j = 1 \ldots R$). The weighting factor modifies the basic version described in (1) to be redefined as,

$$D_{ik} = \left[ \sum_{j=1}^{R} W_{ij} (y_{kj} - x_{ij})^2 \right]^{\frac{1}{2}}$$

Where:

$$W_{ij} = \begin{cases} 0, & \text{if } (y_{kj} - x_{ij}) \geq 0 \\ a_{ij}, & \text{if } (y_{kj} - x_{ij}) < 0 \end{cases}$$
The final output will be a matrix $D$ where each element $D_{ik}$ in the matrix is an expression of the weighted distance between the grouped resource and requirements vector points. This distance value is interpreted as a measure of industry potential in a subregion under evaluation. Should $D_{ik} = 0$ this would indicate that all industrial requirements are satisfied by that region. Increasing distance measures indicate a poor match between the industrial requirements and subregional resources.

The $D$ matrix shows $I$ industries on the column and $S$ subregions on the row. By comparing industries in a column, it is possible to determine which industry $i$ has the highest potential in a subregion $s$. Row comparisons indicate which subregion best satisfies the requirements of an industry. In brief, this describes the basic design of the regional industrial potential model.

The Regional Industrial Potential Model (RIPM) was given empirical verification in the Coastal Plains Region of the United States in early 1970. According to Sweet,

> The results of the model would appear to be reasonable, given the constraints established by the selection of specific location factors and the fact that the relative importance of each factor is determined by the set of test industries selected.\(^{32}\)

The output is basically a 28 subregion by 30 test industry matrix. The subregion set indicates the potential of "$I" test industries for "$R" subregions.\(^{33}\) Another version of the output ranks 30 test industries for a single subregion.\(^{34}\) Although some discussion of the output is given, Sweet does not provide any interpretation of the "scores" nor does he offer any directions for implementation of the output.
The Regional/Industrial Allocation Model (RIAM)

Shortly after the Coastal Plains Region experience, the RIPM was applied to an economic development program in the Four Corners Region of the southwestern part of the United States by a research team of the Battelle Memorial Institute from Columbus, Ohio. Battelle changed the name of the RIPM to Regional/Industrial Allocation Model (R/IAM). The mathematical structure of the model remained virtually unchanged from the version applied in the Coastal Plains Region. However, the Four Corners effort saw the introduction of research objectives which suggested that the R/IAM could be used as a decision-making tool for economic development.

The identification of test industries was accomplished through a survey of community development leaders to determine what they considered to be the most important goals, barriers and advantages for economic development in the Four Corners Region. By this method, the first major screening reduced the number of possible industry groups from 413 to 145. In addition to the input of the local leadership survey, Battelle employed a screening matrix to further refine the industry choices to "desirable" industries. The desirability screening matrix used eleven criteria for determining the desirability matrix. The eleven criteria selected for use in the screening matrix are listed below.

1. Size of establishments (high mean)
2. Location of industrial establishments
3. Forward industrial linkages
4. Backward industrial linkages
5. Degree of presence in region
6. Short term growth rates
7. Projected growth rates
8. Level of labor intensity
9. Wages
10. Skill level of labor required
11. Size of establishments (low mean)
This procedure in turn reduced the number of industries to 100 "desirable" industries. The desirable set of industries were then entered into the R/IAM to determine economic feasibility and potential. The output of R/IAM scores was transformed to a four level ranking system presumably for ease of interpretation. The functional relationship or each component of the Four Corner Project is presented in Figure 7.

The Battelle Four Corners effort introduced several innovations into the design of a regional economic development program. Most important is the use of local leadership decisions as input into the industry selection process, and the recognition of regional development goals as well as development obstacles. Far reaching as these innovative program techniques may be, that portion of the Four Corners program based on R/IAM output may require modification if it is to be used by local development groups.

The main problem with the phase one effort concerns the difficulty with interpreting the final "scores" of the output. In both phase one versions, a perfect match between industrial requirements and regional resources is computed as 0.0. Increasing distance measures indicate a poor match between the industrial requirements and subregions matrix. Does an industry which receives half the potential score only satisfy fifty percent of the requirement? Apparently the algorithm used in the phase one effort does not allow for this type of interpretation of the potential score. In addition to the problem of interpreting potential scores, the output of the phase one effort does not provide enough information on regional potential indicators. Important to the decision-making process, whether it be done by industry or the community, is information on the size and dollar potential of markets, location of
FIGURE 7

STEPS IN THE FOUR CORNERS SUITABLE-INDUSTRIES IDENTIFICATION PROCESS

Development Goals and Objectives

Industry Attributes

Desirability Screening Matrix

Desirability Criteria

Industries that are Both Desirable and Feasible for the Four Corners Region

Feasibility Analysis (Regional/Industrial Allocation Model)

Industries that are Best Suited for Individual Subregions

suppliers and other similar types of analysis.

The phase one development effort of the regional potential model represents a significant step forward in the application of models to solve real world problems. As such, the regional potential model stands out as a unique, innovative, and potentially powerful tool for testing regional economic theory. However, the problem with the interpretation of regional potential scores must be corrected if the regional potential model is to be used as a decision-making tool by local development groups. The next section of this chapter will describe a second phase effort on the regional potential model that hopes to correct the score problem, and also to generate additional economic indicators for assessing regional economic potential.

The Ohio-Regional Potential Model (O-RPM) - Phase Two

The next level of effort on the model was undertaken by the Ohio Department of Development as the basic tool for implementing a selective industrial development program for the State of Ohio. Selective industrial development was offered as an alternative to Ohio's previous development efforts. By selective industrial development is meant that only those industries which support Ohio's economic development goals and objectives would be actively promoted and pursued. A number of research designs could be used to institute a selective development program but the RIPM was chosen as the basic technique for establishing the selective development program.

The effort began in earnest when funding for the project was acquired from the Appalachian Regional Commission (ARC) in the summer of 1971. At that time, staff of the ARC were reluctant to support a modeling effort of the RIPM type. Funding only became possible when ARC was
assured that the model was part of a total program design for a local development district. In other words, ARC was more interested in program results rather than in the design efforts with the model. At this point, a decision was made to return to the original basic framework of the RIPM as the first step toward making the model more sensitive to the measurement of regional industrial potential.

**Mathematical Formulation of (O-RPM)**

In this model, the industrial structure of an economy is assumed to operate on four factors: markets, resources, transportation, and labor. Thirty-two equations are used to estimate elements of the industrial requirements sector and thirty-two equations are used to estimate elements of the subregions resources sector. The economy is divided into an industrial requirements sector and a subregions resources sector. The industrial requirements sector is composed of ten elements described by two equations for markets, three for resources, seven for labor and four for transportation. A like number for each of the four factors describe the subregions sector. In the general model, measures of "expected factor satisfaction" are developed to determine the industrial requirements and regional potentials with respect to each of the four location factors. By combining measures of effectiveness computed for each of the four location factors, an overall measure of "expected satisfaction" is determined which is interpreted as a regional industrial potential index. (See Figure 8).

More precisely, the following equations describe the procedure for calculating a regional potential index. Let $X_{im}$ be a measurement of requirement for a given industry $i$ with respect to the measure $m$. There are as many measures $m$ as there are elements in a factor. Let
FIGURE 8
COMPOSITION OF REGIONAL INDUSTRIAL POTENTIAL INDEX

REGIONAL POTENTIAL INDEX $E_{1r}$

**MARKET INDEX** $E_{11r}$
- Expected Satisfaction $e_{11mr}$
  - Market Requirement $x_{11m}$, $m = 1, 2$
    1) Intermediate Goods
    2) Finished Goods

**SUPPLIER INDEX** $E_{12r}$
- Expected Satisfaction $e_{12mr}$
  - Supply Requirement $x_{12m}$, $m = 1, 2, 3$
    1) Raw Materials
    2) Intermediate Products
    3) Other Services

**LABOR INDEX** $E_{13r}$
- Expected Satisfaction $e_{13mr}$
  - Labor Requirement $x_{13m}$, $m = 1, 2, \ldots, 6$
    1) Labor Force
    2) Orientation
    3) Available Education Level

**TRANSPORTATION INDEX** $E_{14r}$
- Expected Satisfaction $e_{14mr}$
  - Transport Requirement $x_{14m}$, $m = 1, 2, \ldots, 4$
    1) Highway
    2) Railroad
    3) Airway
    4) Waterway
Let $Z_{imr}$ be a measurement $m$ of the regional resource potential of an industry $i$ in a region $r$. The expectation that the regional resource potential of region $r$ will meet the requirement with respect to measure $m$ of the given industry $i$ is defined as:

\[ e_{imr} = \frac{Z_{imr}}{X_{imr}} \]

where $e_{imr}$ = expectation that the subregion $r$ will meet the requirement of industry $i$ with respect to measure $m$

$i$ = test industry $(1, 2, 3, \ldots, I)$

$m$ = factor element measure $(1, 2, 3, \ldots, M)$

$r$ = test region $(1, 2, 3, \ldots, R)$

By definition in (1) $e_{imr}$ represents a measure of the expectation that a test region will satisfy a factor requirement of a test industry. However, it is possible that a subregion can exceed the requirements of a test industry. To adjust for this condition, the following constraint is introduced.

\[ e_{imr} = \begin{cases} 
1, & \text{if } Z_{imr} > X_{im} \\
\leq 1, & \text{if } Z_{imr} \leq X_{im}
\end{cases} \]

The numerical value obtained from the calculation of $e_{imr}$ ranges from 0.0 to 1.00 for each of the four location factors $m$. Each factor measure is calculated on like units of measure so that mathematical laws are followed. For example, in the case of $X_i$ for market requirement and $Z_i$ for market potential, both factors of the equation are expressed in dollar units. The resulting numerical value is interpreted as a measure expectation that the dollar market requirement of industry $i$ will be satisfied by locating in subregion $r$.

Each of the four location factors is composed of a number of elements described by a measure $m$. To account for the magnitude of each
element to the total, a weighting factor, is introduced. Once a weight for each element is determined, the weighted elements of each factor are summed by the additive chain process. An additive chain is used when the outcome of events are accumulative. This process is described by the following equation.

\[
E_{imr} = \frac{1}{\sum_{m=1}^{M} a_{imr}} \left[ \sum_{m=1}^{M} a_{imr} e_{imr} \right]
\]

\[E_{imr} = \text{figure of merit for } m \text{ measurements for the industry } i \text{ on location factor } n\]

\[e_{imr} = \text{figure of merit of an element with respect to measure } m \text{ of industry } i \text{ in region } r\]

\[a_{imr} = \text{weighting factor with respect to the importance of the measure } m \text{ of industry}\]

\[
\text{normalization factor} = \frac{1}{\sum_{m=1}^{M} a_{imr}}
\]

\[m = 1,2,3..., M = \text{number of factor element measures}\]

\[i = \text{industry } = 1,2,3..., I\]

\[r = \text{region } = 1,2,3..., R\]

At this point, a figure of merit \(X_{imr}\) for each of the four location factors is calculated. The figure of merit is interpreted as a regional factor index. The four regional factor indexes are combined by the product chain process. A product chain is used when the outcome is based on sequented events. The overall figure of merit, interpreted as the regional industrial potential index, is given by the following equation.
The term $E_{ir}$ is a composite index of four factors that expresses the degree of expected satisfaction industry $i$ will find in subregion $r$. If several industries $i$ and a number of subregions $r$ are run through the model, a matrix of regional industrial potential indexes are produced. Industries with the highest potential for a subregion will be found in a column, and subregions with the highest potential for an industry will be found along a row. A matrix $(I \times R)$ can also be produced for each of the four location factors where similar row and column comparison can be made.

**Market Factor - Industry Requirements**

In order to obtain the measurements $X_{imr}$ and $Z_{imr}$ for equation (1), a measure of expected satisfaction for each factor element must be defined for both industry requirement and regional potential. Interest here is in the mathematical definitions for market requirements.

Each industry is oriented to their market in varying degrees. By using the 1963 input-output tables, it is possible to determine industry orientation of intermediate goods for other manufacturing industries or
to those industries serving the final consumer market directly with finished goods. The degree of market orientation is termed the forward linkage concept and is a much sought mechanism for implementing development policy. In the O-RPM, forward linkage is based on the gross volume of the market as reported in the transactions table. Final industrial market requirement is composed of two elements expressed by equations for, intermediate market requirements \( X_{i}(MI) \), and consumer or finished good market requirement \( X_{i}(MF) \). Industry market requirement is expressed in terms of the expected level of gross sales determined as a function of forward linkage, labor productivity and scale of operations.

The mathematical formulation is expressed as follows:

\[
X_{i}(MI) = \left( \sum_{g} I_{ig} \right) \cdot R_{i}P_{i}
\]

\[
X_{i}(MF) = \left( \frac{C_{i}}{S_{i}} \right) \cdot R_{i}P_{i}
\]

Where, \( X_{i}(MI) \), \( X_{i}(MF) \) = requirements of intermediate product market and consumer product market of industry \( i \), dollars respectively

\( S_{i} \) = total annual output of industry \( i \), dollars

\( I_{ig} \) = intermediate product output of industry \( i \) input to industry \( g \)

\( C_{i} \) = personal consumption market of industry \( i \)

\( R_{i} \) = labor productivity (annual output per employee) dollars

\( P_{i} \) = size of average establishment of industry \( i \), number of employees

\( g \) = manufacturing industry index (=1,2,...)
The first term in the equation is a measure of market orientation, the second term is the productivity of labor for that industry \((R_i)\), and the third term is a measure of scale for an average operation.

**Market Factor - Regional Potential**

The potential market for the output of an industry, whether it be expressed in dollars, units, or customers, is a very important factor in the industrial location decision-making process. In this model the market potential of a region or subregion is evaluated by taking into account the spatial distribution of markets and the location of established competition. Under one set of conditions, presence of a large market makes a location attractive; but large markets also include competitors and must be taken into account in the location decision. To account for these conditions, the equation that is offered here as the measure for market potential is complex by necessity, but powerful for spatial analysis.

The basic equation for intermediate market potential is given by equation (7) while a simpler form is presented in equation (8).

\[
Z_{ir}(MI) \approx \sum_{g=1}^{G} \left[ \frac{S_{ug}}{E_{ug}} \sum_{\delta} \lambda_{ig} \delta \left( \frac{P_i}{P_i + E_i} \right) \right]
\]

Two additional defining equations are introduced. Equation (9) defines total employment of industries \(g\) in the region at radius \(\delta\) miles from the test industry \(i\). This equation sums employment in those \(g\) industries which buy from test industry \(i\) at some distance.
(9) \[ E_{g\delta} = \sum_{n}^{N_g} E_{g\delta} n \]

Equation (10) defines total employment of the established industry \( i \) at radius \( \delta \) from industry \( g \). This equation accounts for employment in competitor industries at a certain distance from a buyer industry \( g \).

(10) \[ E_{g\delta} = \sum_{n=1}^{N_i} E_{g\delta} n \]

Equation (7) through (10) and equation (12) are further defined by the following terms:

- \( Z_{ir}(MI), Z_{ir}(MF) \) = intermediate and personal consumption market potentials of industry \( i \), dollars, respectively
- \( \frac{O_{ug}}{E_{ug}} \) = output per employee of U.S. industry \( i \) dollars
- \( \frac{I_{ig}}{O_{ig}} \) = direct requirement of industry \( g \) (input from industry \( i \) to industry \( g \) per dollar output of industry \( g \))
- \( E_{g\delta} \) = total employment of establishments of industry \( g \) in the region at radius \( \delta \) miles from the test industry \( i \)
- \( E_{g\delta} n \) = number of employees of establishment \( n \) of industry \( g \) in the region of radius \( \delta \) miles from the test industry \( i \)
- \( \lambda_{ig}, \mu_{ig\delta} \) = percent distribution of commodities, intermediate and personal consumption products, by distance, respectively
- \( P_i \) = size of an average establishment of the test industry \( i \)
\( E_{i\delta} \) = total employment of the established industry \( i \) in a radius \( \delta \) from industry \( g \)

\( E_{i\delta} n \) = employees of establishment \( n \) of industry \( i \) in the region of distance \( \delta \) from the industry \( g \)

\( D_i \) = distance by which at least 75% of commodities shipped by industry \( i \), (max. 1000 miles for max \( \lambda \); 300 miles for max \( \mu \))

\( C_{ui}P_u \) = consumer sale of U.S. industry \( i \), per person, dollars per person, where \( C_{ui} \) is consumer sales dollars, and \( P_u \) is U.S. population

\( P_c{\delta} \) = population of county or metropolitan area at distance \( \delta \) from the test industry \( i \)

\( i,g \) = industry's index (=1,2,3,...), and

\( n \) = index of competitive establishment of industry \( i \) (=1,2,3,...)

The distance \( \delta \) is calculated between two limits and the region ranges in the models are as follows:

<table>
<thead>
<tr>
<th>Area</th>
<th>Distance Lower</th>
<th>Range Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>99</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td>199</td>
</tr>
<tr>
<td>3</td>
<td>200</td>
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<tr>
<td>4</td>
<td>300</td>
<td>399</td>
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<tr>
<td>5</td>
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<tr>
<td>6</td>
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</tr>
<tr>
<td>7</td>
<td>600</td>
<td>799</td>
</tr>
<tr>
<td>8</td>
<td>800</td>
<td>1000</td>
</tr>
</tbody>
</table>
At least two elements of the market potential equation call for additional discussion. Attention is directed to the right side of equation (8) which is described by the following terms.

\[
\sum_{i} \lambda_{i} g \delta E_{g} \left( \frac{P_{i}}{P_{i} = E_{i} \delta} \right)
\]

This part of the market potential equation contains correction for competitive industries within the subregion and a distance function that is based on the actual shipping schedule for a \( g \) industry. The \( g \) industries in the equation must be the same as those selected for market requirements in equations (5) and (6). Industry \( i \) is the test industry under evaluation. Distance \( \delta \) between any two area sets in the subregion is given by equation (11).

\[
D = \beta \cos^{-1}\left\{ \cos(\text{Lat.}B - \text{Lat.}A) - \cos(\text{Lat.}A)\cos(\text{Lat.}B) \right\} \left[ 1 - \cos(\text{Long.}B - \text{Long.}A) \right]
\]

\( D = \) statute miles where \( \beta \) is 69.09

\( \text{Lat.}A, \text{Lat.}B = \pm \) degrees where \( \pm \) indicates north and south directions from Equator, respectively

\( \text{Long.}A, \text{Long.}B = \pm \) degrees where \( \pm \) indicates east and west direction from Greenwich line

The distance \( \delta \) in the equations is computed as the minimum distance between two points by means of their coordinates. Any point on the surface of the earth can be described in terms of latitude and longitude. In the model, location \( A \) represents the test county and, \( B \) is a location outside the test county. In a given region, the points are treated as the population centers of the counties whose coordinates are in terms of degree of latitude and longitude.
The set of g industries is compared to the industrial structure of a county that is within the search range. If there is a match, employment in the g industries will be summed by equation (9). This process will continue until the percent output of g industries reaches 75% level of total shipment D_i. If there are no g industries within the first 100 mile search, the instructions carry the search to the next 100 mile range and will continue until either D_i or an arbitrary 1000 mile limit is reached.

The term $\lambda_{ig}$ represents the percent distribution of intermediate commodities by distance. Every industry has its own geographic shipment pattern that reflects the nature of the final product and the spatial distribution of its market. For example, the manufactured ice industry (SIC 2097) ships almost 100% of its output within fifty miles of the plant. A manufacturer of jewelry goods may ship only 2% within fifty miles. An example of shipment schedules for four industries are shown in Figure 9. Thus, the use of industry shipment schedules is a more accurate reflection of the spatial behavior of an industry than arbitrarily drawn market areas. The use of industry shipment schedules gives another alternative to the gravity model concept which was used by Sweet to account for industrial shipping behavior in the market potential equation.

Adjustment for competition is given by equation (10). In only rare situations will an industry be free from competitors within their market area. During the search for g industries, the computer will also search for i industry competition and record the total employment in that county. The search will continue according to the limits set previously for $E_g$ and $\delta$. The entire right side of the market potential equation
FIGURE 9

DISTRIBUTION BY DISTANCE OF SHIPMENT
SELECTED FOUR DIGIT INDUSTRIES

INDUSTRY
SPATIAL ORIENTATION
A - LOCAL MARKET
B - REGIONAL MARKET
C - NATIONAL MARKET
D - INTERNATIONAL MARKET

DISTANCE IN MILES

PERCENT OF TOTAL SHIPMENTS

(A) SIC 2097 Manufactured ice (100% within 200 miles)
(B) SIC 3411 Metal Containers (96.3% within 1000 miles)
(C) SIC 3811 Engineering and scientific instruments (76.2% within 1000 miles)
(D) SIC 3911 Jewelry and precious metals (51.4% within 1000 miles)
described in equation (8a) can be viewed as a competition and distance deflator. The product of the terms in expression (8a) combined with the remaining terms of equation (8) results in a measure of market potential within a prescribed market area.

Another segment of industry market potential is the strength and proximity of the finished goods or consumer market. In this regard measures such as expected per capita consumption and number of consumers located within a market area is of paramount importance. Those industries which are oriented heavily toward the finished goods market have locational needs that require a spatial position in the center of the market. The consumer market potential equation was designed with these needs in mind. The formulation of the consumer market potential equation is given by equation (12).

\[ Z_{ir}^{(MP)} = \frac{C_{ui}}{P_u} \left[ \frac{300}{\sum_{\delta} \left( \frac{P_i}{P_i + E_i \delta} \right)} \mu_{ic} \delta \cdot P_c \delta \right] \]

\[ C_{ui}/P_u = \text{per capita consumption of industry } i \text{ output to consumer market} \]

\[ \frac{P_i}{P_i + E_i \delta} = \text{correction for competitive } i \text{ industries} \]

\[ \mu_{ic} \delta = \text{percent distribution of commodities by distance} \]

\[ P_c \delta = \text{population of county at distance } \delta \text{ from the test industry } i \]

Note in equation (12) that the upper limit of the market has been set at 300 miles. This limit to the extent of the consumer goods market is an attempt to reflect the distance that a truck could cover in one round trip in a day. The population constant \( P_u \) is a measure of popula-
tion in the United States in 1963. This is an attempt to have both $C_{ui}$ and $P_u$ reflect actual 1963 data conditions. However $P_c$ is expressed in terms of 1970 population information. Completion of the operation on equation (9) results in a measure of the finished goods or consumer market potential for test industry $i$.

**Supplier Factor - Industry Requirements**

An industry that is considering locating in an area is also concerned about the availability and location of suppliers for the support of his operation. The number and distance of the suppliers are, therefore, an important location factor to consider. In the O-RPM, the composition of the supply network is described in three components; raw materials, intermediate products and other services. In the development economics literature, this supply network is known as the backward linkage concept. For some types of industries, strength of the backward linkage supply line may be more important than market potential. The resultant measure is the number of suppliers of each major class required for, or available to, a given $i$ industry. It is the unit number of suppliers that is sought. The supply requirements for raw materials $X_{i}(RM)$, intermediate products $X_{i}(IM)$, and other services $X_{i}(OM)$ are described by the following equations.

\begin{align}
X_{i}(RM) &= \sum_{a=1}^{A} \sigma_s \ (S_{aiu}) \\
X_{i}(IM) &= \sum_{g=1}^{G} \sigma_s \ (S_{giu}) \\
X_{i}(OM) &= \sum_{o=1}^{O} \sigma_s \ (S_{oiu})
\end{align}
(S) = a function of sales = \[
\begin{cases}
0 & \text{when } S < 5 \text{ ($M)} \\
1.0 & \text{when } S \geq 5 \text{ ($M)}
\end{cases}
\]

(S) = a function of sales which has a value either 1.0 or 0 depending upon the sales of suppliers above the threshold value

\[ a, g, o = \text{supplier index for raw materials, intermediate products and other services} \]

**Supplier Factor - Regional Potential**

The evaluation of supplier potential for a test industry is given a spatial dimension with the introduction of distance factors into the equation. An upper limit of 200 miles has been set for raw material suppliers, 1000 miles for intermediate goods and 50 miles for other services. The 200 mile limit for raw materials was chosen because it reflected the cost of shipping heavy, bulk items. An upper limit of 1000 miles for intermediate products was chosen because goods in this category have a higher value added and thus can absorb the cost of long distance shipments. Other services which includes such items as repair, advertising and legal services must be in close proximity because of their unpredictable needs and the limit was chosen to be 50 miles. Only those industries which employ 20 or more persons are considered as potential suppliers. The supplier potential equations are given as,

(17) Raw Material

\[
Z_{ir}(RM) = \sum_{a=1}^{200} \sigma E \left( \sum_{\delta} D_a^2 E_{a\delta} \right)
\]

(18) Intermediate Product

\[
Z_{ir}(IM) = \sum_{g=1}^{1000} \sigma E \left( \sum_{\delta} D_g^2 E_{g\delta} \right)
\]
(19) Others (services, communications, etc.) 
\[ Z_{1f}(FM) = \sum_{i=1}^{50} \sigma E \left( \sum_{\delta} E_{o_{\delta}} \right) \]

(20) 
\[ \sigma E \left( \sum_{\delta} E_{a} \right), \sigma E \left( \sum_{\delta} E_{g} \right), \sigma E \left( \sum_{\delta} E_{o} \right) = \begin{cases} 1.0 \text{ when } E \geq E_{th} \\ 0 \text{ when } E < E_{th} \end{cases} \]

Where: \( E_{th} \) (threshold value) \( \approx 20 \) employees.

Factor Three - Transportation Requirements

Critical to the industrial location decision-making process is the availability of various modes of transportation. Shipments of supplies to a plant and the final distribution of that product to the market can be accomplished by several combinations of rail, highway, air, and water transportation modes. Of course, some industries use one form more than others but it is important that a choice of alternative forms of transport be available. In the present version of the O-RPM, transportation facilities are assumed to be either required or not required. If the percent distribution of commodities for an industry falls below one percent, it is deemed not required. If above one percent, it is required according to the percentage of commodity shipped by mode, by industry. The requirement for transportation is formulated as follows:

\[ X_{ig}(TR) = \begin{cases} 1.0 \text{ when } f_{ig} \geq 1\% \\ 0 \text{ when } f_{ig} < 1\% \end{cases} \]

\( X_{ig}(TR) \) = expectation that the \( g \) transportation mode is required \((g = 1, 2, 3...)\) where value 1.0 is defined as "required," and 0 is "not required".

\( f_{ig} \) = percent distribution of commodities of industry \( i \), transported by means of the \( g \) transport mode (\( g=1 \) rail; \( g=2 \) highway; \( g=3 \) air; \( g=4 \) water).
Transportation Factor - Regional Potential

Distance from a transportation line or network and the number of modes available within a given area can be expressed as a measure of transportation potential. In this version of O-RPM, transportation potential is evaluated as a function of the availability of a given transportation route within a set distance from the population center of the region. The availability of rail $Z_{ir}(RT)$, highway $Z_{ir}(HT)$, airway $Z_{ir}(AT)$, and waterway $Z_{ir}(WT)$ are presented by the four equations below.

\[ Z_{ir}(RT) = \begin{cases} 0.0 & \text{when } d_{Rr} > 5 \text{ miles} \\ 1.0 & \text{when } d_{Rr} \leq 5 \text{ miles} \end{cases} \]

\[ Z_{ir}(HT) = \begin{cases} 0.0 & \text{when } d_{Hr} > 5 \text{ miles} \\ 1.0 & \text{when } d_{Hr} \leq 5 \text{ miles} \end{cases} \]

\[ Z_{ir}(AT) = \begin{cases} 0.0 & \text{when } d_{Ar} > 55 \text{ miles} \\ 1.0 & \text{when } d_{Ar} \leq 55 \text{ miles} \end{cases} \]

\[ Z_{ir}(WT) = \begin{cases} 0.0 & \text{when } d_{Wr} > 5 \text{ miles} \\ 1.0 & \text{when } d_{Wr} \leq 5 \text{ miles} \end{cases} \]

\[ d_{Rr} = \text{Distance to rail facilities, miles} \]
\[ d_{Hr} = \text{Distance to interstate highway, miles} \]
\[ d_{Ar} = \text{Distance to commercial facilities, miles} \]
\[ d_{Wr} = \text{Distance to port, miles} \]

A five mile range from the population center of a test county to a high-
way interchange, rail terminal or port facility was chosen. Assuming that trucks and automobiles cruise at a speed of 55 MPH, a one hour driving radius to a commercial airport was chosen as the distance limit for air transportation.

**Labor-Force Factor - Industry Requirements**

The final factor to be discussed is the labor component of O-RPM. An adequate supply of labor, located within commuting distance of a plant, with the proper skills and education, are very important considerations for the plant location decision. In rural areas, the supply of labor may be abundant but available skills and experience may be minimal. In large metropolitan areas, a highly skilled labor force is assured but it may be in short supply. However, the commuter shed for a large metropolitan area is usually much greater in spatial extent than would be found in a small community. In fact, many towns are in the labor shed of large metropolitan areas and residents choose to travel a greater distance in order to gain higher wages and income. Thus, the labor factor may be one of the more complex components in location decision-making because it deals with the psychological makeup of the individual, his perception of place prosperity, and his desire for higher monetary returns in another location.

An early version of O-RPM grouped the labor component into six classes based on educational attainment. This follows a similar approach by Sweet who argued that, educational attainment by number of school years completed, was a reasonable surrogate for occupational skills. During the test phase of O-RPM, new data became available from the 1970 census which allowed for a division of the labor factor into seven major occupational categories. It was also possible to introduce considera-
tion of employment by sex into O-RPM. However, the empirical test of the model was based on education attainment levels as proxies for occupational skill. The formulation of the labor force requirement equation is described as,

\[(26) \quad X_i(Q) = \left( \frac{E_{iQ}}{\sum_{q=1}^{6} E_{iq}} \right) P_i \]

Where: \( X_i(Q) \) = number of employees of industry \( i \) establishment required for education attainment level \( Q \)

\( E_{iQ} \) = number of employees in industry \( i \) for education level \( Q \)

\( E_{iq} \) = number of employees in industry \( i \), with an educational level \( q \) (\( q=1,2,3,...,6 \))

\( P_i \) = establishment size of industry \( i \), employees

\( q = 1 \) for 1 to 7 years in elementary school

\( q = 2 \) for 8 years in elementary school

\( q = 3 \) for 1 to 3 years in high school

\( q = 4 \) for 4 years in high school

\( q = 5 \) for 1 to 3 years in college, and

\( q = 6 \) for 4 years in college and plus

**Labor Force Factor - Regional Potential**

The labor force potential available around a subregion is a function of the radius of the journey to work which in turn is dependent on the quality of the transport network and location of the economic opportunity. The test region for O-RPM called for a commuting distance of twenty miles. The labor force potential equation is formulated as follows,
(27) \[ Z_{irq}(IQ) = \sum_{s} \left[ I_{Q_{s}qM} U_{sM} + I_{Q_{s}qF} U_{sF} \right] \]

(28) \[ = \sum_{s} \left[ L_{U_{sM}} \left( \frac{Q_{Q_{s}M}}{P_{sM}} \right) + L_{U_{sF}} \left( \frac{Q_{Q_{s}F}}{P_{sF}} \right) \right] \]

Where: \( q = (1,2,\ldots,6) \) education attainment levels

\( I_{Q_{s}qM}, I_{Q_{s}qF} = \) Labor population of county at distance \( s \) from the test region, with education attainment \( q \) level for male and female, respectively.

\( U_{sM}, U_{sF} = \) Unemployment rate of county at distance \( s \) from the test region for male and female, respectively.

\( P_{sM}, P_{sF} = \) Male and female population of 16 years old and over of county at distance \( s \) from the test region.

\( L_{U_{sM}}, L_{U_{sF}} = \) Male and female labor population unemployed, respectively, in county at distance \( s \) from test region.

\( Q_{s}qM, Q_{s}qL = \) Male and female population with education attainment \( q \), respectively, in county located at distance \( s \) from test region.

\( D = 20 \) miles

The elements and form of the labor in the O-RPM is believed to be a reasonable measure of labor force requirements and potential. In order to insure that the measurement of labor force reflects actual conditions in an area, the unemployment rate in a county is changed each time new figures become available. The labor data used is based on
those individuals who have held employment for at least one year. The index does not account for disguised unemployment nor does it measure workers who have never entered the labor force, such as housewives. Thus, it is possible that the potential labor force in an area is much greater than that measured here.

The Regional Factor Index

The importance of a location factor as described in O-RPM is a function of the industry type, management objectives, and perhaps most important from a development view, the perception of the decision-maker as to the location of the operation. The O-RPM is designed with two types of weighting considerations. One for elements in each factor, and another for major locational factors. The first, $E_{imr}$ is a measure of the importance of an element in a factor in relation to the total factor measure for an $i$ test industry. Equation (3) discussed earlier will now be expanded based on the following definitions.

$n = \text{index of location factor (1, market; 2, supplier, 3, transportation; and 4, labor force)}$

$m = \text{index of locational factors element (1,2,3,..., M)}$

$r = \text{index of region unit}$

$i = \text{index of industry}$

Recall equation (3)

$$E_{imr} = \frac{1}{\sum_{m=1}^{M} a_{imr} \left( \sum_{m=1}^{M} (a_{imr} e_{imr}) \right)}$$

A weighted measure of effectiveness for the market factor is described in equation (29). Note that $E_{11r}$ is termed the Regional Market Index for test industry $i$ for subregion $r$: 
\[
E_{ilr} = \frac{1}{(a_{i11} + a_{i12})} \left[ (a_{i11} e_{i11r}) + (a_{i12} e_{i12r}) \right]
\]

Where:

\( a_{i11} \) = weight of intermediate product of industry \( i \)

\[
G = \sum_{g=1}^{G} (I_{ig}/S_{i}), \text{ see (equation 5)}
\]

\( a_{i12} \) = weight of finished or consumer goods market of industry \( i \)

\[
= C_{i}/S_{i}, \text{ see (equation 6)}
\]

\( e_{i1r} \) = \( Z_{i1r} \)

The Regional Resource Supplies Index is calculated as follows:

\[
E_{i2r} = \frac{1}{3} \frac{3}{\sum_{m=1}^{3}} \left[ (a_{i2r}) (e_{i2r}) \right]
\]

Where:

\( a_{i21} \) = weight of raw material supply of industry \( i \)

\[
A = \sum_{a=1}^{A} (S_{ia}/T_{i})
\]

\( a_{i22} \) = weight of intermediate supply of industry \( i \)

\[
G = \sum_{g=1}^{G} (S_{ig}/T_{i})
\]

\( a_{i23} \) = weight of other services of industry \( i \)

\[
0 = \sum_{o=1}^{O} (S_{io}/T_{i})
\]

\( e_{i2r} \) = \( Z_{i2r}/X_{i2r} \)

\( T_{i} \) = total imput to industry \( i \) in dollars

\( S_{ia}, S_{ig}, S_{io} \) = inputs of raw material \( S_{ia} \), intermediate products \( S_{ig} \), and other services \( S_{io} \) in dollars.
Note that $a_{12r}$ is based on dollar inputs of each supplier category while $X_i^{(RM)}$, $X_i^{(IM)}$, and $X_i^{(OM)}$ are given in unit number of suppliers. Thus, the weights for $E_{12r}$ are based on a dollar measure preserving the volume importance of each supply category in relation to the total.

The Regional Transportation Index is calculated as follows,

\[
E_{13r} = \frac{1}{4} \sum_{m=1}^{4} \left( a_{13r} \cdot e_{13r} \right)
\]

Where: (see equation 21)

- $a_{i31} =$ weight as a % of commodities of industry i shipped by rail,
- $a_{i32} =$ weight as a % of commodities of industry i shipped by highway,
- $a_{i33} =$ weight as a % of commodities of industry i shipped by air,
- $a_{i34} =$ weight as a % of commodities shipped by water.

The Regional Labor Index is calculated as follows,

\[
E_{14r} = \frac{1}{6} \sum_{m=1}^{6} \left( a_{i4r} \cdot e_{i4r} \right)
\]

Where:

- $a_{i41} =$ weight as a % of employees required in education attainment, 1 to 7 years.
- $a_{i42} =$ weight as a % of employees required in education attainment, 8 years.
- $a_{i43} =$ weight as a % of employees required in education attainment, 9 to 11 years.
\[ a_{144} = \text{weight as a \% of employees required in education attainment, 12 years} \]

\[ a_{145} = \text{weight as a \% of employees required in education attainment 13 to 15 years} \]

\[ a_{146} = \text{weight as a \% of employees required in education attainment 16 years and over} \]

The Regional Industrial Potential Index - Factor Weights

The importance of an industrial location factor is a function of many complex elements; most location decisions are based on economic and business considerations, while a part of the decision-making process may be subject to individual preferences, biases and prejudices. In an attempt to isolate the psychological factors influencing location decision-making behavior, Stafford studied several recently located firms in Southern Ohio. Using the personal interview method, Stafford found that the person interviewed justified the decision to locate the plant based on expected economic factors such as wages, markets, labor supply, and absence of unions, etc. As the interview progressed, additional reasons for locating the plant were given which were based more on psychological biases of management or perceptions of the location. The research by Stafford suggests that the importance of a location factor is a function of industry type, management objectives, present life cycle of the firm, and perhaps most important from a development viewpoint, the spatial perception of the plant site. Therefore, any quantitative technique for deriving a location factor weighting system appears to be subject to economic and psychological variables.

One approach to the selection of factor weights is to divide the industrial structure of an economy into three major groups based on
linkage, the distribution of their product, and labor intensity. The three groups are national type industries, regional oriented industries, and local market industries. (See Table 8). National market industries can be further sub-divided into three sub-groups; resource oriented industries with strong backward linkage ties to basic raw materials, non-resource oriented industries with backward linkage to intermediate suppliers, and national consumer market industries that are tied closely to population and other businesses. Regional type industries, on the other hand, may be attracted because of ample labor supply and excellent transportation facilities and are less concerned with markets or raw materials. Industries which seek to operate at the local level, serve customers or provide business services to national or regional industries. Weights for local industries, therefore, would be heavily market oriented and less dependent on the other three factors.43

In summary, the task of choosing weights for O-RPM indicates that the importance of a location factor is a function of the industry, objectives of the firm, and spatial level of operation. If the model is to be used to test a number of economic development alternatives, then it is important to choose the factor weights that reflect the strategy. In short, if O-RPM is to be used as a decision-making tool, it is imperative that the weights remain variable. However, once a set of weights are chosen, they must remain the same for the test of industry i among the subregions r.

With this background discussion on the factor weight problem, the mathematical formulation of the Regional Industrial Potential Index is presented.
## TABLE 8
SUGGESTED FACTOR WEIGHT FOR O-RPM

<table>
<thead>
<tr>
<th>Spatial Orientation</th>
<th>MARKET $W_{11}$</th>
<th>SUPPLIER $W_{12}$</th>
<th>TRANSPORT $W_{13}$</th>
<th>LABOR $W_{14}$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. NATIONAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Raw Material</td>
<td>.15</td>
<td>.50</td>
<td>.05</td>
<td>.30</td>
</tr>
<tr>
<td>2. Intermediate</td>
<td>.20</td>
<td>.20</td>
<td>.10</td>
<td>.50</td>
</tr>
<tr>
<td>3. Consumer</td>
<td>.70</td>
<td>.05</td>
<td>.20</td>
<td>.05</td>
</tr>
<tr>
<td><strong>B. REGIONAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Raw Material</td>
<td>.10</td>
<td>.40</td>
<td>.20</td>
<td>.30</td>
</tr>
<tr>
<td>2. Intermediate</td>
<td>.10</td>
<td>.20</td>
<td>.20</td>
<td>.50</td>
</tr>
<tr>
<td>3. Consumer</td>
<td>.50</td>
<td>.05</td>
<td>.20</td>
<td>.25</td>
</tr>
<tr>
<td><strong>C. LOCAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Services</td>
<td>.75</td>
<td>.05</td>
<td>.15</td>
<td>.05</td>
</tr>
<tr>
<td>2. Consumer</td>
<td>.85</td>
<td>.05</td>
<td>.05</td>
<td>.05</td>
</tr>
</tbody>
</table>
Recall equation (4).

\[ E_{ir} = \left[ \prod_{m=1}^{N} E_{inr} \right] \frac{1}{\sum_{m=1}^{N} W_{in}} \]

Taking into account the four weighted factors, market \( W_{i1} \), suppliers \( W_{i2} \), transportation \( W_{i3} \), and labor \( W_{i4} \), equation (4) is expanded as follows:

(32)

\[ E_{ir} = \left[ (E_{i1r} W_{i1}) (E_{i2r} W_{i2}) (E_{i3r} W_{i3}) (E_{i4r} W_{i4}) \right] \frac{1}{\sum_{N=1}^{4} W_{in}} \]

Operation on equation (32) will give a measure potential for test industry \( i \) for subregion \( r \). The index is expressed in numerical terms from 0.0 to 1.0 and is interpreted as a measure of expected satisfaction. In addition to the Regional Industrial Potential Index and the four individual factor indexes, the output of O-RPM contains additional economic and marketing information that can be used to improve the decision-making capabilities of a community or an industrial prospect.

Summary

This chapter has attempted to fulfill two objectives. In the first section, a discussion of the strength and weakness of several state input-output based models was presented. The discussion was focused on the use of these models as tools for establishing state and regional policy. The second part of the chapter presented an overview and review of the Regional Industrial Potential Model operationalized by Sweet. The Battelle version of the regional potential model, called the Regional/Industrial Allocation Model (R/IAM), was also discussed. Both phase one versions were found to be innovative and important modeling efforts in
the field of regional and economic geography. However, a number of shortcomings were noted in these efforts which led to a second phase effort described as the Ohio-Regional Potential Model (O-RPM). The thrust on the design of O-RPM was to improve upon the phase one efforts, upgrade its spatial sensitivity, and structure the output so that the model can be more effective as a tool for testing regional economic policy and assisting communities in establishing development priorities.

As in all cases of model building, O-RPM must face empirical verification. In preparation for that field test, the next chapter will give a brief description of the test region, the 28 counties of southern Ohio known as Appalachian, Ohio.
NOTES TO CHAPTER V


4. Ibid., p. 326.

5. The first five models selected are described in more detail in:


6. Ibid., p. 58.

7. The use of national coefficients at the regional level is possible. Shen derived an estimate of input-output for New England from the 1947 United States table.


9. Further discussion on the limitation of input-output techniques for regional analysis can be found in:


15. Ibid., p. 132.


18. Efforts to build an I/O model for the State of Ohio have come from Dr. W. L'Esperance of the Ohio State University, Department of Economics.


21. A clear distinction between "firms" and "industry" must be made. By firm is meant a single business organization usually identified by a single name. An industry is an aggregation of firms that, to some degree, produce a similar line of goods, products or services. By this definition, we speak of the "manufacturing industry" or "service industry". Thus, a business operating as a resort hotel would be classified in the recreation industry. For more on this subject see:


25. The Mahalanobis $D^2$ statistics is derived from:

$$D_{ab}^2 = \sum_{i=1}^{P} \sum_{j=1}^{P} s_{ij} d_i d_j,$$

where

$$d_i = \bar{x}_a - \bar{x}_{ib}, \quad d_j = \bar{x}_{ja} - \bar{x}_{jb} \quad \text{and} \quad s_{ij} = (S_{ij})^{-1}.$$

Thus the terms $d_i$ and $d_j$ are distance measures based on the
difference in the two group means on either variate i or j. Note that the group means are calculated within the same population group.


28. The steps involved are described as follows:
   1. The matrix of $D^2$ statistics for all pairs of observations is computed.
   2. The smallest $D^2$ is identified, and the two corresponding observations are grouped.
   3. The row and column vectors are replaced by a single row and column. These now contain the distances from the centroid of the new two-member groups to all other observations.
   4. The process is continued through a service of steps until one group containing all the observations exists.

King, op. cit., p. 198.

29. Sweet, op. cit., p. 22.

30. If potential is to be expressed as a single vector, then it appears that another method of analysis may be vector analysis. According to vector mechanics, a resultant force is defined as the sum of all individual forces and the angular relationship to one another.


34. Sweet, op. cit., pp. 93-97.


36. The specific research objectives guiding the Four Corners Project are:
   (1) To analyze the region's existing industrial and economic base, with emphasis on the manufacturing sector.
   (2) To assess the region's resources and to identify barriers to development which may be alleviated through efforts of the Commission.
   (3) To identify the industries which are best suited for the total region and its component subregions.
   (4) To determine the types of support required in the region to attract new industries and to strengthen existing industries.
36. (continued)  
Ibid., pp. i-ii.

37. Dr. Greta Yu, Technical Consultant to the Ohio Department of Economic and Community Development contributed immeasurably to the mathematical programming and computer systems design of the O-RPM.


39. Development economics calls for understanding of both the forward and backward linkage concept. "Development policy must attempt to enlist these well known backward and forward effects; but it can do so only if there is some knowledge as to how different economic activities 'score' with respect to these effects."

Hirschman, op. cit., p. 100.

40. Sweet, op. cit., p. 73.

41. Sweet, op. cit., p. 32.


43. The seminal work on industrial location factors must be credited to Professors Hunker and Wright who surveyed 545 manufacturing firms locating in Ohio between 1939 and 1962. They found that markets and labor were two of the most often mentioned locational determinants.

Henry L. Hunker and Alfred J. Wright, Factors of Industrial Location in Ohio (Columbus: The Ohio State University, Bureau of Business Research, 1963).
CHAPTER VI
THE ECONOMIC CHARACTERISTICS OF
THE APPALACHIAN REGION AND APPALACHIAN OHIO

The Appalachian Region - An Overview

For those interested in regional economic development, the Appalachian Region of the United States presents an interesting study in contrasts. It is a region rich in natural beauty and resources, and at the same time is held up as an example of a land that has been scarred and desecrated into ugliness. Appalachia's landscape has been violated by those interested only in the coal that lay below her surface. The location of the Appalachian region, positioned so near the vast urban industrial complexes of the Midwest and Northeast, would lead one to believe that this land should have wealth equal to her surrounding neighbors. Unfortunately, economic progress has not been the Appalachian experience. Expecting wealth, one finds abject poverty; instead of entrepreneurs, there are exploiters; where once there were people, one sees only emptiness; what was once a land of promise, has become a place of despair. Yet, there are those who see the Appalachian region as a land of unfulfilled promise and potential.

After decades of economic decay and social distress, the federal government formally recognized that a vast portion of the United States was not sharing the wealth of a prosperous national economy. In large measure, the Appalachian economic problem can be explained simply, that
industry found other sections of the country more attractive for investments. In addition, national economic policy was not sensitive to regional problems caused by these industrial decisions. It was assumed that regional disparities in wealth would eventually equalize over time.

By the early 1960's, America's social conscience could no longer disregard the plight of Appalachia. In 1965, the President and Congress passed the Appalachian Regional Development Act. To administer the Act, the Appalachian Regional Commission (ARC) was established. The Commission found their area of jurisdiction to include parts of twelve states and all of West Virginia. Approximately eighteen million people live in the region, scattered unevenly from south central New York to northern Alabama, a distance of about 1300 miles. (See Figure 10).

Critics of the legislation argued that because of the complexity of the Appalachian Region, the goals and objectives of the Act would never be achieved. They went on to point out that even if the geography of the region was mastered, there was no way the Commission could administer the program among thirteen diverse political entities. The record since 1965, however, tells another story which indicates that the Commission has been reasonably successful in administering the Act. In part, the achievements of ARC are due to the power to implement their own plans, a semi-autonomous status, and the ability to function efficiently as a regional agency. Recognition for success is also a result of adequate funding, efficient administration, and a willingness by the states to accept a federal-state partnership to solve regional problems.¹

**Federal-State Partnership**

During the first year of the Appalachian program, the states were reluctant to enter into a partnership with the federal government. The
FIGURE 10

THE APPALACHIAN REGION
OF THE UNITED STATES

The 28 Southern Counties of Ohio
states were quick to reject a Commission proposal for an overall coordinated plan for the Appalachian Region. After rejecting a "top down" regional planning approach, a compromise was reached which called for the states to submit regional investment plans of their own, subject to the approval of the Commission. The guiding principle for all state plans was the efficiency clause in the Act which called for investments to be made in those areas where the expected return on public dollars would be the greatest.

Criteria for project selection by the states was given by the Commission staff so that some semblance of unified investment plans would be submitted. Rothblatt found that eight criteria were offered to the states as guidelines for project selection.

1. Conformance with the development plan or program for the area in which the project is to be located.
2. The degree of development impact which the project will bring and the relationship of the project to overall economic development.
3. The relationship of the project to the growth potential of the state or sub-region.
4. Contribution of the project to a balanced development program in the area.
5. Relationship of the project to the population in the area which it serves, including relative per capita income and unemployment rates.
6. The relative financial resources of the state or political subdivisions or instrumentalities seeking to undertake the project.
7. The relative importance of the project in relation to other projects in its class and in its area.
8. The degree to which the project will have a continuing growth effect in terms of employment, average level of income or other economic and social indicators.

To the credit of the Commission staff, these criteria were of great
value for determining project priorities in a state, and is a major factor that contributed to the success of the program.

The Role of the Local Community in the Federal-State Partnership

If state investment plans were to be successful, the Commission felt strongly that local participation in the planning process was vital. Toward that objective, the Local Development District (LDD) was created which called for multi-county cooperation in planning and development. By creating the LDD, the Commission hoped to strengthen local government, achieve economies of scale on investment projects, and provide a mechanism for the administering of other federal and state programs. In short, the LDD was to be the basic building block in the federal-state partnership. Through this mechanism, the Commission hoped for greater efficiency in the transfer of federal policy to the local level.

As a concept, the decentralization of decision-making through the LDD program is an innovative approach towards achieving the goal of citizen participation in federal and state programs. However, the Commission's LDD program raises an important issue that must be addressed, if not by the existing political system, then by society as a whole. To what extent should local groups control their own economic and social destiny? Should local groups control public programs which directly affect them? If so, how will goal conflicts be resolved when local decisions are contrary to those of other communities, the region, or the state and federal government? These are difficult questions for which answers must be given if government is to satisfy the desires of an increasing number of people who want to participate in the decisions that affect their destiny. The LDD program, in Rothblatt's words,
...represents an effort to bridge this authority gap between local and state government, just as the ARC itself attempts to do between state and federal governments. As such, the LDD program, if transformed into a more representative system, could become a model for coping with this growing dichotomy between large scale planning efforts and citizen participation. 3

The Appalachian Ohio Region is divided into three Local Development Districts. Citizens of these districts have accepted the LDD program of the Commission. Whether the LDD has increased citizen participation in federal-state planning and program efforts, has not been determined. Perhaps the citizens of southern Ohio feel that problems facing the area are of such a magnitude that they are willing to accept any program that offers hope for the future.

The Economic Geography of Appalachian Ohio 4

The twenty-eight southern counties of Ohio make up the State of Ohio's portion of the Appalachian Region. Located on the northwest fringe of the region, Appalachian Ohio can be described as a transitional zone between the prosperous lower Great Lakes region and the severely depressed areas of western Maryland, West Virginia and eastern Kentucky. (See Figure 10). Appalachian Ohio does not exhibit the severe economic and social distress found in other sections of the Appalachian Region. However, because of close proximity to the Cincinnati, Columbus, Akron/Canton, and Pittsburgh metropolitan areas, many residents of Appalachian Ohio have made their way to these cities in order to seek greater economic opportunity. The greatest bond between Appalachian Ohio and the rest of the Appalachian region is that they share a common problem of suffering from selective out-migration. The basic objective of the Ohio Appalachian Plan therefore, is to invest in those projects that will bring about greater opportunities for employment and
improve the health and education of the people. The strategy assumes that greater economic opportunities and a healthy, more educated people would slow the tide of out-migration.

The key for successful implementation of the objectives in the Ohio Appalachian Plan may be locked somewhere in the economic geography of southern Ohio. A brief description of the area will provide the background for a better understanding of the problems and obstacles that will be encountered in Appalachian Ohio. The statistics to be presented generally reflect the condition of Appalachian Ohio in 1970.

The relief is undulating to rugged and the soils are not well suited to cultivation. An estimated 37% of the area is covered by woodland. Rich in mineral resources, Ohio Appalachia has large quantities of bituminous coal, stone, clay, sand and gravel. Underground water supply is generally poor, with some major exceptions; but the many rivers and streams provide considerable potential for municipal water supply, recreational use, and scenic enjoyment. However, the streams are also subject to the problems of pollution and periodic flooding. As a location factor for attracting industrial development, Appalachian Ohio's rivers and streams can be considered negligible. In addition, the problem of rugged terrain makes it extremely difficult to find large parcels of flat land suitable for industrial development. Consequently, site preparation costs are high which discourages developers and new business prospects.

The rugged topography of Appalachian Ohio and nearby mountain ranges to the east and south have caused many problems for the region's transportation system. A major exception to this has been the water transportation on the Ohio River, a major inland water route of the
United States. Historically, river transportation was relatively much more important in the early pioneering and settlement of the midwest than it is now, although it has been enjoying a revival in the past few years. Unfortunately, proximity to a navigable inland waterway has been declining in importance as a major industrial location factor.

Increasing in importance as a location factor are highways and the inter-state highway system. Most industries have become highly dependent on trucking, both for incoming materials and outgoing products. Residents have become more dependent on commuting for employment and other activities. Major highways through the region include U.S. highways and two interstate freeways. Interstate 77 has greatly increased accessibility to the industrial and population concentrations in northeast Ohio. Interstate 70 relieves the heavily used U.S. Route 40, the historic "National Road," connecting with the Pennsylvania Turnpike, and provides easy access to Pittsburgh and major east coast centers, and to Columbus, St. Louis, and Chicago.

Of the 12 U.S. highways, Interstate 70 is by far the most heavily traveled with all stretches averaging over 15,000 vehicles per day. Second in average volume is U.S. Route 23 connecting Portsmouth and Chillicothe with Columbus, Toledo, and Detroit to the north and Ashland, Kentucky to the south. Other U.S. routes are also important as are State routes, but many of these are hampered by rugged terrain. Generally, there are routes serving most of the larger population concentrations in most all directions. The one regional link which is missing is in east-west accessibility through the lower middle and southern sections of Ohio Appalachia. In this area, most all highways run only north and south and have poor accessibility to Cincinnati or to Marietta and
Parkersburg. This void will be partially filled with the completion of the Appalachian Development Highway System. Lesser highways and local roads are even more affected by the problems of topography. Most roads are narrow and winding. Routes are often along or across valleys with frequent flooding. The many streams in the area reduce accessibility in some directions or require many expensive crossings. Lack of highway accessibility continues to be a major deterrent to the industrial development of the region.

Location near a rail line with high quality service continues to hold up as a location factor for many industries. Despite the rugged terrain, the Appalachian region of Ohio is surprisingly well supplied with rail lines. Major lines connect the region's population and economic centers with most of the nearby major metropolitan areas. Most lines follow the north-south river valleys, but there also are lines cutting across the valleys.

Despite the rapid growth of air freight, commercial airlines derive most revenue from passenger traffic. The presence of a commercial airport within one hour drive appears to satisfy the location requirement of business for air service. On that score, most cities of Appalachian Ohio are within the commuting distance of a commercial air facility. Major air carrier airports are located nearby at Pittsburgh, Parkersburg, Huntington, Cincinnati, and Columbus. In addition, the region is very well served by general aviation airports which are adequate for small business jets. Twenty-six of the twenty-eight counties are directly served by general aviation airports with runways of 3500 feet or more. However, many of these small facilities lack hangers, taxi strips, and aprons for large commercial carriers. Investments in
general aviation airfield projects may be a questionable development strategy. In southern Ohio, industrial development that can be contributed to general aviation facilities is non-existent.

Urban Development

The process of urbanization, rising gross national product, and industrialization are closely correlated phenomena influencing the economic development of a region. For example, in the United States, approximately seventy-five percent of the population is classified urban in 1970. In Ohio, the figure is close to eighty percent. The thirteen state Appalachian Region is forty-five percent urban while Appalachian Ohio could account for only thirty-one percent of the population as urban. The low degree of urbanization in southern Ohio suggests a widely dispersed population base, and a low level of urban support activities which in turn forces residents to seek these services in larger urban centers. Low levels of urbanization in Appalachian Ohio forces a flow of dollars out of the region causing an even greater obstacle to the service sector development of existing urban centers.

The strength of the service sector is increasing in importance as a location factor of industrial development. If shortage of services are coupled with relative isolation and a lack of urban amenities, then a community has twice as difficult a task in attracting industries and people. The image impressed upon an industrial prospect indicates that the perception factor may be an important locational determinant, especially in economically depressed areas. Many cities in Appalachian Ohio suffer from a negative image as a result of their location, low level of amenities, poor services, and urban blight.
Population

A key indicator of economic health in a region is expressed in the growth, quality, and mix of the population. From an industrial development viewpoint, the size and quality of the population is translated into a measure of labor supply and potential work force. For those industries sensitive to final demand and consumers, the growth of population and income level are indicators of market potential. However, Appalachian Ohio population has slowed considerably since 1900. Some comparisons with state and national population statistics are presented in Table 9. Although Appalachian Ohio population increased between 1960-1970 decade and is projected to increase slightly by the next federal census in 1980, the region is slipping in relation to the rest of the state and the nation. The very slow growth rate reflects a trend of out-migration due in large measure to greater economic opportunities elsewhere.

A quality view of the population is given in Table 10. Immediately apparent is that conditions in Appalachian Ohio have improved during the 1960-1970 decade. Human resources have been upgraded, families have more income and a greater number of workers were employed in 1970 than a decade earlier. Although the Appalachian portion of Ohio still lags the rest of the state, it appears as if a combination of market equilibrium, federal investments, and state programs are revitalizing the economy of southern Ohio. The creation of job opportunities therefore, must be a major objective in the overall economic development of Appalachian Ohio. As such, analysis of the recent performance of the industrial sector in the region is necessary.
<table>
<thead>
<tr>
<th>Year</th>
<th>Appalachian Ohio</th>
<th>Ohio</th>
<th>Appalachian Ohio As % of Ohio</th>
<th>U.S.A.</th>
<th>Appalachian Ohio As % of U.S.A.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900&lt;sup&gt;a&lt;/sup&gt;</td>
<td>903</td>
<td>4,158</td>
<td>21.7</td>
<td>75,995</td>
<td>1.19</td>
</tr>
<tr>
<td>1910</td>
<td>940</td>
<td>4,767</td>
<td>19.7</td>
<td>91,972</td>
<td>1.02</td>
</tr>
<tr>
<td>1920</td>
<td>974</td>
<td>5,759</td>
<td>16.9</td>
<td>105,711</td>
<td>.92</td>
</tr>
<tr>
<td>1930</td>
<td>989</td>
<td>6,647</td>
<td>14.9</td>
<td>122,775</td>
<td>.81</td>
</tr>
<tr>
<td>1940</td>
<td>1041</td>
<td>6,908</td>
<td>15.1</td>
<td>131,669</td>
<td>.79</td>
</tr>
<tr>
<td>1950</td>
<td>1035</td>
<td>7,947</td>
<td>13.0</td>
<td>150,697</td>
<td>.69</td>
</tr>
<tr>
<td>1960</td>
<td>1120</td>
<td>9,706</td>
<td>11.5</td>
<td>179,323</td>
<td>.62</td>
</tr>
<tr>
<td>1970</td>
<td>1025</td>
<td>10,655</td>
<td>10.0</td>
<td>204,900</td>
<td>.50</td>
</tr>
<tr>
<td>1980&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1028</td>
<td>11,772</td>
<td>9.0</td>
<td>224,000</td>
<td>.40</td>
</tr>
</tbody>
</table>

**Sources:**


<sup>b</sup> From "Ohio 2000" Office of Program Analysis, Ohio Department of Economic and Community Development, 1973. (Unpublished)
TABLE 10
CHANGE IN EDUCATION LEVEL, FAMILY INCOME
AND UNEMPLOYMENT IN APPALACHIAN OHIO 1960-1970

<table>
<thead>
<tr>
<th>Education of Persons Ages 25 and Over</th>
<th>Appalachian Ohio</th>
<th>Ohio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median school years completed 1960</td>
<td>9.4%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Median school years completed 1970</td>
<td>11.1%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Percentage increase 1960-1970</td>
<td>15.0%</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Families by Income</th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Median income 1960</td>
<td>$4,385</td>
<td>$ 6,171</td>
</tr>
<tr>
<td>Median income 1970</td>
<td>7,416</td>
<td>10,313</td>
</tr>
<tr>
<td>Percent with income of -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Less than poverty level</td>
<td>15.2%</td>
<td>7.6%</td>
</tr>
<tr>
<td>2. $15,000 or more</td>
<td>9.0%</td>
<td>21.6%</td>
</tr>
</tbody>
</table>

| Civilian Labor Force Unemployed         |                   |      |
| 1960 percent unemployed                 | 8.2%              | 5.5% |
| 1970 percent unemployed                 | 5.6%              | 4.0% |

The industrial base of Appalachian Ohio has experienced significant sectoral changes during the 1960's. Inspection of Table 11 shows that agriculture and forestry are virtually finished as major generators of employment for the Region. The prospects for mining in the future are bright as coal takes on added importance as a prime generator of electric energy. In addition, the opening of deep mines in the Meigs County area, to supply the new American Electric Power generating plant in Chesapeake, will add approximately 3000 more jobs to the mining sector.

Resurgence in the transport, trade, and finance sectors is an encouraging sign that the non-manufacturing sector is gaining strength. This would indicate that the export of local dollars outside the region is beginning to subside. Employment in the service sector increased by thirty-two percent, adding just under 25,000 jobs during the ten year period. Yet this sector continues to lag the growth in the rest of the state and is considerably behind the U.S. total. Construction employment in the region reached a new high in 1970 but still does not match State of Ohio or national figures. Note also in Table 11 that the Armed Forces accounted for over 10,000 jobs in 1960. By 1970, those jobs were no longer in existence. The agriculture and forestry, and Armed Forces sectors in combination accounted for slightly more than 30,000 lost job opportunities in the region. Despite these sizeable losses, overall employment in Appalachian Ohio was up by almost 25,000 jobs. However, this change represents about a seven percent increase during the ten year period, less than one percent per annum growth.

The data indicates that the economy in Appalachian Ohio was not
<table>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>Agriculture &amp; Forestry</td>
<td>30,026</td>
<td>8.5</td>
<td>16,000</td>
<td>0.4</td>
</tr>
<tr>
<td>Mining</td>
<td>11,265</td>
<td>3.2</td>
<td>11,253</td>
<td>3.1</td>
</tr>
<tr>
<td>Construction</td>
<td>21,737</td>
<td>6.1</td>
<td>25,059</td>
<td>3.9</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>113,405</td>
<td>32.0</td>
<td>123,509</td>
<td>33.9</td>
</tr>
<tr>
<td>Transportation Communication &amp; Utilities</td>
<td>25,555</td>
<td>7.2</td>
<td>26,791</td>
<td>7.4</td>
</tr>
<tr>
<td>Trade</td>
<td>61,692</td>
<td>17.4</td>
<td>70,886</td>
<td>19.5</td>
</tr>
<tr>
<td>Finance Real Estate &amp; Insurance</td>
<td>7,864</td>
<td>2.2</td>
<td>9,821</td>
<td>2.7</td>
</tr>
<tr>
<td>Services</td>
<td>71,785</td>
<td>20.3</td>
<td>95,022</td>
<td>26.1</td>
</tr>
<tr>
<td>Armed Forces &amp; Not Reported</td>
<td>10,722</td>
<td>3.0</td>
<td>465</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td>354,051</td>
<td>99.9</td>
<td>378,806</td>
<td>97.1</td>
</tr>
</tbody>
</table>

growing as fast as other sections of the state, nor was it capturing enough growth to provide the opportunities necessary to curb the out-migration of the resident population. A key sector responsible for the sluggish performance of the region's economy is manufacturing. Although manufacturing added 10,000 new jobs during the period, it was not enough to provide employment for the 30,000 displaced from other declining sectors, or the normal flow of graduates from secondary or technical schools. Collison analyzed the new industrial activity in the 13 Appalachian states and found that Appalachian Ohio attracted 24 new manufacturing plants in 1971. This figure represented only six percent of the total number which located in the entire State of Ohio. Therefore, the existing manufacturing base is not expanding fast enough, nor is the region capturing a fair share of new industrial activity.

By using shift-share analysis, it is possible to arrive at a figure which can be described as the employment or "job gap". Analysis of the manufacturing sector for the 1960-1966 period found that the region was unable to realize approximately 12,000 jobs. Recently, shift-share analysis was performed on the region's manufacturing sector for the full ten year period since 1960. The study concluded that Appalachian Ohio was unable to provide about 25,000 employment opportunities. It is clear from the evidence presented here that the economic development of Appalachian Ohio hinges on strategies that will cut away at the manufacturing employment gap. A revitalized manufacturing base, fueled by a high multiplier effect, can stimulate other sectors of the regional economy. An industrial development program with specific manufacturing development strategies must be the mechanism that will stimulate the economy of Appalachian Ohio to accelerated growth in the
next decade. To accomplish this objective, Ohio produced two investment plans that outlines an agenda for achieving the development objectives of the Region.

**The Ohio Appalachian Plan - The Investment Strategy in 1968 and 1974.**

Ohio's first attempt at designing an investment plan for Appalachian Ohio came in 1968. To meet the program objectives of that plan, the State of Ohio determined the investment priorities to be (1) transportation (Appalachian Development Highway, access roads to industrial sites and county airports), (2) human resource development (vocational education and health), (3) water development (new supplies and pollution abatement), and (4) housing. However, approximately eighty percent of the investments were channeled into the Appalachian Development Highway. As a development strategy, increasing the accessibility of a region is a logical prerequisite for upgrading the locational potential of a region so that economic development can occur. Gauthier believes that the Appalachian highway investments were being influenced by local control, and are in contradiction of the original objectives of the Act. However, neither the 1968 Ohio Plan or the Act itself gave any recognition to programs that would promote industrial development activity. It was assumed that once the investments were made and the projects on their way to completion, industry would recognize the economic opportunities and choose to locate in the region. Based on the previous analysis of the Appalachian Ohio economy, it is clear that industry and business are not aware of the economic potential in the region.

After six years of investments, the Appalachian Development Highway is almost forty percent complete in Ohio. The 1974 plan recognizes this fact, and is shifting to goals that reflect greater interest in
community, human resource, and environmental protection investments.

The goals of the 1974 Ohio Plan are reproduced in full below.

The major goal of Ohio's Appalachian Program is Economic Development. More specifically, the intent will be to increase private investment in the region which will result in the creation of new jobs.

This will be achieved both by contributing to the competitive attractiveness of the Region and by facilitating or responding to private investments.

In addition to Economic Development, Ohio has three secondary goals including:

1. The further development and improvement of the region's communities.

   Investments in communities, facilities, and infrastructure will be made in order to achieve the following two objectives:

   a. The development of the region's communities so that they may continue to provide a viable environment in which to live.

   b. The improvement of the region's communities so that their potential for future growth and attracting investments will be enhanced.

2. Improving the quality and quantity of human and social services for the people of the region.

   By increasing the capacity of the human service institutions within Appalachia, it is hoped that health, education, and related social services will be made available and accessible to all the residents of the region.

3. The improvement and maintenance of environment quality. ARC investments will be used to:

   a. Improve the natural resources of the region which have been detrimentally affected by prior development;

   b. Promote the ecological utilization of Appalachia's natural resources in the future.

Note the emphasis on economic development, private investment and the creation of new jobs. Unfortunately, a list of investment priorities have not been decided due to uncertainty of the federal funding level
for Ohio. Unquestionably, when priorities are determined, monies will be allocated to community, human resource, and environmental programs.

Summary

As a prelude to a field test of the O-RPM, this chapter presented a brief overview of the Appalachian Region and the role of the state and community in the ARC program. It was found that the Commission is committed to a federal-state partnership and that the important link between the two is the Local Development District (LDD). The LLD program is the mechanism that the Commission relied on to achieve efficiency in the transfer of federal policy to the local level.

Analysis of the economic geography of Appalachian Ohio revealed that the rugged terrain of southern Ohio is the obstacle that must be overcome for the region to become competitive in the future. The terrain problem is responsible for the following development "bottlenecks" that make the region unattractive for industrial development.

1. Poor highway accessibility to the region's growth centers.
2. Large tracts of flat land are scarce; as a result, industrial site preparation costs are high.

In addition, the terrain problem may be the reasons for the low percentage of urbanization in the region. The low level of urbanization may result in minimum urban support services, making the region even more unattractive for industrial development.

The analysis of the industrial base has also shown that the region lags the rest of the State of Ohio and the nation in generating employment opportunities. Although there was some improvement in the economy during the 1960-1970 decade, the region continues to suffer from out-migration. It was found that the manufacturing sector was not expanding
fast enough to close the "job gap". Based on these observations, it appears that an industrial development program must focus mainly on specific manufacturing oriented strategies as a mechanism for stimulating the economy of the region.

Finally, the investment strategies continued in the 1968 and 1974 Appalachian Ohio Development Plan were reviewed. The 1968 plan placed a high priority on highway investments in order to increase accessibility. The 1974 plan appears to be moving toward community development, human resource and environmental investment priorities. Both plans are committed to the Appalachian growth center strategy of investing in those areas where return on public investments will be highest. Economic revitalization of the region is the goal under both plans; however, neither program has a design for implementing strategies that will capitalize on these investments. The 1968 and 1974 plans fall short on industrial development strategies that will arouse industry awareness of the economic potential of Appalachian Ohio. The next chapter will present one program attempt that uses the Ohio Regional Potential Model to determine industrial development strategies in three growth centers of Appalachian Ohio.
NOTES TO CHAPTER VI

1. The Appalachian experiment has attracted wide interest in the literature. In addition to the analysis offered by Widener (1973), Rothblatt (1971), and Hansen (1971), the following books are also suggested:


CHAPTER VII

A FIELD TEST OF THE OHIO-REGIONAL POTENTIAL MODEL

The Appalachian Ohio Selective Development Program

The objective of this chapter is to present the results of an O-RPM field test which was conducted as part of the Appalachian Ohio Selective Development Program. In the field, the program came to be known simply as "Selective Development". Funds for the Selective Development Program were made available to the Ohio Department of Economic and Community Development by the Appalachian Regional Commission. The framework for the program was based on the Conceptual Model for Community Economic Development proposed in Chapter IV of this dissertation. The design of the program, as well as drafting and submitting a proposal to the Appalachian Regional Commission were initiated by the author. The language of the proposal is almost identical to the specifications contained in the Contract. Charged with responsibility and control of the program, every effort was made by the author to follow the basic framework of the Conceptual Model.

The program moved toward the goal of a community development program in three phases as shown in Figure 11. Comparison with Figure 4 in Chapter IV, reveals the similarity between the Selective Development Program and the Conceptual Model. Phase A and Phase B\(^1\) of the program are attempts to determine the economic health and development aspirations of the community, and is similar to Stage A of the Conceptual Model.

198
FIGURE 11

THE APPALACHIAN OHIO SELECTIVE DEVELOPMENT PROGRAM

PHASE A

COMMUNITY
INDUSTRIAL ATTITUDE
SURVEY

DESRABILITY
CRITERIA

PHASE B

INDUSTRIAL
LOCATION
DECISIONMAKING

MANAGEMENT
CRITERIA

PHASE C

REGIONAL POTENTIAL
MODEL

FEASIBILITY
CRITERIA

LOCAL
DEVELOPMENT
GROUP

AREA
DEVELOPMENT
PROGRAM

STATE
RESEARCH
GROUP

LOCAL REACTION

DEVELOPMENT POLICY ANALYSIS

199
Industrial development priorities are calculated by means of a regional potential model (O-RPM) in Phase C. Thus, Stage B of the Conceptual Model and Phase C of the Selective Development Program are designed to test the "desirable" community goals for feasibility and regional potential as one step toward establishing development policy.

The output of the three phases are fed directly to the local development group where the consequences and alternatives of policy are weighed. Whether to proceed with the implementation of an area development program or to change development policy is a decision made by the local development group. Both the Conceptual Model and the Selective Development Program allow for feedback through the system, and the process continues until consensus is achieved. During this feedback phase, the behavioral change strategy comes into play which is used as a means for reaching group consensus. Once consensus is reached, the development group can make a decision to implement a development program.

Attention is directed to the state research group in Figure 11. The role of the state research group is to provide local leadership with technical expertise and guidance. In this manner, the staff supplement strategy is introduced as a means of improving the decision-making capabilities of the community. Thus, the Appalachian Selective Development Program serves as the vehicle for testing the Conceptual Model proposed in Chapter IV. In addition, the state research group could also act as the intermediate agency in the efficient transfer of policy from the national to the local level as proposed in Chapter II (Figure 1). The remainder of the chapter will be devoted to a detailed discussion of the results of a field test of the Appalachian Selective Development Program.
Procedure for Field Implementation of Selective Development

The first step taken in the field test was to make the three directors of the Local Development Districts (LDD) in Appalachian Ohio aware of the Selective Development Program. Each director was briefed as to the Contract specifications and what was expected as community input and participation. A number of benchmark deadlines were set that were to be used to reach the goal of the program. After the directors of the LDD were briefed, an open community meeting was held where those in attendance were given first exposure to the program. The purpose of the open meeting was to arouse community interest and awareness of the program. An essential first step was a determination of the community attitude toward economic development and, more specifically, industrial development.

To determine the attitude of the community toward economic development, a survey was taken of civic leaders and others interested in the economic health of the community. By design, the sample is biased toward the leadership of the community. Subjects for the survey were chosen from Chambers of Commerce membership rosters and VIP lists from newspapers, banks, and other civic and labor organizations. In addition, announcement of the survey was made in the local newspaper inviting others in the community interested in expressing their views on the future direction of the community.

The state research team was physically located in the community during the survey period, usually at the Chamber of Commerce, the City Hall, or other available space in the central business district. Each participant in the survey could schedule a convenient time for the interview. The survey was conducted by means of a three part questionnaire.
In Part A, the subject was asked to respond to a number of open-ended questions. Response to the questions were then recorded by the interviewer. Upon completion of the open-ended questions, the subject was asked to complete the remaining two parts of the questionnaire on his own. Section B of the questionnaire asked the subject to give a preference ranking for a number of general development strategies. Section C presented the subject with twenty-five specific industries found to be suitable for the Appalachian Region. After assessing the characteristics of each industry, the subject was asked to choose three most preferred and three least preferred from the list. A sample of the three part questionnaire can be found in Appendix A. Completion of the survey portion of the program allowed for a determination of the aspirations, assets, weaknesses, and goals of the community.

After analysis of the information and data taken from the survey, usually thirty days, the results were reported to the community. The report included a summary of all the information gathered in the survey. This included an analysis of the open-ended questions, development strategies, and a ranking of the "desirable" industries. In addition, the report contained a specific course of action that could be implemented immediately, and recommendations that should be taken in the long run. At this time, the leadership group of the community was identified, organized, and charged with the responsibility of implementing the recommendations of the report. The local economic development group was made up of those who had the most to gain from the future economic development of the area. Once the leadership group was selected, the task of determining development priorities for the community was considered.

An important task facing the group was to gain a better under-
standing of the results of the survey. During these working sessions with the local development group, an attempt was made to draw a clear distinction between community desirability as expressed in the survey, and economic feasibility as seen by industry. In short, the sessions with the groups covered such economic development topics as comparative advantage, capital versus labor intensive industries, transportation needs, labor supply, union activity, taxes, and industrial sites. This was in preparation for use of the O-RPM as an aid in making a decision between industries considered desirable by the community and economic feasibility as determined by O-RPM. The "desirable" industries were then entered into the O-RPM for analysis of regional potential. After the analysis was performed, the output was presented to the community development groups. They were aided in the interpretation by the state research team. When consensus was reached, the group was faced with implementing an industrial development strategy. Thus, the recommendations from the survey, and the output of the O-RPM on industry potential provided the building blocks for a community economic development program.

This procedure was followed in three growth centers of southern Ohio. The Selective Development Program was tested in the cities of Steubenville in Jefferson County, Zanesville in Muskingum County, and Portsmouth in Scioto County. (See Figure 12). As an example of one case study, the next section of the chapter will present a discussion of results taken from a field test in Portsmouth, Ohio.

An Economic Profile of Portsmouth, Ohio

Portsmouth was selected for application of the Selective Development Program for several reasons. In many ways, the Portsmouth area is faced with a set of economic problems that are typical of many communities
FIGURE 12
OHIO APPALACHIAN REGION
THE 28 SOUTHERN COUNTIES

Counties Which Served as Test Areas for the Ohio-Regional Potential Model and the Selective Development Program

▲ Appalachian Ohio Growth Centers
in the Appalachian area. In the past, Portsmouth experienced prosperity when the economy was linked closely to the growth industries of the period. Historically, the Portsmouth area has been known for agriculture, the manufacture of brick products and shoes, and the quarrying of sandstone. In addition, Portsmouth gained a reputation first as a river port and canal terminus, and then as a rail center. Today, the manufacturing industries are represented by steel— the largest employer in the area— fabricated metals, chemicals, and a declining shoe industry.

Changing transportation and distribution requirements rendered first the water, and then the railroads less economically potent. The reduction in railroad employment has been a major blow to the Portsmouth economy. New technology has cut away at the employment base in the steel, metal fabricating, and chemical industries. In addition, no new plant locations or expansions from existing industry in the area were able to take up the slack. In the early 1960's, an atomic energy plant located twenty miles to the north of Portsmouth, and was hailed by the community as the growth industry of the future. To date, the plant has not realized the employment that was originally forecast and is troubled by an uncertain market for the product.

The erosion in the Portsmouth economy began in 1940, and population has decreased steadily since that time. There are ten thousand fewer people in Scioto County today than there were at the beginning of World War II. Adding to the difficulties of the Portsmouth area were several bitter labor strikes that hit the utility, steel, and chemical industries. Along the way, Portsmouth gained a reputation as a poor location in which to do business. During the 1960's, the unemployment rate in Scioto County fluctuated from seven percent to fifteen
percent of the labor force.

An employment profile of Scioto County is presented in Table 12. Careful inspection of the employment data indicates that the main contributor to the erosion of the Portsmouth area economy is a declining manufacturing base, a problem not uncommon to Appalachian Ohio. The peak employment year in the region was 1953, when approximately 18,000 people were employed.

In 1964, a comprehensive planning program was completed for the Scioto County Region. This effort included an overall Economic Development Plan (OEDP) as required by all communities seeking federal assistance and funding. The summary report of the plan contained a rather sobering analysis of existing conditions in the Portsmouth area and prospects for the future.

Though the region is presently in economic decline, accumulated savings from past eras of economic opulence, and perhaps more importantly money not previously invested because of lack of faith in the region, now permit it a wide area of flexibility to developing new resources for prosperous exploitation. Much time is needed, however, before new development can take hold. Until the next state of economic process, the region cannot help but experience the inevitable declines in employment and population. Income will continue to grow, albeit at a slower pace, as a consequence of the higher earnings of workers in more heavily capitalized industries.2

In contrast to this gloomy picture, the population and economic projections for the Scioto County area were much more optimistic. According to the OEDP, population in Scioto County was projected to reach 89,800 by 1970. When the projections were publicly released, the community leaders interpreted the projected figures to mean that the next several years would see a significant turn around in the Portsmouth economy. However, the 1970 census reported 76,951 living in the county. This figure represented a shortfall of fifteen percent. Employment pro-
### TABLE 12

**EMPLOYMENT BY INDUSTRY GROUP**  
**SCIOTO COUNTY, OHIO IN SELECTED YEARS: 1950-1970**

<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>1970</th>
<th>1960</th>
<th>1950</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Mining &amp; Quarrying</td>
<td>39</td>
<td>.3</td>
<td>42</td>
</tr>
<tr>
<td>Contract Construction</td>
<td>1,270</td>
<td>8.9</td>
<td>672</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>6,382</td>
<td>44.5</td>
<td>7,625</td>
</tr>
<tr>
<td>Transportation &amp; Utilities</td>
<td>889</td>
<td>6.2</td>
<td>662</td>
</tr>
<tr>
<td>Wholesale &amp; Retail Trade</td>
<td>4,025</td>
<td>28.1</td>
<td>3,936</td>
</tr>
<tr>
<td>Finance, Insurance &amp; Real Estate</td>
<td>622</td>
<td>4.4</td>
<td>508</td>
</tr>
<tr>
<td>Services</td>
<td>1,083</td>
<td>7.6</td>
<td>961</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>14,344</td>
<td>14,415</td>
<td>16,674</td>
</tr>
</tbody>
</table>

**SOURCE:** Research and Statistics Division (Columbus, Ohio: Bureau of Employment Services).
jections were also considerably off from the projected 1970 level. Expectations and hopes of the community were raised again only to be tempered by the harsh facts of reality. The decline continued in the Portsmouth economy.

Unfortunately, the community paid little attention to the economic development program outlined by their planning consultant as a necessary prerequisite if the region was to meet the projected population and employment goals. The Scioto-Portsmouth Economic Redevelopment Plan can be found in Appendix B. It is extremely doubtful if the Portsmouth economy could have reached the levels projected even with full implementation of the economic development program. The program lacked consideration of national and regional shifts in markets and industrial investments. In short, the program was not practical. The gap between desirability as expressed by the projections, and economic feasibility as evidenced by reality, was too wide to bridge and reach a community consensus or "satisficer" position.

In the middle 1960's, another research effort was made on the Scioto County area, this time in conjunction with the Appalachian Regional Commission investigation of the area. The research was necessary in order to locate "growth centers" that would bring the highest return on public investment. After the research was completed, the analysis revealed that Appalachian Ohio had eleven "growth" centers. Portsmouth placed last on the list. (See Table 3 in Chapter III). Nevertheless, the people of the Portsmouth area received a psychological boost when it became known that they were designated a "primary growth center" by the Appalachian Regional Commission. Again, the hopes and aspirations of the community were raised only to be forced back to reality by the
economic facts of life. The community leaders found that being designated as a growth center does not automatically insure the growth of the economy.

With some awareness of these past efforts, the Selective Development program was given a full field test at a time when the Portsmouth economy was experiencing serious economic difficulties. In January of 1972, unemployment in the Portsmouth area reached 16% of the labor force. A general air of pessimism and despair was detected during the preliminary field research, and verified later by the survey. There was uncertainty among the community leaders as to the path that should be taken to restore confidence in the region. Economic development and jobs were foremost on their minds. The editor of the local newspaper took interest in the program and things began to happen. Without his support, the program implementation would not have been successful. Eventually, he surfaced as one of the leaders that had something to gain by this program. He was motivated by his "self-interest" in the economic health of the community as well as civic pride. Through his leadership, the state research team was able to gain a successful test of the program. The results of the interviews and surveys which determined the attitude of the Portsmouth community toward economic development will now be discussed.

Community Attitude Survey

During a five day period in January 1972, 86 personal interviews were conducted in the city of Portsmouth. The total possible number of subjects in the leadership sample was estimated to be approximately 150. About 60 of the total number interviewed were considered to be civic, business, or labor leaders. The remaining 26 were classified as
"interested citizens". The response to each question in Part A of the survey can be found in Appendix A. After analysis of the responses to each question, it was possible to break out a set of problems and a set of assets for the Portsmouth area. The problems perceived to be facing the community are presented in Table 13. Three out of four persons mentioned that the community had a "negative self-image". One out of five responses (20.8%) mentioned that the Portsmouth area had a "poor labor image". If the number of poor labor image responses are included with the negative self-image responses, then a significant problem facing the Portsmouth area is "negative image".

Approximately four out of ten (43.4%) felt that the "lack of employment opportunities" was the second most critical problem in the Portsmouth area. The "lack of industry" was chosen by one out of four (25.8%) as a significant problem. The lack of industry and employment opportunities suggests that the community suffers from "poor economic health". This is not a surprising finding, but it is significant that the leadership of the community recognized that the existing local economy was not able to provide economic opportunities. Finally, the third major problem facing Portsmouth was classified as the "lack of cooperation between various civic, business, and labor groups". This finding indicates that the Portsmouth area suffered from leadership strife that was felt by many as detrimental to the community.

The positive features of the Portsmouth area are presented in Table 14. When asked what they saw as the positive side of Portsmouth, six out of ten responses (61.5%) indicated that Portsmouth had "friendly, industrious people". This indicates that a majority of the leadership of the community feel that residents of Portsmouth are hard working and
### TABLE 13

**GENERAL PROBLEMS FACING THE PORTSMOUTH AREA***

**JANUARY 1972**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Negative Community Self Image</td>
<td>63</td>
<td>75.6</td>
</tr>
<tr>
<td>2. Lack of Employment Opportunities</td>
<td>36</td>
<td>43.4</td>
</tr>
<tr>
<td>3. Lack of Cooperation Among Development Groups</td>
<td>30</td>
<td>36.4</td>
</tr>
<tr>
<td>4. Lack of Industry</td>
<td>22</td>
<td>25.8</td>
</tr>
<tr>
<td>5. Poor Labor Image</td>
<td>17</td>
<td>19.8</td>
</tr>
</tbody>
</table>

*There were 86 people in the survey.

### TABLE 14

**POSITIVE FEATURES OF THE PORTSMOUTH AREA***

**JANUARY 1972**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Friendly Industrious People</td>
<td>53</td>
<td>61.5</td>
</tr>
<tr>
<td>2. Ohio University Branch</td>
<td>43</td>
<td>50.0</td>
</tr>
<tr>
<td>3. New Vocation-Technical School</td>
<td>41</td>
<td>47.8</td>
</tr>
<tr>
<td>4. Shawnee State Park</td>
<td>29</td>
<td>33.8</td>
</tr>
<tr>
<td>5. Natural Beauty of the Environment</td>
<td>24</td>
<td>28.0</td>
</tr>
<tr>
<td>6. All Modes of Transportation are Good</td>
<td>19</td>
<td>22.1</td>
</tr>
</tbody>
</table>

*There were 86 people in the survey.
friendly. Certainly, this finding could be put to use in an image improvement program. Approximately half mentioned the Ohio University branch (50.0%) and the Vocational Technical school (47.8%) as positive factors. If responses to the two are summed, it is clear that the leadership of the Portsmouth area value their university and technical educational facilities highly. Approximately three out of ten mentioned "Shawnee State Park" (33.8%) and "natural beauty of the environment" (28.0%) as significant assets to the Portsmouth area. The two in combination suggest that the rural landscape is perceived as an important resource.

About one out of five (22.8%) felt that "all modes of transportation are good". This finding is significant because at the time of the survey, Portsmouth was 85 miles from the nearest inter-state highway, was not served by a commercial airline, nor were the Ohio River port facilities used. Apparently, some of the community leadership felt that the railroad lines and the state highways serving the city were sufficient for economic development. The transportation issue will surface again when the output of the O-RPM is discussed.

A Chi Square analysis of the negative and positive responses reveals that there is no discernible difference between the two sets, significant at the 5% level of confidence. This indicates that when the two sets of responses are statistically analyzed, it can be said that the leadership group feel as strong about the positive factors as they do about the problems in the Portsmouth area. Based on this analysis, an area development program should visibly promote the positive features of the Portsmouth area while a quiet but vigorous campaign is directed to correct the negative image problem. In this manner, it may be possible
to counteract the reputation gained by the Portsmouth area as a "poor location" for business. The non-economic factors, such as physical appearance of the community, cooperation, and attitude of the residents has become important in the location decision. For example, Stafford found that image and perception of the location was an important factor in choosing one community over another for a branch plant.\(^3\)

**Industry Attitude Survey**

The questions posed in Section B of the questionnaire were designed to determine the development strategy preferences of the community toward economic development. Each question was structured in simple, non-technical language. The economic development objective of each question is identified in parenthesis. (See Appendix A, Part B). Thus, an attempt was made to isolate community preferences for such economic development objectives as diversification, backward and forward linkages, labor or capital intensive industries, service and recreation development, industrial sites, commercial development, and residential development.

The results of the industrial attitude survey are presented in Table 15. Each development alternative is ranked from highest to lowest according to the sum of the "most important" and "secondary importance" responses to each question. The development of strategic sites for industrial development proved to be the number one development objective of the Portsmouth community. In fact, the major development bottleneck facing the Scioto County area is the absence of any high quality industrial sites suitable for immediate development. Thus, the survey indicates that the community is aware of the problem and ranks it highly both as a problem, and a development objective. Questions that ranked
TABLE 15
ECONOMIC DEVELOPMENT PREFERENCES
RANKING OF GOALS AND OBJECTIVES
PORTSMOUTH-SCIOTO COUNTY
JANUARY 1972

<table>
<thead>
<tr>
<th>OBJECTIVES (Question No.)</th>
<th>MI</th>
<th>SI</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategic Sites (13b)</td>
<td>60</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>Diversify Structure (2)</td>
<td>57</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>Retain and Expand (4)</td>
<td>47</td>
<td>32</td>
<td>3</td>
</tr>
<tr>
<td>Branch Plants (7)</td>
<td>42</td>
<td>34</td>
<td>4</td>
</tr>
<tr>
<td>Any Industry (3)</td>
<td>46</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Employment At Any Cost (11)</td>
<td>46</td>
<td>20</td>
<td>6</td>
</tr>
<tr>
<td>Business in Existing Communities (14a)</td>
<td>38</td>
<td>31</td>
<td>7</td>
</tr>
<tr>
<td>Different Housing Styles (15e)</td>
<td>42</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>Existing Structure (1)</td>
<td>35</td>
<td>36</td>
<td>9</td>
</tr>
<tr>
<td>Tourism (8)</td>
<td>35</td>
<td>36</td>
<td>9</td>
</tr>
<tr>
<td>Town Houses-Apartments (15b)</td>
<td>32</td>
<td>32</td>
<td>11</td>
</tr>
<tr>
<td>Industrial Park (13a)</td>
<td>25</td>
<td>48</td>
<td>12</td>
</tr>
<tr>
<td>Supplement Business with Shopping Centers (14b)</td>
<td>29</td>
<td>36</td>
<td>13</td>
</tr>
<tr>
<td>Single Family Housing (15a)</td>
<td>24</td>
<td>17</td>
<td>14</td>
</tr>
<tr>
<td>Small Business (9)</td>
<td>14</td>
<td>39</td>
<td>15</td>
</tr>
<tr>
<td>Defense and Space (12)</td>
<td>14</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>Capital Intensive (10)</td>
<td>8</td>
<td>35</td>
<td>17</td>
</tr>
<tr>
<td>Economy With High Cost Housing (15c)</td>
<td>10</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>New Shopping Center (14c)</td>
<td>9</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>As Business Wishes (14d)</td>
<td>10</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>Non-Manufacturing (5)</td>
<td>5</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td>Technical Unemployment (13c)</td>
<td>1</td>
<td>14</td>
<td>22</td>
</tr>
<tr>
<td>All Housing Types Isolated (15d)</td>
<td>3</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>Market Forces (6)</td>
<td>2</td>
<td>5</td>
<td>24</td>
</tr>
<tr>
<td>Seasonal Industries (13e)</td>
<td>0</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>Polluting Industries (13d)</td>
<td>0</td>
<td>7</td>
<td>26</td>
</tr>
</tbody>
</table>

Note: MI is the number of people answering "MOST IMPORTANT"

SI is the number of people answering "SECONDARY IMPORTANCE"

There was a total of 86 people in the sample.
from second through seventh highest suggests that any industrial development strategy will be accepted by the community. For example, the leadership of Portsmouth is willing to support an industrial development program that will diversify the existing industrial structure, and to stimulate the expansion of existing industry. Yet, one of the major problems facing the Portsmouth economy is that the existing industrial base has not been expanding. A high ranking for the attraction of branch plants fails to take into account that one of the major problems facing the Appalachian region is absentee corporate decision-making. Branch plant development would tend to aggravate that condition. Perhaps the high ranking of "employment at any cost" best summarizes the attitude of the Portsmouth community toward industrial development.

The development strategies ranking lowest were, as expected, industries that are seasonal, cause pollution, or carry the possibility of technological unemployment. This response is very much in line with the experience of history in the Portsmouth area. Development of the non-manufacturing, commercial, and tourism sectors range from relative indifference to low priority. Perhaps most important is the low ranking given to "market forces" as a development objective. In overwhelming numbers, the survey indicates that the leadership of Portsmouth are not willing to abide by the laws of the market and wait for equilibrium to correct the economic difficulties facing the community. In other words, the community welcomes intervention as a means of restoring the economic health of the community.

The analysis of the data could have been carried to a higher level through the use of cross tabulations. Proceeding in this manner would have allowed for checking inconsistencies in responses. For example,
there is no doubt that many of those who ranked "employment at any cost" as most important were also highly concerned about attracting industries which are seasonal or cause pollution. Cross tabulation could have been made by occupation, age, or place of business. Although not presented here, these options were made available to the community development group. Moving from the industrial development strategy profile, the next section will present preferences for specific industries.

Desirable Industry Profile

The final portion of the survey asked for six choices of industries, three most preferred and three least preferred. Twenty-five, four digit SIC industries were given as choices. Each industry was described by several characteristics, such as average hourly wage, average size of plant, employment mix, level of pollution, etc. The list of industries were taken from an industrial feasibility study conducted by the Fantus Corporation in contract with the Appalachian Regional Commission. According to the Fantus study, the twenty-five industries have been analyzed and show high locational potential for the Appalachian region. In compliance with an ARC request, the twenty-five high locational potential industries were to be tested by the O-RPM for Appalachian Ohio. By accepting the Fantus industries, it was possible to begin the screening process for suitable industries from a well researched set of industries. Had this not been available, it would have been necessary to resort to the screening matrix procedure first suggested by Epps.

Limited industry preferences further narrowed the choice of development alternatives to very specific industries suitable for testing by the O-RPM. In addition, the preferences are expressions of desirable industries for the Portsmouth area. The results of the industry pref-
erence ranking are shown in Table 16. The four leading industry preferences are high wage, high technology, and "clean" industries. Industries least preferred are low wage, polluting or otherwise non-glamorous types of industries. Note also the almost even split on the steel industry which is the leading employer in Scioto County. The industry preference profile for the Portsmouth area is not surprising. Most communities have a high aspiration level for economic development goals and objectives. Unfortunately what is viewed by the community as a desirable path toward development may not be realistic or feasible. Locational feasibility for these industries must be assessed before a local economic development program can be designed. Therefore, the regional potential for the desirable industries must be tested by the O-RPM.

Report to the Community

In addition to the three part survey that determined desirability criteria for the Portsmouth area, municipal and county budgets were also analyzed as an indicator of possible fiscal support for economic development programs. Past planning documents of the regional planning commission, state planning office, and other documents were also analyzed. As a result of this effort, the community was presented with a full report of the findings from the survey and other research on the Portsmouth area. Four specific recommendations were made for Scioto County and are summarized briefly below.

1. Develop a program to improve the image of the Portsmouth area.

2. Design and implement a four phase development program.
   a. To retain and expand existing industries.
   b. To provide for complementary development of growth industries.
TABLE 16
RANKING OF DESIRABLE INDUSTRIES
SCIOTO COUNTY

<table>
<thead>
<tr>
<th>INDUSTRIES</th>
<th>MOST PREFERRED</th>
<th>LEAST PREFERRED</th>
<th>RANK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument-Control</td>
<td>27</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Metal Stampings</td>
<td>23</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Motor Vehicle Parts</td>
<td>21</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Office Machinery</td>
<td>18</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Primary Aluminum</td>
<td>17</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Electrical Components</td>
<td>14</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Textile Machinery</td>
<td>12</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Mobile Homes</td>
<td>11</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Foamed Plastics</td>
<td>10</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Refractory Metals</td>
<td>6</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>Material Handling Equip.</td>
<td>4</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>Noncellulosic Synthetics</td>
<td>8</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Printing</td>
<td>4</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>Meats-Dried-Frozen Foods</td>
<td>7</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Malleable Castings</td>
<td>4</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Plastic and Powder Metal</td>
<td>4</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>Primary Steel-Steel Mill</td>
<td>12</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Nonferrous Metals</td>
<td>1</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Plastic Resins</td>
<td>3</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Aerospace</td>
<td>5</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Nonferrous Castings</td>
<td>0</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>Apparel</td>
<td>3</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Chlor-Alkali</td>
<td>2</td>
<td>18</td>
<td>23</td>
</tr>
<tr>
<td>Textile Mill Products</td>
<td>2</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Paper and Products</td>
<td>4</td>
<td>28</td>
<td>25</td>
</tr>
</tbody>
</table>

Note: There were a total of 86 people in the sample
c. To attract labor intensive industries.

d. To diversify the industrial mix.

3. Merge county and municipal development efforts into a unified program.

4. Update all elements of the Scioto County comprehensive plan.

Measurement of Locational Feasibility - A Field Test of the O-RPM

Seven industries and three Appalachian Ohio growth centers composed the test matrix for the O-RPM. In addition to Portsmouth in Scioto County, the test matrix included the growth centers of Steubenville in Jefferson County, and Zanesville in Muskingum County. By including the Zanesville and Steubenville growth centers in the test matrix, it is possible to make comparisons among areas for the same industry or for the same factor. The seven industries that composed the test matrix are shown in Table 17. Instrument controls was selected in the Portsmouth survey as the industry most desirable for the community. In the data base of the O-RPM, the industry most similar to instrument controls is SIC 3822, automatic temperature controls. The remaining six industries in the test matrix were ranked less than most desirable and are included mainly to illustrate the type of analysis possible with the output of O-RPM.

Regional Market Index

The regional market indices for each desirable industry in each of the three sub-regions are shown in Table 18. Comparison of indices by column will show which of the seven industries score highest in a sub-region. Four industries, including instrument controls (SIC 3822), have perfect scores of 1.00. This means that the four industries are able to satisfy 100% of their market requirements by locating in the
### TABLE 17

TEST INDUSTRIES FOR THE O-RPM

<table>
<thead>
<tr>
<th>SIC</th>
<th>INDUSTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>3356</td>
<td>Nonferrous rolling and drawing</td>
</tr>
<tr>
<td>3537</td>
<td>Industrial trucks and tractors</td>
</tr>
<tr>
<td>3552</td>
<td>Textile machinery</td>
</tr>
<tr>
<td>3611</td>
<td>Electric measuring instruments</td>
</tr>
<tr>
<td>3671</td>
<td>Electronic tubes, receiving types</td>
</tr>
<tr>
<td>3679</td>
<td>Electronic components</td>
</tr>
<tr>
<td>3822*</td>
<td>Automatic temperature controls</td>
</tr>
</tbody>
</table>

*Most Desirable Industry For Scioto County

### TABLE 18

THE MARKET INDEX

<table>
<thead>
<tr>
<th>Industry</th>
<th>SUB REGION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>3356</td>
<td>.75</td>
</tr>
<tr>
<td>3537*</td>
<td>1.00</td>
</tr>
<tr>
<td>3552</td>
<td>1.00</td>
</tr>
<tr>
<td>3611</td>
<td>1.00</td>
</tr>
<tr>
<td>3671</td>
<td>1.00</td>
</tr>
<tr>
<td>3679</td>
<td>.56</td>
</tr>
<tr>
<td>3822*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

A - Steubenville (Jefferson County)
B - Zanesville (Muskingum County)
C - Portsmouth (Scioto County)
* - Desirable Industries for Scioto County
Portsmouth area. However, comparisons by row for the same industries reveals that the other two regions in the test matrix can also satisfy 100% of the market requirement. Industries that have low market potential scores are electronic components, and nonferrous rolling and drawing. Thus, in terms of market potential, Scioto County compares equally well with Muskingum and Jefferson Counties. Therefore, neither of the three areas has a clear comparative market advantage over the other. In addition to the calculation of a market index, the O-RPM generates information on market potential expressed in dollars for intermediate or finished goods. (See equations 5 through 9 in Chapter V). The market potential for automatic instrument controls (SIC 3822) within a 1000 mile radius of the Portsmouth area is in excess of twenty million dollars. (See Table 19). The information generated in Table 19 has significant marketing implications that could be used for marketing feasibility reports, designed and packaged for an industrial prospect. However, the information found in Table 19 was not used by the local development group in Scioto County or other test areas. Interest focused mainly on the market index which was much easier for them to interpret and understand.

The Supplier Index

The supplier potential indices for each of the seven test industries are shown in Table 20. Analysis by row and column indicate that for at least six of the seven industries, the number of suppliers required are reasonably satisfied by each of the sub-regions. However, Scioto County could satisfy only 77% of the supplier requirements for automatic instrument controls. Muskingum scored worse and Jefferson County faired slightly better than Scioto County in degree of supplier
TABLE 19

SCIOTO COUNTY
MARKET REQUIREMENTS AND POTENTIAL

<table>
<thead>
<tr>
<th>Industry</th>
<th>REQUIREMENT*</th>
<th>AREA**</th>
<th>POTENTIAL*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IM</td>
<td>FM</td>
<td>IM</td>
</tr>
<tr>
<td>3356</td>
<td>$5,525</td>
<td>0</td>
<td>800</td>
</tr>
<tr>
<td>3537</td>
<td>441</td>
<td>0</td>
<td>800</td>
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<tr>
<td>3552</td>
<td>336</td>
<td>0</td>
<td>600</td>
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<tr>
<td>3611</td>
<td>577</td>
<td>0</td>
<td>1,000</td>
</tr>
<tr>
<td>3671</td>
<td>5,561</td>
<td>908</td>
<td>600</td>
</tr>
<tr>
<td>3679</td>
<td>1,892</td>
<td>47</td>
<td>1,000</td>
</tr>
<tr>
<td>3822</td>
<td>$5,525</td>
<td>0</td>
<td>1,000</td>
</tr>
</tbody>
</table>

* - in $1,000
** - radius in miles
IM - intermediate market
FM - finished market
### Table 20

**The Supplier Index**

<table>
<thead>
<tr>
<th>Industry</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3356</td>
<td>.91</td>
<td>.91</td>
<td>.91</td>
</tr>
<tr>
<td>3537*</td>
<td>.94</td>
<td>.94</td>
<td>.94</td>
</tr>
<tr>
<td>3553</td>
<td>.90</td>
<td>.90</td>
<td>.90</td>
</tr>
<tr>
<td>3611</td>
<td>.89</td>
<td>.89</td>
<td>.89</td>
</tr>
<tr>
<td>3671</td>
<td>.91</td>
<td>.91</td>
<td>.91</td>
</tr>
<tr>
<td>3679</td>
<td>.90</td>
<td>.88</td>
<td>.88</td>
</tr>
<tr>
<td>3822*</td>
<td>.83</td>
<td>.67</td>
<td>.77</td>
</tr>
</tbody>
</table>

A - Steubenville (Jefferson County)
B - Zanesville (Muskingum County)
C - Portsmouth (Scioto County)

* - Desirable Industries for Scioto County
Suppliers' requirements and potential for each of seven industries are shown in Table 21. Interest is focused mainly on the number of suppliers required by the industry and the number of suppliers available within a given area. An upper limit of 200 miles has been set for raw material suppliers, 1000 miles for intermediate, and 50 miles for service and other suppliers. The regional potential for suppliers is a very important location factor as it expresses the strength of the backward linkage for supply and raw material support. Some industries are much more sensitive to supply conditions than they are to the market distribution of their customers. The information contained in Table 19 has significant implications for industrial development, especially if the location of each supplier could be identified by county location. More interest was shown in the supplier index rather than the information on the number and location of suppliers shown in Table 21.

The Transportation Index

The transportation indices for each of the seven test industries are shown in Table 22. In the O-RPM, the transportation factor is taken into account by either assuming it is required or not required. If the percent distribution of a product by mode of transport falls below one percent, it is not required. If it is greater than one percent, it is required according to the percentage of commodity shipped by that industry for each of the four transport modes. The percent distribution of commodities for each of the test industries are shown in Table 23. Note the heavy orientation toward interstate highway transportation of automatic instrument controls (SIC 3822). Since an interstate highway is not found within five miles of Portsmouth, the area scores zero on the
<table>
<thead>
<tr>
<th>Industry SIC</th>
<th>REQUIREMENT*</th>
<th>AREA</th>
<th>POTENTIAL*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RM</td>
<td>IM</td>
<td>S</td>
</tr>
<tr>
<td>3356</td>
<td>0</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>3537</td>
<td>0</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>3552</td>
<td>0</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>3611</td>
<td>0</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>3671</td>
<td>0</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>3679</td>
<td>0</td>
<td>39</td>
<td>13</td>
</tr>
<tr>
<td>3822</td>
<td>0</td>
<td>13</td>
<td>5</td>
</tr>
</tbody>
</table>

* - in unit number of suppliers  
RM - raw material  
IM - intermediate manufactured goods  
S - service and other supplies
### TABLE 22

**THE TRANSPORT INDEX**

<table>
<thead>
<tr>
<th>Industry</th>
<th>Sub Region A</th>
<th>Sub Region B</th>
<th>Sub Region C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3356</td>
<td>.33</td>
<td>1.00</td>
<td>.33</td>
</tr>
<tr>
<td>3537*</td>
<td>.14</td>
<td>1.00</td>
<td>.14</td>
</tr>
<tr>
<td>3553</td>
<td>.32</td>
<td>1.00</td>
<td>.04</td>
</tr>
<tr>
<td>3611</td>
<td>.35</td>
<td>.90</td>
<td>.30</td>
</tr>
<tr>
<td>3671</td>
<td>.39</td>
<td>1.00</td>
<td>.37</td>
</tr>
<tr>
<td>3679</td>
<td>.14</td>
<td>.99</td>
<td>.07</td>
</tr>
<tr>
<td>3822*</td>
<td>.04</td>
<td>1.00</td>
<td>.15</td>
</tr>
</tbody>
</table>

A - Steubenville (Jefferson County)
B - Zanesville (Muskingum County)
C - Portsmouth (Scioto County)
* - Desirable Industries for Scioto County

### TABLE 23

**PERCENT DISTRIBUTION OF COMMODITIES BY MEANS OF TRANSPORT**

<table>
<thead>
<tr>
<th>Industry (SIC)</th>
<th>Rail (%)</th>
<th>Interstate Highway (%)</th>
<th>Airway (%)</th>
<th>Waterway (%)</th>
<th>Others (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3356</td>
<td>32.3</td>
<td>66.7</td>
<td>0.1</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>3537</td>
<td>13.0</td>
<td>85.4</td>
<td>0.7</td>
<td>0.5</td>
<td>0.4</td>
</tr>
<tr>
<td>3552</td>
<td>31.5</td>
<td>67.4</td>
<td>0.0</td>
<td>0.0</td>
<td>1.1</td>
</tr>
<tr>
<td>3611</td>
<td>23.1</td>
<td>57.6</td>
<td>5.7</td>
<td>3.7</td>
<td>9.9</td>
</tr>
<tr>
<td>3671</td>
<td>37.0</td>
<td>60.9</td>
<td>1.5</td>
<td>0.0</td>
<td>0.6</td>
</tr>
<tr>
<td>3679</td>
<td>5.7</td>
<td>81.7</td>
<td>7.7</td>
<td>1.3</td>
<td>3.6</td>
</tr>
<tr>
<td>3822</td>
<td>1.3</td>
<td>81.5</td>
<td>2.4</td>
<td>0.0</td>
<td>14.8</td>
</tr>
</tbody>
</table>

highway component of the transportation factor. Rail and water are available in Scioto County but the automatic instrument control industry ships very little by these transport modes. This explains the low score for both Scioto and Jefferson Counties. Since interstate 70 and rail lines fall within the five mile radius of Zanesville, and almost all seven test industries ship exclusively by these two modes, the Muskingum sub-region scores high on the transport index. (See equations 21 through 25 in Chapter V).

The sensitivity of the transport index leaves much to be desired. Scioto and Jefferson Counties pay heavily for not being located within five miles of an interstate highway interchange. If the range of accessibility would be increased to twenty-five miles, both Portsmouth and Steubenville would have improved their transport scores. If proximity to a four-lane highway could have been included, in addition to interstate highways, the transportation index would have changed as well. Since transportation is so important in the location decision, more research is needed in order to make this factor sensitive to real-world conditions. The Scioto County development group reacted strongly to the "penalty" imposed on their overall regional potential score by the transport constraints. However, reaction to the transport index did serve an important purpose. Recall that the survey indicated that one out of five felt that "all forms of transportation were good" in the Portsmouth area. After analysis of the transportation factor score, the local development group became very much aware of the importance of an interstate highway for industrial development.

All three counties scored a perfect 1.0 for their ability to satisfy the labor requirements for each of the seven test industries.
Therefore, it will not be necessary to present a comparison matrix. Perhaps more important is a discussion on the methodology and results of operation on equations 26 through 28. The labor force requirement for the seven test industries and the labor market potential for Scioto County are shown in Table 24. Notice that labor force requirement by industry is controlled by average plant size for each industry. Thus, if one adds all \( Q_n \) groups for any test industry, the total will equal the average plant size for that industry. Labor force potential for Scioto County area is made up of all unemployed persons in the labor force within 20 miles of the test county. \( Q_n \) skill levels are estimated from the 1970 Census of Population for each county. The unemployment rate and work force in each county is updated quarterly from data provided by the Ohio Bureau of Employment Services. Also note that the same number of persons in each \( Q_n \) group is available for each industry.

As in the case of the transportation index, there is still much to be done with the labor factor if it is to give an accurate estimate of labor force potential by skill for each industry. It is possible to envision unskilled workers moving from one industry to another. However, as the industry becomes more complex, there is a greater need for matching perfectly occupational demands with skill supply in the area. The use of the 20 mile commuting distance as the extent of the labor shed is also somewhat arbitrary and limiting. It may be possible that workers in Ohio Appalachia are willing to commute farther than twenty miles in order to gain employment. This fact was brought to our attention by the Scioto County development group. Therefore, additional research on this factor is necessary if it is to accurately reflect the supply, quality, and cost of labor in an area.
### TABLE 24

SCIOTO COUNTY
LABOR REQUIREMENTS AND LABOR FORCE POTENTIAL

<table>
<thead>
<tr>
<th>SIC</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
<th>Ave. Plant Size</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
</tr>
</thead>
<tbody>
<tr>
<td>3356</td>
<td>33</td>
<td>26</td>
<td>34</td>
<td>40</td>
<td>10</td>
<td>0</td>
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<td>439</td>
<td>371</td>
<td>584</td>
<td>123</td>
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<tr>
<td>3537</td>
<td>9</td>
<td>12</td>
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<td>5</td>
<td>71</td>
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<td>439</td>
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<td>123</td>
<td>105</td>
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<td>13</td>
<td>26</td>
<td>40</td>
<td>12</td>
<td>11</td>
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<td>47</td>
<td>79</td>
<td>80</td>
<td>26</td>
<td>17</td>
<td>299</td>
<td>396</td>
<td>439</td>
<td>371</td>
<td>584</td>
<td>123</td>
<td>105</td>
</tr>
</tbody>
</table>

**Skill Level Expressed by Education**

- **Q1** - 1 to 7 years
- **Q4** - 12 years
- **Q2** - 8 years
- **Q5** - 13 to 15 years
- **Q3** - 9 to 11 years
- **Q6** - 16 and over

* - 20 mile labor shed
The Regional Potential Index

Once indices for each factor are computed (See equations 1 through 3 in Chapter Five), the next step is the calculation of the overall regional potential index for each test industry. (See equation 4 in Chapter V). Two different weighting strategies are used in deriving the regional potential indices shown in Table 25. Strategy A places 50% of the emphasis on the labor factor. Those regions with high labor indices, such as the Appalachian Ohio growth centers, would no doubt choose this weighting scheme. Notice that strategy A allows for high regional potential indices for all three test regions. Strategy B weighs markets and suppliers equal at 30%, and transportation and labor force equal at 20%. Under strategy B conditions, the weak regions, Jefferson and Scioto Counties, drop significantly while the decline in Muskingum County is very small.

Factor weights remain a variable choice in the O-RPM program. The factor weight mix is a function of the strategy decided by the local decision-makers. However, once a weighting scheme is chosen, it must remain fixed for all test industries and regions being analyzed. It is important to emphasize that variable factor weights affect only the final regional potential index and has no effect on the other factor indices calculated. Much more research needs to be conducted on the factor weights problem before the composite regional index can be interpreted with any accuracy in location decision-making. However, the regional potential index does present another alternative to the open ended version of the potential score computed in the phase one version of the model. In addition, the regional potential index was found to be more easily understood and interpreted by local development groups
TABLE 25
THE REGIONAL POTENTIAL INDEX

<table>
<thead>
<tr>
<th>Industry SIC</th>
<th>Jefferson A</th>
<th>Jefferson B</th>
<th>Muskingum A</th>
<th>Muskingum B</th>
<th>Scioto A</th>
<th>Scioto B</th>
</tr>
</thead>
<tbody>
<tr>
<td>3356</td>
<td>0.83</td>
<td>0.71</td>
<td>0.98</td>
<td>0.93</td>
<td>0.81</td>
<td>0.70</td>
</tr>
<tr>
<td>3537</td>
<td>0.81</td>
<td>0.67</td>
<td>0.99</td>
<td>0.98</td>
<td>0.81</td>
<td>0.67</td>
</tr>
<tr>
<td>3552</td>
<td>0.70</td>
<td>0.50</td>
<td>0.98</td>
<td>0.97</td>
<td>0.70</td>
<td>0.50</td>
</tr>
<tr>
<td>3611</td>
<td>0.88</td>
<td>0.79</td>
<td>0.97</td>
<td>0.96</td>
<td>0.86</td>
<td>0.75</td>
</tr>
<tr>
<td>3671</td>
<td>0.91</td>
<td>0.83</td>
<td>0.95</td>
<td>0.93</td>
<td>0.89</td>
<td>0.80</td>
</tr>
<tr>
<td>3679</td>
<td>0.72</td>
<td>0.56</td>
<td>0.87</td>
<td>0.80</td>
<td>0.75</td>
<td>0.50</td>
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<tr>
<td>3822</td>
<td>0.70</td>
<td>0.51</td>
<td>0.92</td>
<td>0.89</td>
<td>0.62</td>
<td>0.54</td>
</tr>
</tbody>
</table>

**Strategy A**

<table>
<thead>
<tr>
<th>Factor:</th>
<th>Weight:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markets</td>
<td>20%</td>
</tr>
<tr>
<td>Suppliers</td>
<td>20%</td>
</tr>
<tr>
<td>Transportation</td>
<td>10%</td>
</tr>
<tr>
<td>Labor Force</td>
<td>50%</td>
</tr>
</tbody>
</table>

**Strategy B**

<table>
<thead>
<tr>
<th>Factor:</th>
<th>Weight:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markets</td>
<td>30%</td>
</tr>
<tr>
<td>Suppliers</td>
<td>30%</td>
</tr>
<tr>
<td>Transportation</td>
<td>20%</td>
</tr>
<tr>
<td>Labor Force</td>
<td>20%</td>
</tr>
</tbody>
</table>
Decision-making and a Consensus Local Development Program

The analysis of potential by the O-RPM was interpreted by the local development group as an indication that the desirable industry selected by the community should not be pursued at this time. Competition from other growth centers for the same industry was convincing evidence that persuaded the local development group to give higher priority to other recommendations made in the Selective Development Program. Immediate attention was given to the design of a program that would improve the image of the Portsmouth area. Following on the heels of this image building effort was another program structured to address local industry expansion efforts. The O-RPM was offered to local business as a means of identifying the location of new buyers for Portsmouth products. By using the input-output I/O table, it is possible to identify the leading buyer of the basic steel industry by four digit SIC. Once the SIC's and their location are determined, it is possible to search a business directory tape, such as that supplied by Dun & Bradstreet, for the names, addresses and other information on individual firms.

An industrial development program that emphasized a new industry strategy for the Scioto County area was found to be somewhat premature for another reason. The development group realized that the Portsmouth area did not have any industrial sites available for immediate occupancy by an industrial prospect of the employment magnitude considered in the O-RPM. As a result, several options were explored to develop several strategically located sites as well as a modern industrial park.

During the summer of 1972, the local development group found that furniture manufacturing plants in the North Carolina Piedmont area were
purchasing lumber from a number of locations in southern Ohio. In addition, the group found that the unemployment rate in the Piedmont area of North Carolina was less than 2% suggesting a tight labor market condition. Based on the knowledge acquired from previous workshops, the group reasoned that southern Ohio had the raw material supply, the labor supply, and proximity to the consumer market that made the Portsmouth area attractive for location of a furniture manufacturing plant. The O-RPM was run for a number of sub-categories in the furniture industry for several southern Ohio Locations. As in the case of automatic temperature controls, Portsmouth paid heavily for not being located on an interstate highway interchange. However, they decided not to use the composite regional index but instead used the labor, market, and supplier indices. Fifteen furniture firms were contacted and made aware of the potential in the Portsmouth area. At least three of these firms expressed interest in the area and asked for more information on business and community aspects.

In summary, the design of a local development program in the Portsmouth area appeared to be strengthened by use of the O-RPM. As a decision-making tool, the model was able to assist local leadership to achieve realistic industrial development strategies through consensus. After a test of the desirable industries, the local development group found that their potential for these industries was made difficult by lack of a critical location factor such as transportation or found that competition from other growth centers for the same industry was too stiff. As a result of the O-RPM analysis of desirable industries, the local development group designed their economic development program much
more realistically and were able to reach a consensus or "satisficer" position.

As a result of the survey and other analysis performed by the state research group, the local development group was able to establish a set of priorities. In the case of Portsmouth, it was decided to improve community image, develop quality industrial sites, and aid existing industry expansion before attempting to seek new industrial development. This would suggest that the O-RPM can be used most efficiently as a decision-making tool when it is an integral part of an overall local development effort such as the Selective Development Program.

The field test of the O-RPM indicated that more research must be undertaken on the model to lend greater precision to the labor and transportation factor. In addition, field experience gained from the Selective Development Program indicates that geographers should increase their research efforts toward the problems of economic development and decision-making at the local level.
NOTES TO CHAPTER VII

1. The industrial location decision-making study (Phase B) was conducted by a research team from the University of Cincinnati directed by Dr. Howard Stafford, Chairman of the Department of Geography. Other members of the team were Dr. Ellin Block Department of Psychology and Allan Brown, a graduate student in the Department of Geography. Unfortunately, the research on industrial location decision-making was not available until the final weeks of the contract year. Some of Stafford's findings were implemented in Steubenville, Ohio.


6. The data base in O-RPM contains information on 450 four digit industry categories. A situation can arise where a desirable industry chosen by the community is not found in the industry data file of O-RPM. In that case, an industry is selected from the data base that has reasonably similar characteristics.
CHAPTER VIII
SYNTHESIS, PROSPECTS AND CONCLUSIONS

Summary of the Major Findings

The goal of this dissertation has been to determine if a spatial component exists in economic policy decisions, and then to propose a method for improving the spatial policy decision-making capabilities of local economic development groups. Four research objectives were established as a means of reaching that goal. The major findings under each of those research objectives are now summarized.

The first research objective was, "to identify the spatial dimensions of economic development policy decisions at the national, regional, and local levels". Investigation of the spatial dimension in economic policy in Chapter II focused on three economic development models. A review of Myrdal's model of circular and cumulative causation led to the following observations.

1. Equalization or trade models, which assume free mobility of the factors of production, have little value in explaining economic spatial variations.
2. Initial advantage is an important factor in the development of certain types of regions and economies.
3. Non-economic factors must be considered in the economic development process.
4. The spatial distribution of economic wealth can be explained by spread and backwash effects.
5. Government policy is an important influence in the economic development process.

Based on the review of Myrdal's work on describing the process of economic development in space, it became apparent that regional development programs must take into account the powerful influence of non-economic forces if they are to be successful. In addition, Myrdal felt that the proper role of the national government is to practice non-intervention in the economic development process and to abide by the principles of the price and market system. As a result of these observations, the economic development program proposed in this dissertation attempts to account for non-economic factors and to propose a role for state government that does not violate the prevailing price and market system.

A review of Hirschman's model of unbalanced growth produced the following observations.

1. Existing economic theories were of little value to a decision-maker in an under-developed economy who was faced with determining area priorities or the kind of industrialization to be pursued.

2. The concept of "balanced growth" as an investment strategy fails as a theory of development because to be successful it requires huge amounts of technical and human resources which are in limited supply in under developed economies.

3. An "unbalanced growth" development policy to be successful must use the input-output relationship of an economy, but only if there is some knowledge as to how different economic activities "score" with respect to these effects.

4. The concept of "unbalanced growth" as an investment strategy
is closely associated with the growth pole concept.

5. One reason for spatial concentrations of wealth may be caused by investors who look for investment opportunities in places more familiar to them and underestimate economic opportunities on the periphery.

6. Under the influence of proper government policy, trickle down forces will overcome the polarization effect.

Based on the review of the Hirschman model, support was found for one of the objectives of this dissertation which is an attempt to design a computer model that will generate a "score" for any of several chosen development paths. A model of this type can be used to improve the decision-making capabilities of those located in lagging regions. In addition, the model can be used to determine development potential on the periphery that can in turn be transmitted back to investors located at the pole.

A review of Friedman's core periphery model produced the following observations.

1. Unprincipled redistribution of resources in favor of locations on the periphery would retard progress at the core, and consequently effect growth of the national economy.

2. The solution of regional problems must be an integral part of a general development policy that is directed toward the attainment of national goods for the efficient spatial organization of an economy.

3. The conflict between regional equity and national efficiency can be made compatible if economic policy is made the sum of all regional investment and development plans.
Based on these observations, the local economic development program proposed in this dissertation is designed to be in harmony with national and state development goals. The common thread that weaves through the three economic development models reviewed, is that economic progress did not appear everywhere at the same time; and once development does appear, powerful forces make for spatial concentrations of economic activity at the initial starting points.

In order to gain deeper insight into the powerful forces that cause concentrations of economic activity, the next phase of research was directed toward examining the influence economic policy decisions have on spatial economic organization. Seven economic development policy objectives were selected for investigation; they were national product, resource development, public investments, inter-urban development, private sector investments, population distribution and intra-urban development. Each of these objectives were analyzed with respect to a conservative or liberal philosophical interpretation. From this investigation, it was concluded that whether a conservative or liberal philosophical position was assumed, a spatial component could be identified with the policy decision. Based on these findings, it was concluded that geographers, because of their understanding of spatial processes, can make a contribution to the formulation of economic policy. As one example of how a geographer would address a policy problem, a regional approach to economic development policy transfer was offered as one mechanism for overcoming the friction of space and reducing the impact of national decisions on the community.

In Chapter III, the research moved to an investigation of federal legislation created to address the regional problem in the United States.
The conflict between national efficiency and equity in regional investment strategies was the focal point for the research. As examples of this controversy, the "worst first" strategy of the Economic Development Administration (EDA) was contrasted with the efficiency criteria of the Appalachian Regional Commission. The research on these two regional investment strategies led to the following conclusions.

1. Neither "worst first" or efficiency criteria were followed precisely by either agency.
2. Regional investment strategies were made as a result of a political compromise between the "worst first" and efficiency criteria.
3. Consensus must be achieved by compromise if regional economic development programs are to have support and be successful.
4. Compromise in determining locations for investments result in a proliferation of growth centers, leading to inefficient expenditure of funds and raising community development aspirations to an unrealistic level.

Based on these observations, it was determined that regional investment strategies must be understood by the community if there is to be successful implementation of the program, and there must be assurance that the development goals of the community are not raised to unrealistic levels. Thus, it was concluded that successful regional development programs are based on the ability of the community to establish local economic development policy.

The second research objective was to "develop a conceptual model for community economic development". Considerable research effort in Chapter IV was directed toward the problems of the community in reacting
and adjusting to economic development decisions. The impact of federal, corporate, and state government development decisions influence the economic health of the community and is reflected most directly in the spatial adjustments to these decisions. Evidence presented in Chapter V indicates that due to a lack of resources, the adjustment to economic development decisions by the community is inefficient. It was found that citizens want to participate in the decisions that affect their communities but were ineffective because they did not have the technical and human resources to be competent decision-makers. As a step toward resolving the dilemma, several organizational strategies were reviewed.

Research into the literature of community development, planning, and sociology revealed that the "self interest" approach holds high promise as an organizational strategy for motivating local economic development groups.

Based on this finding, it was proposed that a community organization that stands to benefit most from economic change should be the focal group for determining local economic development policy and strategy. A behavioral change and staff supplement strategy appeared to be appropriate for implementing community economic development programs. As a result of this research, this study was able to formulate a conceptual model for community economic development based on the principles of rational decision-making for an individual. To assist the community leadership group in the formulation of local economic development policy, a development potential model is introduced into the local decision-making process as an aid in determining industrial development priorities. As one component of an economic development program, the output of the potential model was designed to be used as a means of arriving at a con-
sensus local economic development program. By instituting a model program of this type, it is hypothesized that the decision-making capabilities of the community will be improved, which in turn will allow for the establishment of more efficient and rational spatial policy at the local level.

The third research objective was "to present a computer model that would determine the economic potential of a region". To reach that objective, several state policy models based on input-output principles were reviewed in Chapter V. The models chosen for review were thought to be fairly representative of the methods and techniques used to apply inter-industry economics to the study of state and regional economies. Based on this review, several techniques and assumptions used to operationalize the models were selected as examples of methods that could influence sub-national economic policy.

1. The use of national coefficients at the regional level.
2. Assuming price levels within a region to retain a constant relationship to national price levels.
3. Using estimated national production coefficients at the regional level.
4. Attempting to account for the spatial component in a regional econometric model by using input-output analysis and export base theory.
5. The use of data estimating procedures or secondary sources as proxy measures for input-output coefficients.

Although these methods are generally acceptable in regional economic analysis, a further note of caution was extended when models made operational by these techniques, are used for policymaking.
Attention was then directed to the Regional Industrial Potential Model (RIPM) designed by Professors Emilio Casetti and Leslie King and developed into an operational model by Dr. David Sweet. The phase one version of the RIPM was tested in the Coastal Plains Region by Dr. Sweet with encouraging results. Shortly after, the Battelle Memorial Institute applied the model in the Four Corners Region of the United States. The Battelle effort, equally successful in application, relied heavily on input from local government leaders and considered economic development goals and objectives of the region. Upon review of the phase one version effort, it was found that several modifications would be necessary if the model was to be used as a decision-making tool at the local level.

1. The measure of industry potential had to be modified for ease of interpretation by users.
2. The output of the RIPM did not provide a measure of potential for each of the four factors.
3. The output of the RIPM did not provide specific information on dollar potential of markets, and the location and number of suppliers.

To correct these shortcomings, a second phase effort was undertaken on the Ohio-Regional Potential Model (O-RPM). The O-RPM is designed to produce location factor scores which range from 0.0 to 1.0 as measures of "expected satisfaction" for markets, suppliers, transportation, and labor force. The four factor scores can be combined into an overall regional potential index. Thus, the output of the O-RPM can produce five different indices for a set of industries and sub-regions. The output can be arrayed in matrix format. Comparison along a row reveals the expected satisfaction of a test industry for several
regions. Analysis along a column indicates the degree of expected satisfaction of several test industries in a target region. In addition, the O-RPM is also capable of producing detailed market potential data in dollars, the number and location of suppliers, regional potential for four modes of transportation, and supply of labor force by seven occupational classes.

In addition to satisfying the objective of producing output that can be readily interpreted at the local level, the research effort on O-RPM has attempted to increase the spatial sensitivity of the model. By introducing the use of actual industry shipment schedules into the calculation of market potential, it is felt that this approach truly replicates a real world process. The market factor in O-RPM takes into account competitors that may be located within a prescribed market area and adjusts for their presence. This too, is an attempt to account for spatial reality. Hopefully, the O-RPM presented in this study represents a step forward in the use of potential models as a means of determining regional industrial development priorities.

The fourth research objective was "to propose a local economic development program based on the framework of the conceptual model for community economic development". The O-RPM was tested as part of a three phase experimental economic development program called the Appalachian Ohio Selective Development Program. The framework for the Selective Development Program was based on the Conceptual Model for Community Economic Development proposed in Chapter IV.

As part of the program, community attitudes toward economic development in Portsmouth Ohio were determined by personal interviews and survey methods. Based on analysis of the results, three recommendations
were offered to the community.

1. The image of the community needed to be improved.
2. Industrial development efforts should focus on the retention and expansion of existing industries.
3. Local development efforts should be unified.
4. All local planning efforts should be updated.

One of the development goals of a community was expressed in the form of a "desirable" set of industries. Locational feasibility and regional potential of the desirable set of industries was calculated by the O-RPM. Based on the output of the model, local development groups were in a better position to assess if the desirable industries had locational potential for their community. In the case of Portsmouth, the local development group decided their immediate development priorities to be industrial site development and a program to correct the negative community image. They reasoned, that once industrial sites were developed, only then would a "new industry" development program be initiated. During this period, the Portsmouth group also decided to institute a local development program that would encourage the expansion of the existing industrial base.

Based on the field application of the Selective Development Program, several concluding observations are in order. The regional potential index and the indices for the market, supplier, transportation, and labor supply were found to be easily interpreted by the community leaders chosen in this study. From the experience gained in southern Ohio, it appears that decision-making at the community level can be improved by the use of a regional potential model such as the O-RPM. However, the field test also indicates that the successful test of the
O-RPM was due, in part, to the organizational strategy used in the community. It is doubtful that a policy model could be applied at the local level without the expression and involvement of community leaders in a decision-making process. Therefore, a combination of the behavioral change and staff supplement organizational strategies appears to be appropriate as methods for upgrading the decision-making capabilities of the community. It was also concluded that the Conceptual Model for Community Economic Development tested in the form of the Selective Development Program is a reasonable approach for implementing local economic development programs.

By instituting a program such as that presented in this study, it is believed that the transfer of economic policy decisions from the national level through the state and regional agencies can be accomplished more efficiently. More rational spatial policy at the local level leads to more efficient implementation of regional and state policies. If this process can be duplicated throughout the country, it is reasonable to assume that national economic goals and objectives will have a much higher probability of success. In short, rational spatial policy leads to a more efficient use of national resources which could lead to a higher national product.

Prospects for Future Research

During the course of this study, it was readily apparent that many of the issues, problems, and concepts presented here needed more in-depth study and research. At times, the urge to pursue an interesting finding was irresistible; but as in all research work, one must not succumb to this temptation if the goal of the study is to be achieved. There is a price to be paid for this decision. As a result, the weak-
nesses of the research becomes more obvious as one moves methodically toward the conclusion of the study. What looked as possible answers in the beginning of the study, now seem to beg for more explanation and further research. Therefore, there are several directions for future study that can be suggested.

The spatial implications of government and corporate policy decisions appear to be an area that is full of promising paths of research. As an example, by concentrating research on one federal budget decision, such as a federal aerospace contract, it may be possible to trace the impact of that decision to different sectors of the economy and the resulting influence on spatial behavior of firms and individuals. A corporate decision to either open or close a facility also has significant influence on the distribution of activities in space. Geographers have shown great interest in plant location research and location decision behavior of the firm. Therefore, the opportunity for extending research into the area of spatial policy may not be that difficult.

Certainly more geographic research is needed on the role of the state and regional governments in the economic development process. At present, sub-national governments play a somewhat passive role in economic development. Their main influence is to react and adjust to federal policy decision by either disbursing federal funds or attempting to control growth after it has already occurred. The present mood in Washington indicates a shift toward greater decentralization of government and decision-making in the future. What are the spatial implications of this decision? Are state and local governments ready to assume a greater role in the establishment of economic development policy? It has been argued in this dissertation that a "policy implementation gap"
exists between federal and local government. Perhaps state government can fill the intermediary role in the transfer of policy from the national to the local level as suggested in Chapter II of this study.

Field experience in the urban areas of Appalachian Ohio, and direct involvement with those most concerned with the economic health of their communities, suggests that geographers should concentrate more of their future intra-urban research in these areas. Many of the development choices facing urban centers located in depressed or stagnant areas are difficult to make without technical expertise. For example, a community with limited budget may be faced with a decision either to allocate scarce resources to an industrial development program or to invest in educational plant. Geographers should direct some of their research effort into building models that would assist communities in determining such development priorities. For those less interested in modeling, and more interested in descriptive analysis, there is a dire need for a rigorous explanation of urban and regional development in depressed areas such as Appalachia.

The survey evidence collected for this study also indicates that many communities in Appalachian Ohio suffer from a negative locational image. This finding would suggest that individuals or firms performing a locational search are influenced in their decisions in some way by their perception of the area. Research into this problem by those geographers interested in the effect perception on locational choice would find Appalachian Ohio an excellent region for a test of their models. A better understanding of the psychological barriers that influence the decision to locate in depressed area communities would be research that could have a high payoff for regional development policy.
Finally, more research needs to be conducted on the role of leaders and leadership groups and their effect on local economic development. Identification of entrepreneurs and risk takers is another area of research calling for involvement by geographers.

Several directions can be pursued on the regional potential model. The labor supply and transportation must be made even more precise and spatially sensitive. An accessibility index for each industry may be the answer. A weakness in the transportation factor is the high degree of reliance on proximity to an interstate highway interchange. Perhaps the highway factor should also include distance from any four lane highway. A time-distance measure for the transportation factor may provide spatial sensitivity and introduce greater reality into the model. The labor supply factor needs more specification at the local level. Supply of labor within the labor shed by occupational categories would lend more precision to the match with specific industrial requirements. At present, the model assumes that each subregion has the same commuting distance for the journey to work. This could be refined and made more realistic by expressing spatial extent of the labor shed as a function of urban size.

The field test of the O-RPM was performed in three "growth centers" suggesting that investments in these centers would have a beneficial spread effect on the surrounding area. However, precise measurement of the spread effect has not yet been satisfactorily accomplished. While formulating the market potential equation, it looked as if the total requirements table could be used to measure the impact of an investment in a growth center over space. For those interested in finding methods to test growth pole theory, this appears to be an avenue
of research that needs exploration.

Elaboration of the model to include more factors is another direction that can be suggested for future research. Energy is rapidly becoming a high priority location factor. In addition to the four factors included in the present version of the model, it is suggested that the fifth factor include a measure of regional energy budget potential. It may also be possible that energy factors could also be designed to include a regional environmental measure. By including energy and environmental standards, the model would be of greater value as a decision-making tool for spatial policy analysis.

The present version of the model produces a set of indices or "scores" that have been interpreted as measures of "expected satisfaction". Expectation hints that some degree of chance is involved, suggesting that future research explore the possibility of extending the model to be a true measure of locational probability. If the model output could produce true probability measures, then it would be possible to test models of location decision theory.

Conclusion

The basic purpose of research is to provide man with a better knowledge of the world in which we live. This study has attempted to shed some light on the process of economic development and how man-made decisions influence our behavior in a spatial setting. The boundaries of inquiry in this study have been necessarily broad and the research has reached out into the domain of many disciplines in order to find satisfactory explanations. Are there fixed bounds in the pursuit of knowledge and the conduct of inquiry? For those interested in the search for knowledge and explanation, the domain of truth has no fixed
boundaries. Hopefully, this study has used wisely the work of other disciplines in reaching the objectives of this dissertation. Satisfaction will only be complete if the study leads in some small way to a better understanding of the world in which we live, and is a contribution to the literature of geographic inquiry.
A. Community Attitude Survey

1. What do you consider to be the primary needs or problems of your community? (Please rank - 1, 2, 3, etc., with number 1 as most important)

Lack of Jobs 36
Negative Community Attitude 24
Lack of Industry 22

2. What do you consider to be the greatest assets or benefits of your community?

Friendly Industrious People 29
Natural Environment 24
All Modes of Transportation are Good 19

3. What do you consider to be important accomplishments in the county during the past two decades?

Ohio University Branch 43
Vo-Tech School 41
Shawnee State Park 29

4. Who do you feel was most responsible for these accomplishments?

A Community Effort 13
No Answer 30

5. Which organizations were the most helpful in achieving these accomplishments?

Chamber of Commerce 40
Civic Organizations 29

6. Who or what do you feel hindered your community most? How?

Negative Community Attitude 20
No Coordination Between Elected Officials and the People 15
Unfavorable Labor Image 17
7. What do you like most about your community?

Hospitable People

8. What do you dislike most about your community?

Community's Negative Self-Image
Lack of Cooperation Between Groups
Nothing

B. Industrial Attitude Survey

The following is a brief questionnaire which seeks to identify objectives you see as important for your community.

Please rank each question by checking the appropriate box on the right. A - Most Important, B - Secondary Importance, C - Least Important

ECONOMIC DEVELOPMENT-GOALS AND OBJECTIVES

1. Attract industries which can take advantage of the existing industrial structure. (Linkage)  A  B  C

2. Attract industries which will diversify the existing industrial structure. (Diversification)  A  B  C

3. Attract any industries willing to locate in the community or region. ("Shot Gun" Approach)  A  B  C

4. This community should adopt an economic development program whose main objective should be to retain and expand existing industries. (Retention and Expansion)  A  B  C

5. This community should adopt an economic development program that discourages manufacturing industrial development and encourages service and non-manufacturing industries. (Service Sector Development)  A  B  C

6. Economic development should not be planned or interfered with - we should let "market forces" decide the future of our community. (Market Equilibrium)  A  B  C

7. An industrial development program for our community should stress the attraction of branch plants. (Scale and Type of Industry)  A  B  C
8. An economic development program for this community should place major emphasis on the recreation and tourism potential of this area. (Recreation and Tourism Development)  

9. The encouragement of the formation of small business enterprises rather than the attraction of branch plants should be the major objective of an industrial development program for this community. (Local Entrepreneurship)  

10. Attracting high wage, skilled labor but capital intensive (uses more machines and equipment rather than people) industries should be the major objective of an industrial development program. (Capital Intensive Industries)  

11. If the community adopts an industrial development program, the major objective, whether we stress expansion or existing industries or attracting new industries, should be to provide employment at any cost. ("Shot Gun" Approach)  

12. An important phase of an industrial development program should include a lobbying effort in Washington to attract defense and space-oriented industries to this community. (Defense)  

13. I prefer industrial development for the County and its communities that would: (Site Development and Wage Alternative)  
   a. create an industrial park  
   b. promote strategically located industrial sites  
   c. attract a high wage industry with potential technological unemployment  
   d. attract a high wage industry that will create pollution  
   e. attract an average wage industry that will provide only seasonal employment  

14. I prefer commercial development for the County and its communities that would: (Commercial Development)  
   a. strengthen business districts within existing communities
15. I prefer residential development for the County and its communities that would emphasize:

(Housing Development)

a. predominantly single-family housing

b. single-family housing with some townhouses and apartments

c. a mixture of economy housing with high cost housing

d. all housing types to be isolated from one another

e. planned subdivisions with availability of different housing styles

C. Industry Preference Survey

OHIO DEPT. OF DEVELOPMENT, APPALACHIAN RESEARCH PROJECT
INDUSTRIES SUITABLE FOR APPALACHIA

Below is a list of industries which were found to be particularly suited for the Appalachian area, along with some general information on each. Choose the three industries you would most like to see developed in your area and place a " + " in the far right column corresponding to those industries. If there are any industries you do not wish to see developed in your area, place a " - " in the far right column corresponding to the three least desirable. If there is any industry you wish to add to the list write it in the space for "OTHER" and place a " + " or " - " in the far right column according to whether you wish to see it developed in or excluded from the community.

Notes: Hourly Wages: 1970 average wage for all employees.

Typical plant size: " * " indicates that these industries maintain many plants which employ fifty or fewer workers.

Potential amount of pollution: any of these industries is capable of maintaining a negligible polluting level with proper controls.

L = low  M = medium  H = high
## INDUSTRIES

<table>
<thead>
<tr>
<th>Industry</th>
<th>Hourly Wages</th>
<th>Typical Plant Size</th>
<th>% Female</th>
<th>Employees</th>
<th>Projected Growth Rate</th>
<th>Pollution Level</th>
<th>Seasonal</th>
<th>Cyclic</th>
<th>Choice &quot;a&quot;</th>
<th>Choice &quot;b&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper and Allied Products</td>
<td>$4.15</td>
<td>150</td>
<td>25%</td>
<td>M H</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+4</td>
<td>-28</td>
<td></td>
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<tr>
<td>Textile Mill Products</td>
<td>3.36</td>
<td>300</td>
<td>50%</td>
<td>L H</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>+2</td>
<td>3-23</td>
<td></td>
</tr>
<tr>
<td>Apparel</td>
<td>2.69</td>
<td>100</td>
<td>80%</td>
<td>L L</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>+3</td>
<td>16</td>
<td></td>
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<tr>
<td>Printing and Allied Industries</td>
<td>4.06</td>
<td>200</td>
<td>30%</td>
<td>M M</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+4</td>
<td>1</td>
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<tr>
<td>Electrical Component Parts</td>
<td>3.64</td>
<td>250</td>
<td>40%</td>
<td>H M</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>+14</td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>Textile Machinery/Pumps and Valves</td>
<td>4.47</td>
<td>300</td>
<td>10%</td>
<td>M L</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+12</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Office Machinery</td>
<td>4.02</td>
<td>1000</td>
<td>25%</td>
<td>M L</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>+18</td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>Motor Vehicle Parts</td>
<td>4.74</td>
<td>200</td>
<td>17%</td>
<td>L L</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>+21</td>
<td>0</td>
<td></td>
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<tr>
<td>Chlor-Alkali Industry</td>
<td>4.76</td>
<td>150</td>
<td>0%</td>
<td>M H</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+2</td>
<td>18</td>
<td>-10</td>
</tr>
<tr>
<td>Materials Handling Equipment</td>
<td>4.41</td>
<td>100</td>
<td>9%</td>
<td>M L</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>+4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Mobile Homes</td>
<td>3.76</td>
<td>150</td>
<td>5%</td>
<td>H M</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+11</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Instruments and Controls</td>
<td>3.72</td>
<td>450</td>
<td>20%</td>
<td>H L</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+27</td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>Noncellulosic Synthetic Fibers</td>
<td>4.95</td>
<td>1000</td>
<td>25%</td>
<td>H L</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>+8</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Metal Stampings</td>
<td>4.74</td>
<td>150</td>
<td>20%</td>
<td>H L</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+23</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Aircraft and Aerospace Parts</td>
<td>5.32</td>
<td>500</td>
<td>14%</td>
<td>L L</td>
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<td>yes</td>
<td>yes</td>
<td>+5</td>
<td>-10</td>
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<tr>
<td>Primary Aluminum Industry</td>
<td>4.54</td>
<td>1000</td>
<td>3%</td>
<td>H H</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+17</td>
<td>-1</td>
<td></td>
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<tr>
<td>Nonferrous Castings</td>
<td>3.44</td>
<td>150</td>
<td>10%</td>
<td>L H</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Malleable and Ductile Castings</td>
<td>3.89</td>
<td>300</td>
<td>3%</td>
<td>H H</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Foamed Plastic Products</td>
<td>4.95</td>
<td>100</td>
<td>30%</td>
<td>H H</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+10</td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td>Rolling, Drawing, and Extruding of Nonferrous Metals</td>
<td>4.47</td>
<td>300</td>
<td>8%</td>
<td>M H</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Meats, Dried and Frozen Produce</td>
<td>3.81</td>
<td>300</td>
<td>40%</td>
<td>M M</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+7</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Plastic and Powder Metal Products</td>
<td>4.95</td>
<td>100</td>
<td>30%</td>
<td>H H</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+4</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Refractory Metals</td>
<td>4.63</td>
<td>400</td>
<td>0%</td>
<td>M M</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Primary Steel and Steel Mill Products</td>
<td>4.54</td>
<td>1000</td>
<td>0%</td>
<td>L H</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>+12</td>
<td>-10</td>
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<tr>
<td>Plastic Resins</td>
<td>4.95</td>
<td>50</td>
<td>10%</td>
<td>H H</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>+3</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

OTHER: ____________________________
APPENDIX B

ECONOMIC DEVELOPMENT PROGRAM
FOR SCIOTO COUNTY, OHIO

The Region must undertake a vigorous program of economic advancement in order to reverse the past downward trends. Following a goal-oriented program of economic development as outlined here, Scioto County can expect to revitalize its economy.

Promotion

An adequate promotional and development program for the Region involves, first, a core of seriously concerned people. Second, it requires the coordination of the activities of all the existing organized efforts in this endeavor. A single promotion and development group made up of representatives from the Portsmouth Area Growth Foundation, Portsmouth Area Development Corporation, Chamber of Commerce, existing industry in the area, the Regional Planning Commission, the City Planning Commission and Labor Organizations should be established perhaps under the aegis of the Scioto-Portsmouth Area Redevelopment Committee. Third, a common policy toward such questions as development priorities and small diversified industry together with large industry promotion should be worked out and be assured of wide community support. Fourth, a full time professional should be employed to work exclusively at the effectuation of this program, on promotional campaigns, and in the contracting of prospective investors.

Immediate Goals

a. Mobilization of local savings resources: Although there are special state tax advantages occurring to ten or less stockholders in a community development corporation, this should not be allowed to inhibit the growth of a greater investment fund for area development by public subscription if needed and if capable of being raised.

b. Liberalization of credit standards for the encouragement of new investments: All credit, development and government agencies in the region should formulate, together, general policies on maximum extension of credit standards, in the light of the local economic condition, for different levels of risks and for different institutions. There will then be available to the new investor a variety of choices. Depending on the amount of financing needed, the area promotor will thus be in a position to advise on whether the amount wanted is available locally for the particular level of risk and also, the type of institutions which should be approached for the loan. This will help
avoid the entanglements and delays which discourage would-be investors.

c. More active role by the Portsmouth Area Growth Fund: Outside enlarging its fund and liberalizing its credit standards, there are several other actions that the Fund might take in keeping with its primary objective of benefiting the community.

1. Set up a revolving fund for the purpose of providing additional collateral and security for investment loans from large institutions, thus extending the credit range.

2. Purchase or build outright an industrial shell for moderate cost leasing of space to new entrepreneurs.

3. Aid in the establishment of an industrial park.

4. Offer special low cost space advantages to local investors to induce the production of items needed in the community.

5. Provide the salary of a full time professional development promotor.

6. Aggressively promote expansion and improvements of established industries.

d. Survey of commonly purchased items of local firms: All established firms should be asked to prepare a list of commonly purchased items for open public bidding by local firms. Those items, for which there is local potential, should receive special local development agency consideration. This could involve the agency providing low cost space for production, as described above for local investors.

e. Fullest utilization of the Portsmouth Branch of Ohio University for locally needed technical and professional training and for industrial research: The needs of the area for such occupations as qualified stationary engineers, draftsmen, nurses and bookkeepers should be incorporated into the curriculum. As early as possible, facilities should be provided for research in such fields as mineralogy, forestry and metallurgy, to provide assistance to local industry.

f. Establishment of special guidance and training facilities for young persons, minority group persons and elderly persons: Since these groups are the most hurt by general economic setbacks, the community is especially responsible for them. Their very different problems require special attention and help, so as to give them a chance at equal opportunity with those less handicapped. The construction of a Youth Rehabilitation Center in the Region is especially recommended. Evaluation of manual and technical training programs in secondary schools should be made, with possible provision of a technical high school in the Region.
g. Investigation of a combined industry labor-school program for the retraining of workers displaced by technical changes: The Scioto County Region has been especially hard hit by unemployment, due to advanced technology, so that a program especially directed to the affected workers is strongly justified. Retraining should not be restricted to local occupational opportunities. Application should be made to the Secretary of Labor for a study of training and retraining needs, after which financial assistance can be applied for from the Secretary of Health, Education and Welfare. However, this should not hold up the immediate implementing of a program by local groups themselves.

h. Encourage all political subdivisions to adopt uniform housing, building, plumbing and electrical codes, and zoning and subdivision regulations: Such a measure would encourage Regional development and discourage unsafe practices which would be very much in the common Regional interest as an aid to economic development.

Intermediate Goals

i. Expand and improve the forest industries: Development agencies can aid in the expansion and improvement of the utilization of the vast forest resource. Machines for shipping and the development of a better market for local board could be encouraged among other improvements.

j. Improvement of the Central City: To maintain Portsmouth's eminent position in trade, the implementation of the Central City Plan is vital. The improvements in circulation, parking, zoning, parks and playgrounds; the updating of school facilities; neighborhood renewal; building code enforcement; are all essential elements in the total development plan.

k. The construction of vital highway projects: High priority highway projects, including urgently needed sections of Route 52, should be programmed and completed at an early date.

l. Development of the Ohio River for recreational purposes: Efforts should be made to provide appropriate landscaping and perhaps additional parks along the shore, as well as lodging and service facilities for boat guests. Over the longer run, efforts should also be initiated toward solving the pollution problem of the river.

m. Establishment of a community hospital: This should be of sufficient size for present needs but additional land should be available for future expansion. A bond issue election has now provided adequate funds.

n. Prepare available industrial sites with necessary facilities: The need is evident and calls for no additional comment.

o. Exert efforts to attract and make possible satellite industries to the steel, petro-chemical and forest product materials of the Region: Professional promotion of this objective should be high in priorities.
p. Conserve and refurbish all existing recreational facilities: Boating, fishing, swimming, camping and all recreational facilities should be re-studied with the intention of improving the expanding facilities. Future recreational sites should be marked and preserved, perhaps through early purchase and/or development controls.

Longer Range Goals

q. Development of the Shawnee State Forest: Development can be expedited through Natural Resources Department controlled private development leases. The state could be called upon to provide only the access roads and water at the appropriate sites. Plans should be drawn for efficient lake development.

r. Establishment of a commercial dock and a multi-purpose boating facility near Portsmouth: The ARA approved study should facilitate greatly the realization of these needed projects.

s. Industrial research on expanded use of available resources: Such a development would be most appropriate in conjunction with the Ohio University Branch in Portsmouth.

t. Enrichment of the environmental setting for new space age firms: Selection of scenic plant sites for new academic-oriented firms, along with the enrichment of the Portsmouth Branch campus, can promote a trend of these types of firms to the area. More firms will be seeking the twin advantages of good living and academic stimulation, possibly even before other considerations. A stable professional work force with a low turnover rate is probably the single most important resource of space-age-industry. The best way of conserving this resource is by providing these two fundamental advantages.

u. Creation of an attractive image for the Region: Control of haphazard roadside development and attention to amenities can be of great benefit to both potential tourist and industrial prospects. An effective program of air pollution control now will set the scale for new industrial development. Similarly, close cooperation in river pollution control will hasten the time of clean streams.

Source: Summary Comprehensive Plan For The Scioto County Region of Ohio, 1964.
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