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An Application to Michigan Counties

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REGIONAL ANALYSIS OF TOURISM POTENTIAL:

AN APPLICATION TO MICHIGAN COUNTIES

By

Petra Göbel

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ABSTRACT

REGIONAL ANALYSIS OF TOURISM POTENTIAL: AN APPLICATION TO MICHIGAN COUNTIES

By

Petra Göbel

The analysis of tourism regions identifies important variations in the ability of counties to attract and service tourists. Therefore, regional analysis is a useful tool in tourism development, planning, and evaluation.

The purpose of the present study was (1) to develop a model that predicts tourism potential of Michigan counties, (2) to explore relationships between measures of tourism potential and tourism components at the county-level, and (3) to describe spatial variations in tourism potential and tourism components across Michigan counties.

A regression analysis along with a spatial analysis were performed using secondary data. Per capita lodging supply and per capita hotel/motel use tax were used as measures of tourism potential and served as two distinct dependent variables. Results suggest that tourism in Michigan is concentrated in the Upper Peninsula and the northern Lower Peninsula. Natural resources, especially miles of Great Lakes shoreline accounted for most tourism potential.

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CHAPTER I

INTRODUCTION

Significance of Tourism

Tourism is a unique and special kind of service product. The concept of tourism according to Burkhart and Medlin (1981) involves five main characteristics. First, tourism arises from the movement of people and their main stay in various destinations. Second, there are three distinguishable elements involved in tourism: travel to the destination, the stay, and activities at the destination. Third, the journey and the stay take place outside the normal place of residence and work, so that tourism gives rise to activities which are distinct from those of the resident and working populations. Fourth, the movement to destinations is of a temporary, short-term character, with the tourist's intention being to return within a few days, weeks, or months. Lastly, destinations are visited for purposes other than taking up permanent residence or employment. This definition does not include business travelers.

These characteristics lead to the following implications: Tourism is an invisible export industry; it is an intangible good that cannot be stored and involves the participation of the customer or tourist. In other words, the cyclical patterns of demand for tourism goods and services have obvious implications for employment and investment. Moreover, tourism is a fragmented industry. It is subject to seasonal variations, unpredictable influences from external forces, the heterogeneous nature of tourism motivations, expectations and images, and it is highly elastic with respect to both price and income. These factors promote a low level of customer loyalty with respect to destinations, modes of travel and accommodations. Therefore, tourism is a powerful tool for economic, social, and physical change within a community (Mathieson and Wall, 1982). Types of tourism facilities include parks, hotels, campgrounds, resorts, ski areas, restaurants, and entertainment centers. In Michigan, tourism includes an abundance of activities such as boating, fishing, swimming, skiing, sightseeing, and shopping. In addition, tourism includes many different providers, such as facility owners, travel agencies, transportation companies, hospitality services, and tour operators. Thus, tourism is a complex, comprehensive, and dynamic phenomenon (Mathiesen and Wall, 1982).

Tourism in Michigan

Tourism is an important industry in Michigan, significantly contributing to the state's economy. With a decreasing automobile industry, recreation, tourism and related businesses are a major source of sustained economic growth and job creation. Michigan has many advantages in the competition for tourists compared to other midwestern states. It has a large population base, cultural centers, attractions and scenic areas, particularly along its thousands of miles of lake shoreline that are unmatched in the Midwest (Hudson Institute, 1985). Michigan has seasonal and year-round recreational sites in all parts of the state. Unfortunately, many of these sites are minimally developed and underused (Public Sector Consultants Inc., 1987). These areas being within a six-hour drive for more than 25 million people, there is the potential for substantial growth of a broad range of facilities to serve the tourist.

Problem Statement

As O'Halloran (1988) indicates, the majority of professionals rely on the state for tourism data; therefore they use data in an aggregated form which is not specific to their respective counties. This reliance on statewide rather than county-specific data can lead to misleading recommendations. Since counties are competing for tourism dollars, a better understanding of regional tourism is

necessary. To understand tourism regions made up of counties, the question needs to be asked: What are the characteristics of a successful tourism county?

An analysis of tourism regions identifies important regional variations not only in the ability of places to attract and service tourists but also in the ability to benefit from tourists. Therefore, regional analysis is a useful tool to assist with product development, tourism planning, and policy evaluation.

The nature of this study is descriptive and exploratory. The intent is to document relationships that may exist between county-level development variables and tourism potential. Two different measures of tourism potential will be examined and their usefulness in explaining spatial differences in tourism potential will be discussed. Major county-level variables include: hotel/motel use tax, number of guest rooms and campgrounds, population, miles of Great Lakes shoreline and of streams, acres of lakes, public access to water resources, percentage of public land, acres of National and State Parks, presence of freeways, number of ski areas and golf courses, and, finally, the number of entertainment facilities.

A regression model will be developed which interrelates these variables. This analysis will be accompanied by a spatial analysis comparing the results of the regression model with a visual representation of the spatial patterns

of key variables. This comparison will assist in interpreting the regression analysis findings.

The study takes advantage of secondary data already available. The data has been provided by the Travel Tourism and Recreation Research Center and the Center for Redevelopment of Industrialized States at Michigan State University, the Michigan Travel Bureau, and the Michigan Department of Transportation.

Specifically, the purpose of this research project is to answer the following questions: "Is tourism potential in Michigan counties related to specific county level tourism attributes?", "Can a model be developed which is useful in explaining spatial differences between counties?" and, "Which attributes are the most important in explaining tourism potential?", meaning, "What attributes make a county a successful tourism destination?"

Study Applications

This analysis will aid in recognizing tourism potentials and development strategies. For example, the Michigan Travel Bureau could use the results to better focus its efforts in the "Say Yes to Michigan" campaign. Regional tourism associations might use the findings to further develop tourism promotion in their areas, and Chambers of Commerce might find applications for this research in their discussion of development issues in their own communities.

In general, the findings could assist any agency determining potential tourist markets, planning long term touristic developments in a region, or developing guidelines to improve or strengthen the success of a tourism destination (Hunt, 1975).

Study Objectives

1. Develop a model that predicts a county's potential for tourism;
2. Explore relationships between measures of tourism potential and identified tourism components; and
3. Describe spatial variations of tourism potential and tourism components across Michigan counties.

Definitions

Tourism Components: Destination attributes and characteristics that play a vital role in the character of a tourism region. They may also be called destination features. Examples are lakes, mountains, beaches, marinas, museums, or restaurants.

Tourism Potential: The ability of a county or region to attract tourists.

CHAPTER II

LITERATURE REVIEW

In this chapter selected literature topics related to this study are reviewed. These topics include: (1) tourist decision-making process, (2) tourism components, (3) characteristics of tourism in Michigan, (4) accommodations use and tourism potential, (5) population and the relative importance of tourism, (6) regional analysis, (7) destination images, and (8) dominance of tourism components. The first section of this chapter reviews the tourist decision-making process and provides an explanation of how this study fits into the overall concept of tourism. In the next section, tourism components are identified from which the independent variables in this study are derived. The third section describes the characteristics of tourism in Michigan. The fourth and fifth section are related to the choice of the dependent variables. The sixth section covers important studies in the field of regional analysis followed by a section on tourism destination images as they are related to the study. Finally, the findings of related

studies are reviewed to suggest the dominance of alternative tourism components in explaining the model.

Tourist Decision Making Process

To better understand the implications and limitations of this study, it is important to understand the tourist decision-making process and to realize how the variables under discussion fit into this concept. Mathieson and Wall (1982) define five principle decision-making phases. In phase one, there is a felt need or travel desire; reasons for and against meeting that desire are weighted. The second phase involves information collection and evaluation through advertisement and word-of-mouth recommendations. The third phase includes the actual travel decision where choices are made regarding destination, mode of travel, type of accommodation and activities. Phase four involves travel preparations and experiences. In the final phase, travel satisfactions and evaluations are established which will influence future travel decisions of individuals. Factors influencing the decision-making process include attributes and characteristics of destinations as well as past experiences. Each of these factors is highly interrelated, which makes the process even more complicated (Mathieson and Wall, 1982).

The outcome of these five decision-making phases is greatly influenced and modified by tourist profiles, travel

awareness, and trip features. The tourist profile describes socio-economic and behavioral characteristics of tourists. Motivations, attitudes, needs and values of tourists are of crucial importance in contributing to and influencing the decision-making process (Mathieson and Wall, 1982).

Potential tourists may be motivated to travel; however, unless they are informed of available opportunities, they might not travel at all. Travel awareness depends on the availability of information and the credibility of these information sources. Generally, there are formal and informal sources of information, formal sources including all means of promotion and informal sources referring to comments and recommendations by relatives, friends and other travelers.

Trip features include such factors as distance, duration of stay, time constraints, trip cost and value for price, party size, safety at the destination and confidence in travel arrangements and travel intermediaries.

Tourism components play a vital role in the assessment of alternatives and in the final choice of the destination. These components will be the focus of this study. To what degree and in which combination are tourism components related to the tourism potential of a destination? However, as this discussion shows, tourism components are only one of many factors influencing the individual tourist's decision regarding when, how and where to travel.

Tourism Components

Many authors take different tourism components into account as illustrated in the following section. McIntosh and Goeldner (1984) identify natural resources, infrastructure, superstructure, transportation and hospitality resources. Burkhart and Medlik (1981) discuss attractions, accessibility, and amenities. Robinson (1976) identifies good weather, scenery, amenities, historical and cultural factors, accessibilities and accommodations. Each of these authors mention more or less the same components, they simply label them differently (see Table 2.1).

Characteristics of Tourism in Michigan

Holecek (1991), summarizes research on travel and tourism in Michigan and characterizes pleasure travel to and through Michigan. Based upon his review of available data, he draws the conclusion that Michigan's prime travel market -- drawing 80 percent of its overnight trips -- includes Illinois, Indiana, Michigan itself, Minnesota, Ohio, and Wisconsin. That means there are fifty million potential consumers. About half of the overnight trips occur on weekends, primarily in July, August, and September (40 percent of all overnight trips). The large majority (80 percent) travels by car, truck, or recreational vehicle for an average length of stay of approximately four nights. Forty-five percent of pleasure trips were taken to visit

Table 2.1: Tourism Components

Author	Component	Explanation
McIntosh and Goeldner	1. Natural Resource	landform, fauna, flora, beaches, climate
	2. Infrastructure	communication, roads, parking, marinas, bus stations,...
	3. Superstructure	resorts, hotels, restaurants, malls, entertainment places,
	4. Transportation	transportation equipment
	5. Hospitality Resources	attitude of residents, festivals, history, dancing, museums..
Burkhart and Medlik	1. Attractions	climate, scenic beauty, history, events, exhibitions,sports,...
	2. Accessibility	distance from major cities, external transportation and communication systems
	3. Amenities	accommodation, catering, entertainment, internal transportation and communication
Robinson	1. Good Weather	
	2. Scenery	lakes, mountains, forests
	3. Amenities	all facilities for recreation and amusement
	4. Historical and Cultural Factor	ruins, castle, festivals, cathedrals, art galleries malls...
	5. Accessibility	closeness to major cities and easy accessibility
	6. Accommodations	food and lodging

Source: McIntosh and Goeldner (1984), Burkhart and Medlik (1981) and Robinson (1976).

friends and relatives, 29 percent had the primary purpose of outdoor recreation, and 20 percent were mostly for sightseeing/tours and special attractions. Forty-three percent of the overnight trips involved staying over at friends and relatives, 30 percent involved lodging in hotels or motels, 11 percent involved camping, and 9 percent involved the use of a vacation home. The recreation activities most likely to be considered when visiting Michigan on a pleasure trip were fishing (23%), swimming (22%), boating/ canoeing (18%), hiking (18%), and camping (6%). Attendance of attractions and events most frequently reported when on a pleasure trip were dining and evening events (23%), natural attractions (18%), landmarks and historic sites (17%), developed attractions such as museums (13%), and festivals, fairs and cultural events (11%).

Michigan consists of many diverse and attractive geographical regions, ranging from the natural beauty of the Upper Peninsula to the metropolitan area around Detroit. Spotts (1991) suggests that, as opposed to visitors of the Upper Peninsula, visitors travelling to the southeastern portion of the state are less likely to enjoy outdoor recreation or to visit natural attractions on their trip. In contrast, they are most likely to report that they are visiting friends or relatives or specific attractions as a trip purpose. The utilization of friends' and relatives' homes for overnight stays is highest in southeast Michigan,

medium in eastern and western Michigan, and lowest in the Upper Peninsula, reflecting the spatial distribution of Michigan's population.

Fridgen (1987) identifies major tourism destinations as perceived by tourists who are familiar with Michigan as well as by those less familiar with Michigan. For travellers familiar with Michigan, designated tourism and recreation centers were Grand Traverse, Mackinac, Keweenaw, Charlevoix, Marquette, Antrim, Wayne, and Roscommon counties. Less familiar travelers gave slightly different responses. They failed to identify small regions along the northwestern coast of the Lower Peninsula as well as the central lakes area in the center of the state. Instead they marked the Thumb Region and the region along Lake St. Clair. The majority of the identified counties were coastal counties. However, it was difficult to determine whether neighboring counties of tourism centers identified by respondents were also perceived as part of the tourist region.

Accommodations Use and Tourism Performance

Accommodations use as a measure of tourism potential has been widely discussed. Choy (1985) suggested that the performance of the hotel industry can be used as an indicator of general trends in travel and tourism-related activities for a particular area.

Pearce (1987) outlines major reasons for the widespread application of accommodation use as an indicator for tourism activity. In his view, accommodations are one of the more visible and tangible elements of tourism. A list of accommodations is generally readily available, with statistics on commercial accommodation being compiled for fiscal and other reasons. The use of accommodation is also logical, since a stay away from home is one of the defining characteristics of tourism. Except where day trips are dominant, the distribution of accommodations provides a good measure of the distribution of tourism activity across a region, state, or county. This distribution is also a reasonable measure of economic impact, since accommodation expenditures usually account for one-third to one-half of a tourist's travel budget (Pears, 1987).

Brown (1981) justifies the use of lodging receipts as an indicator of total tourism-related expenditures. He argues that tourists, as well as local residents, trade at the same restaurants, recreation establishments, and other sectors of the retail economy. Also, because there are many entrances and exits into and out of counties, few other measures are as good an indicator of tourism volume.

Bishop and Spotts (1990) also point out the usefulness of hotel/motel use tax collections as an important indicator of the performance of the travel industry as a whole. However, the use tax is not a comprehensive indicator of

travel activities since much travel activity takes place on day trips, and portions of overnight travel involve lodging in second homes, with friends or relatives, or at campgrounds. Furthermore, the tax data reflects the price charged as well as the amount of traveler spending in hotels and other establishments. Based upon the arguments and work of these and other authors it appears that hotel/motel use tax receipts are one of the better indicators available for the researcher to use in tourism investigations.

Population and the Relative Importance of Tourism

Although data on the distribution of accommodations give a useful indication of where tourism is important in terms of a county or region, absolute figures do not necessarily reflect the significance of tourism within a particular county. Clawson and Knetsch (1969) recognized the impact of a population base on tourism performance quite early in their work. They suggested that the influence of the population distribution be removed within the potential zone by putting the variable on a per capita basis. Looking at lodging data on a per capita base makes it possible to determine the importance of tourism for a region and to eliminate the effect population centers have in terms of attracting visitors in and of themselves.

Keogh (1984) suggests that researchers apply Defert's tourist function index. This index is a measure of tourist

activity or intensity as reflected by two populations, the visitors and the visited. It is derived by comparing the number of beds available to tourists in a county (N) with the resident population of that county (P) according to the formula : TF = (N * 100) / P.

Regional Analysis

Through regional analysis important regional variations can be identified, including a region's ability to attract and service tourists as well as to benefit from expenditures and contact with tourists. In understanding tourism at the regional level it is essential to know how one destination relates to another, whether or not a region is a primary destination itself and what is the nature and composition of regional tourism components. Therefore, regional analysis is useful for the purpose of product development, tourism planning, and policy evaluation (Smith, 1987).

In North America, Gunn (1982) was one of the first to do research in the field of tourism regional analysis. He proposed a methodology for identifying regions with potential for tourism development in Canada based on the fact that tourism implies travel from origins to destinations and that destinations imply a sense of space. He declares that a fundamental requirement of tourism planning is to understand, first, the location of potential

tourism places with respect to other features in other locations and, second, the natural and cultural resources and the popular images of those places.

In his study "An Approach to Regional Assessment of Tourism Potential" Gunn (1980) describes a process that determines geographical zones. Because of the strength of certain locational and organizational factors, some regions have a greater potential for future tourism than others. His assumption is that the tourism industry depends on the flow of tourists who seek things to see and do, like parks and recreation resources, or commercial attractions and events. Attractions are primarily physical land developments. Gunn developed an inventory of regional resources for 20 counties in south central Texas. He used mapping procedures to describe zones with greatest tourism potential in order to help with future policy decisions. In the study by Gunn nine factors were used that are closely related to the variables used in this study, transportation and access to the region being the most crucial ones as identified by Gunn.

In yet another study, Brown (1981) successfully uses lodging receipts to measure the relative and absolute importance of tourism to the economies of New York counties. He employs a spatial analysis and develops two maps. One map shows net changes in lodging receipts for New York counties. The other map illustrates lodging receipts of a

county in percentage of the New York states total lodging receipts.

Smith (1987) describes a procedure for defining tourism regions on the basis of county-level resource patterns. He identified 16 variables most of which are similar to the variables used in this study. He counted facilities and resources while neglecting the capacity or quality of each individual facility. Next, a principal component factor analysis was performed on these variables, attaching a score to the factor loadings for each county. These scores were then mapped to illustrate county variations. Thirdly, tourism regions were identified through a cluster analysis by grouping counties with similar resource patterns. Finally, with a regression model, resource patterns were correlated with variations in the economic importance of tourism in each county to help identify the types of tourism resources important for a strong economy. Smith employed two measures of economic importance. One was the percentage of local retail receipts attributable to tourist expenditures as an indication of the significance of tourism in the area. The other measure was the percentage contribution of tourism expenditures in a county to total provincial receipts to measure the magnitude of each county's tourism development in terms of its contribution to the total provincial tourism economy.

His findings suggest that there are strong regional variations across the tourism resource base. Counties are not created equal when it comes to tourism components. Some counties are poor in one type of tourism resource, while rich in another. In terms of economic impact, it was observed that urban tourism and urban fringe tourism had the highest economic impact, far higher than wilderness and outdoor recreation resources (Smith, 1987). Smith concludes that tourism is an industry with important geographical and regional aspects. These aspects must be recognized and understood if weaknesses in a county or state tourism industry are to be corrected and if the strengths are to be fully utilized.

Livingstone and Mitchell (1989) used the same methodology as Smith in their study of South Carolina counties. They also found similar results. First, considerable regional differences were observed. Second, the regression analysis showed that urban tourism had the highest positive correlation with the dependent variable. They used number of visitors, visitor expenditure, and state and local taxes generated by visitors as dependent variables in four separate regression analyses. Counties that fall into the urban tourism category have large numbers of accommodations, activities, facilities, and programs which attract the largest numbers of in- and out-of-state visitors.

Destination Images

A tourism image is defined as the impressions that a person holds about a region in which he or she does not reside (Hunt, 1974). Although tourism resources are the basis for tourism travel, images play an important role in the tourist decision-making process. Hunt (1974) designed a study to determine whether some recreation areas command higher use than others simply because of a perceived status. Data indicated that there were differences in preference for areas. In a study of nine regions, Goodrich (1978) explored the relationship between perceptions of an area and preferences for an area as a vacation destination. Results indicate that favorable impressions of a tourist area increase the probability of choice or preference for that area as a vacation destination.

Raitz and Dakhil (1988) administered a questionnaire to college students throughout the United States to find out their preferences for specific physical environment types for high quality recreational experiences. Seashores and lake environments were the most preferred. Assuming that these findings can be generalized for all tourists, Michigan has the potential to build upon these preferences in the competition for tourists.

Specifically in Michigan, Deale (1983) conducted a study of auto travelers' perceptions using a cognitive mapping technique. Her major finding was that counties

bordering the Great Lakes were identified more often as the centers of recreation and tourism regions than inland counties. She reports that respondents associate these shoreline regions much more often with recreation and tourism then regions located inland. Mackinac Island and Grand Traverse County received special attention. Also, western Lake Michigan counties had a more positive image than eastern Lake Huron counties. The northwestern counties of lower Michigan were believed to be more scenic, and more popular destinations, having better accommodations and friendlier people, as well as better boating, camping, sailing, beaches, festivals and events than counties located on the Lake Huron side of Michigan.

Importance of Tourism Components

The tourism system is activated by attractions. Only in rare cases do people travel without being stimulated by attractions. The attraction is the primary trip purpose (Crompton, 1990). There are many forms of attractions; researchers are still arguing which types of attractions are most important in generating tourism visitation.

Richie and Zins (1978) administered a survey to managers from various sectors of the tourism industry and found that natural beauty was clearly the single most important determinant of the attractiveness of a given region. They found that cultural and social characteristics

were the second most attractive feature of a tourism destination.

Var (1974, 1977) established an index of touristic attractiveness on the basis of informed judgments for Turkey and for the Canadian Province of British Columbia. Natural factors and food and shelter were ranked highest in both countries. Historical prominence, which was quite important for Turkey, was also rated an important factor in British Columbia. Natural beauty, however, was ranked first in both cases. On the other hand Smith's (1987) findings illustrate, that urban tourism based on theater, shows, festivals or historic sites contributes most to the tourism performance of a county, far more than outdoor recreation. But then he did not consider the role of population when developing the dependent variable.

Makens (1987) discusses the importance of historic sites as visitor attractions in his article. He found that historic sites were primary visitor attractions and act as important vehicles for preserving and transmitting the values of our cultural heritage to each emerging generation.

Curtis (1990) acknowledges the major success of commercial theme parks as visitor attractions. He describes them as challenges to the public recreation sector. Without integrating such attractions, the public sector will fall behind its commercial competitors.

A survey on Michigan tourism administered by Ross Roy, Inc. in the mid-80s (Holecek, 1991) estimates that 48 percent of all travelers taking pleasure trips in Michigan were visiting a natural attraction, developed attraction, historic site, landmark, or museum. Recreation activities most likely to be considered when on pleasure trips in Michigan were fishing, swimming, boating, canoeing, hiking, and camping. This emphasized the natural resource-based recreation in Michigan. Attractions of interest when traveling in Michigan were dining and evening entertainment (32%), natural attractions (18%), landmarks and historic sites (17%), developed attractions and museums (13%), and fairs, festivals, and cultural events (11%) (Holecek, 1991).

Apparently the importance of a single tourism component varies with the region under consideration. However, natural resources as well as developed attractions play an important role with respect to the tourism potential of a region.

Conclusions from the Literature Review

Regional analysis is an important research technique which can be used to understand the location of potential tourism destinations with respect to other features. It also helps the researcher understand the natural and cultural resources as well as the popular images of those places (Gunn, 1982). The literature review suggests that the

tourism performance in Michigan counties or elsewhere could be partially explained by the existence of physical land developments. It has to be recognized, however, that there are also other reasons for choosing a specific tourist destination (Mathieson and Wall, 1982). The major tourism components that will have to be incorporated into the model are accommodation features, developed resources or attractions, natural resources, and the accessibility of tourism destinations (Robinson, 1976). Natural resources are likely to be the dominant tourism component in Michigan (Ritchie and Zins, 1987, Var, 1974, 1978), especially the Great Lakes shoreline (Deale, 1983, Raitz and Dakhil, 1988). Several measures of tourism potential have been suggested in literature, namely hotel/motel use tax, which is a performance measure (Bishop and Spotts, 1990), and volume of accommodations, which is a supply measure (Pearce, 1987), each of which can be expressed as a per capita figure (Clawson and Knetsch, 1969). Relationships between these variables and regional differences in tourism potential across Michigan counties are the subject of the hypotheses for this study.

Hypotheses

Based upon previous works which have explained the relationships between attractions, natural resources and tourism growth, two general hypotheses can be proposed. The

consistent findings by others that tourists are attracted to natural resources, scenic beauty, and attractive landscape elements, provide the background for hypothesis number one, which is stated as follows:

Hypothesis 1:

Natural resource components as opposed to developed attractions will be the strongest explanatory contributor to county-based tourism potential.

Findings also suggest that visual as well as physical access to the Great Lakes are a very important factor in attracting tourists. The powerful presence and beauty associated with the Great Lakes provides the basis for the next hypothesis which is as follows:

Hypothesis 2:

Great Lakes shoreline will be the single most important tourism component in explaining tourism potential in Michigan counties.

CHAPTER III

ANALYSIS TECHNIQUES AND PROCEDURES

In this Chapter research variables and analysis techniques, particularly regression analysis are outlined and discussed. The first section of this chapter reviews variable measurement and discusses the spatial distribution of variables in Michigan. The second part of the chapter outlines the model building process and describes steps used in the regression analysis.

Research Variables

The selection of specific variables from among the many suggested in the tourism literature is very crucial to the success of the study. The choice of dependent as well as independent variables will be described in detail. Each variable will be first defined and then operationalized. To better understand spatial differences between counties and to better interpret the results of the regression analysis a spatial analysis of each variable will follow.

Spatial analysis is a method used to reveal general geographical variations of variables. By mapping tourism

components on a county bases a broader picture of the spatial structure of tourism components in Michigan can be illustrated. Pearce (1987) provides many examples of spatial analysis applications in tourism; Herbin (cited in Pearce, 1987) has produced maps showing the distribution of resorts, ski lifts, and occupancy rates in the Alps. Ashworth's maps (cited in Pearce, 1987) show the distribution of accommodations and attractions in the Netherlands, and Ishii (cited in Pearce, 1987) deals with a range of recreational resources and facilities in Japan. Also Smith (1987) as well as Var (1974, 1977) mapped spatial variations in their tourism components. Spatial analysis is a technique, widely used by tourism researchers, that presents variables in their spatial context.

Regression Analysis

A multiple linear regression model will be the primary analysis instrument in this study. It relates multiple independent variables to one dependent variable. The model can be expressed as:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_p X_{pi} + e_i$$

The notation X_{pi} indicates the value of the pth independent variable for case i. The β terms are unknown parameters and the e_i terms are independent random error terms which are normally distributed with mean 0 and constant variance σ^2. The model assumes that there is a normal distribution of the

dependent variable for every combination of the values of the independent variables in the model. The number of observations has to exceed the number of coefficients estimated to come to reliable results (Chou, 1989).

One of the first steps in calculating an equation with several independent variables is to calculate a correlation matrix for all variables. Such a matrix shows the correlation between the dependent variable and each independent variable, as well as intercorrelations among independent variables. Large intercorrelations between the independent variables of 0.5 and more are a threat to the results of the multiple regression analysis. Without adding much to the overall fit of the model, they inflate the variances of the estimates, making individual coefficients quite unreliable. Therefore, highly correlated independent variables will have to be modified (Kachigan, 1982).

Partial regression coefficients or B-coefficients will be estimated with the method of least squares. To overcome the difficulty of direct comparison of the relative importance of explanatory variables when different units of measurement are used, a transformation into units of standard deviation is necessary. The Beta coefficients can be calculated directly from the regression coefficients using

$$Beta_k = B_k * (S_k / S_y)$$

where S_k is the standard deviation of the kth independent variable (Ott, 1977).

Having obtained the sample regression equation and established the varying degrees of significance of the regression coefficients, the closeness of fit of the regression model needs to be determined by calculating the coefficient of multiple determination, R square. R square is defined as the ratio of the explained variation due to regression to the total variation in the dependent variable. Thus, R square can be interpreted as the portion of the total variation in the dependent variable that is associated with or explained by the regression of the dependent variable on all independent variables. Therefore, the closer the value of R square is to one, the smaller the scatter of points about the fitted regression and the better the fit is. The sample R square tends to be an optimistic estimate of how well the model fits the population. The model usually does not fit the population as well as it fits the sample from which it is derived. The adjusted R square corrects R square to more closely reflect the goodness of fit of the model in the population (Kachigan, 1982).

The coefficients in the sample multiple regression equation are subject to sampling error. Before it can be used as a predictive device, it needs to be determined whether the sample regression coefficients are statistically significant. This will be accomplished by testing the joint

effects of the independent variables on the dependent variable. Thus, a F-test of

$H_0 : \beta_1 = \beta_2 = \ldots = \beta_p = 0$

would be a test of the null hypothesis that the dependent variable is not linearly related to the independent variables. Large values of F will indicate rejection of the null hypothesis (Chou, 1989).

In order to look for evidence that the necessary assumptions are not violated, it is important to plot residuals. A residual is the difference between an observed value and the value predicted by the model. Residuals should be plotted against predicted values. The distribution of residuals should be examined for normality. The relative magnitude of residuals is easier to judge when they are divided by estimates of their standard deviation. The resulting standardized residuals are expressed in standard deviation units above or below the mean (Ott, 1977). Standardized residuals will not only be plotted by case but also mapped. The mapping criteria is whether the standardized residual for a county is above or below the mean. Mapping makes it possible to detect spatial patterns of over- or underestimation of the dependent variable for certain counties.

When building a regression model it is also important to identify cases that are influential, or that have a disproportionately large effect on the estimated regression

model. One way of doing so is to compute the leverage of a case. The leverage for a case describes the impact of the observed value of the dependent variable on the prediction of the fitted value. Ideally, each observation should have an equal influence. Therefore, all leverages should be near i / p, i being the number of cases and p being the number of independent variables (Kachigan, 1982).

Finally,it is useful to split the sample randomly into two parts. One part is then used to estimate the model, while the remaining cases would be reversed for testing the goodness of fit. This is important since a model usually fits the sample from which it is derived better than it fits the population (Ott, 1977). In this study splitting the data set into two parts would result in a very small sample size for the model building process, and therefore, only five counties will be reserved to test the model. Of course, these five counties will be excluded from the model building process. These five counties will be chosen randomly from counties that present the middle range of population sizes among Michigan counties.

CHAPTER IV

VARIABLE MEASUREMENT

This chapter which focuses upon variable development and measurement,is divided into three sections: (1) dependent variables (2) independent variables, and (3) limitations of the study. In the first two sections variables will be derived from major tourism components that have been identified in the literature review. Those considered for the study include: accommodation features, developed attractions, natural resources, accessibility, and county population. Variables will be defined and a rationale for including the variable in the model will be provided. Then variables will be operationalized. The spatial distribution will be shown by mapping each variable in its geographical context, and finally, a general discussion of the variable will follow. The last section of this chapter discusses limitations of the study. Michigan counties and regions are illustrated in Figure 4.1. Similar base maps will be used in the presentation of the spatial analysis.

Figure 4.1: Counties and Basic Regions in Michigan

Dependent Variables

For the purpose of this study two different dependent variables have been chosen, per capita hotel/motel use tax and per capita lodging supply. It is assumed here that both are measures of tourism potential; the first, however, is a performance measure, dividing the amount of hotel/motel use tax receipts by the population base of a county. The second is a supply measure, dividing the number of guest rooms and campsites in a county by its population base. While per capita use tax takes only travelers who stay in hotels or motels into account, per capita lodging supply recognizes the importance of camping as a lodging alternative. Unfortunately, though, data on campground visitation is not available. However, since tourism is a growing industry in Michigan, per capita lodging supply should provide an appropriate indication of tourism potential for counties and regions in the state. In the following, each part of the two measures will be discussed separately: (1) lodging supply, (2) hotel/motel use tax, and (3) relationship to county population. The data on the dependent variables is displayed in Table A.1.

Lodging Supply

Camping in Michigan is not only an important recreation activity and base for other forms of recreation, it is also a type of lodging. According to a survey by Ross Roy, Inc.,

14 percent of all pleasure trips to Michigan between 1983 and 1986 included an overnight stay in a campground. In 1985, 88,053 campsites were available to the traveler compared to 96,503 guest rooms in lodging facilities in 1986 (Spotts, 1991). Therefore, it is important to include the number of campsites as well as the number of guest rooms in any analysis of tourism lodging supply.

Supply of Guest Rooms

It is estimated that 96,503 guest rooms are available to the tourist visiting and traveling in Michigan. According to Spotts (1991), 59 percent of the establishments were hotels/motels, 36 percent were cabin/cottage establishments, 5 percent were bed & breakfasts/historic inns, and less than 1 percent were condominiums. Overall, 87 percent of guest rooms were provided by hotels and motels as opposed to cabins/cottages and condominiums, which emphasizes the more urban orientation of guest rooms. Operators of lodging establishments are listed in Table 4.1.

It is also important to note that some lodging establishments are not open year round. For instance, in rural Mackinac County only 22 percent of the lodging establishments operated year round as compared to 100 percent in the more densely populated counties Clinton, Isabella, Lapeer, Midland, Saginaw, Lenawee, and Washtenaw. These percentages demonstrate the seasonal character of

resource-based tourism as compared to year-round tourism and business traffic in urban counties.

The data set was obtained from the Travel, Tourism, and Recreation Resource Center at Michigan State University. The original data sources were the Yellow Pages of phone directories, the American Hotel and Motel Association's annual directory, a publication by the Michigan Travel Bureau entitled "Michigan's Bed & Breakfast and Historic Inns," the Michigan Lodging Association's membership roster, and a printout of taxpayers supplied by the Department of Treasury. Although the guest room inventory dates back to 1986, it can still be used as a good approximation of 1989's guest room distribution over all Michigan counties.

The total supply of guest rooms is highly concentrated in urban areas, reflecting the high volume of business travel, as can be seen in Figure B.1. The highly traveled interstate highways may also account for the relatively large number of guest rooms in these counties. On the other hand, rural counties with a high supply of guest rooms like Mackinac, northwest Lower Michigan, Gogebic, Chippewa, Roscommon, and Iosco, all contain important tourist sites and attractions. The Michigan Straits region includes major historic attractions; Sleeping Bear Dunes National Lakeshore and many popular resorts are located in northwest Lower Michigan; most ski areas and the only mountains in Michigan are found in Gogebic County; Chippewa County includes the

heavily visited Soo Locks and Tahquamenon Falls State Park; Roscommon County provides two large inland lakes; and Iosco County offers plentiful Great Lakes fishing opportunities (Spotts, 1990). Counties like Berrien, Grand Traverse, Marquette, Muskegon, and Saginaw all contain sizable cities as a population base as well as important tourist attractions. Relatively few guest rooms are located in the central Upper Peninsula, northeast Lower Michigan, west central Michigan, the Thumb region, or most of the extreme southern part of the Lower Peninsula. Each of these areas lack a major city, major tourist attractions, or an interstate highway.

Table 4.1: Operators of Campgrounds and Lodging Establishments

Campground Provider	% of total Sites	Lodging Provider	% of total Establishments
Commercial	58.9	Hotel/Motel	59
State Park	15.5	Cabin/Cottage	36
Local Public	14.7	B & B/Inn	5
Non-Profit	5.1	Condominium	< 1
State Forest	3.4		
Nat. Forest	2.0		
Nat. Park	0.3		
Total	100.0	Total	100

Source: Spotts, D. (1991). Travel and Tourism in Michigan - A Statistical Profile, Second Edition. East Lansing, Michigan: Research Monograph # 2, Travel, Tourism and Recreation Research Center, Michigan State University.

Supply of Campsites

Campsites are the second component of lodging supply. They are provided by the private sector, local communities, and by State and National Parks, as well as by State and National forests. Operators of campgrounds are described in Table 4.1 (Spotts, 1991). Camping is typically a more resource-based type of lodging compared to the location of guest rooms. Furthermore, travelers who camp are less likely to include business travelers or visit friends or relatives compared to those staying at commercial lodging facilities. Like some of the more rural lodging facilities, campground use is very seasonal and restricted by changes in weather. When comparing the number of campsites and the number of guest rooms one must bear in mind that campgrounds are open approximately six months out of the year and sometimes less.

The data for the campsite variable was obtained from various sources. The number of commercial and local public campsites was provided by the Michigan Department of Public Health, where all commercial campgrounds must be licensed and registered. The data dates back to 1985, but it should provide a reasonable estimate of current campsite distribution. It should be noted that the important issue are differences in the spatial distribution of campsites across Michigan counties, not the exact number of campsites. Campsites which are offered by the non-profit sector, like

fraternal organizations, recreation or religious organizations, are excluded from the count, because they are not open to the general traveling tourist.

An estimate of the number of State and National Forest campsites was provided in the brochure "Michigan Campground Directory" published by the Michigan Travel Bureau in connection with the Michigan Association of Private Campground Owners. The information is dated 1991.

State Park campsites were estimated by content analyzing the brochure "Michigan State Parks" (1990) published by the Michigan Department of Natural Resources and distributed by the Michigan Travel Bureau. In summary, the calculated number should provide a reasonable estimate of all campsites available to the traveling public in each of Michigan's counties.

The spatial distribution of campsites is illustrated in Figure B.2. Campsites are concentrated in the eastern Upper Peninsula, primarily in Chippewa and Mackinac counties, which both have very attractive tourist features. Hardly any campsites are located in the inland counties in the middle part of Michigan -- Midland, Gladwin, Gratiot, Clinton, or Eaton. These are primarily agricultural counties with few lakes and streams to foster campgrounds. Most campsites are located along the west coast in Mason, Oceana, Muskegon, Ottawa, or Allegan and at the beaches of the northern Lower Peninsula in counties like Grand

Traverse, and Cheboygan. Campsites are also located within easy reach of population centers. There is also a large number of campsites in the southernmost counties of Michigan which are likely to serve Ohio and Indiana residents as well as Michiganders from major cities. These counties have also a good number of miles of streams and acres of lakes as well as several State Parks.

Hotel/Motel Use Tax

The second key dependent variable in this study is hotel/motel use tax revenues. The room tax is a 4 percent tax levied on "rooms or lodging furnished by hotelkeepers, motel operators and other persons furnishing accommodations that are available to the public on the basis of a commercial business enterprise, irrespective of whether or not membership is required for use of the accommodations, except rooms and lodging rented for a continuous period of more than one month" (Michigan Department of Treasury, 1984). The types of establishments required to pay the room tax include inns, motels, tourist houses, nudist camps, apartment hotels, resort lodges, and cabins as well as certain camps operated by other than non-profit organizations. The data are collected and recorded by the Department of Treasury; it is also maintained by and available through the Travel, Tourism and Recreation

Research Center at Michigan State University for all Michigan counties.

The trend in use tax collections shows a steady increase between 1985 and 1989. However, in 1990 an economic downturn was felt due to the beginning recession and the Gulf War (Spotts, 1991). The trend is portrayed in Table 4.2. It has to be kept in mind that changes in the data reflect changes in the prices charged at lodging establishments as well as changes in the amount of spending therein.

Table 4.2: Trend in Unadjusted Hotel/Motel Use Tax Receipts in Michigan (1985 - 1989)

Year	Hotel/Motel Use Tax in $
1985	17,127,335
1986	18,737,261
1987	18,737,261
1988	19,978,770
1989	21,812,110

Source: Spotts, D. (1991). Travel and Tourism in Michigan - A Statistical Profile, Second Edition. East Lansing, Michigan: Research Monograph # 2, Travel, Tourism and Recreation Research Center, Michigan State University.

The following limitations in the data need to be recognized (Spotts, 1986). First, there is the problem of taxes paid by hotel/motel chains. In the case of a franchise, use taxes are paid in one sum by the corporate headquarters rather than by each of their affiliated properties. Consequently, these payments are recorded for

the county or state containing the corporate headquarters. If franchise businesses do a significant share of the business in a given county, the hotel/motel use tax for a county will underestimate the volume of business activity.

The second limitation is the classification problem. When businesses apply for a use tax registration they complete an application that requires them to state which of the Department of Treasury's Business Classification Codes best describe their principal business activity. These responses are the basis for the Department of Treasury's categorization of use tax collections under specific business types. Therefore, in most instances, someone operating a hotel would select BCC 701 - "Hotels, Tourist Courts, Motels" - as the best description of his or her business. However, if this hotel contains a restaurant which the applicant considers as the principal business activity, he or she could choose another Business Classification Code.

Finally, use tax collections might not fully reflect business transactions because some business owners may not fully report all of their taxes. The exact magnitude of this problem is unknown, but it is assumed to exist at some level.

These difficulties limit the quality of the data as an indicator of tourism volume and, therefore, hotel/motel use tax receipts should be considered only as an approximate

indicator of tourism volume, particularly in counties that have many franchise businesses. Nevertheless, if it is assumed that changes in tax volume are not due to one of these three problems, then changes in taxes collected above price changes can be attributed to shifts in business volume and can be viewed as a tourism performance measure in that county (Spotts, 1986).

The use tax has a similar spatial distribution pattern as Michigan guest rooms, as can be seen in Figure B.3. The use tax, however, emphasizes the importance of year-round tourist attractions and business travel in the urban areas, which are independent from vacation time or weather changes. Therefore, summer vacation destinations in the Upper Peninsula that have a high number of guest rooms like Chippewa, Mackinaw, and Marquette, as well as Gogebic, which has many winter sports resorts, do not have extremely high tax revenues although they have many rooms. The same is true for the counties in the northern part of the Lower Peninsula. In addition, it is possible that room charges are not as high in these counties when compared to more urban counties.

County Population

The previous literature review suggests that population size is an important variable to be considered when studying tourism destination regions.

By including the population base of each county as part of the dependent variable, population-based differences of counties can be controlled. By controlling for population, attention is paid to the fact that cities are an attraction in and of themselves. Recreation facilities, events, and other attractions within population centers serve primarily their own population and only secondarily tourists.

The population data for each Michigan county was obtained through the Center for Redevelopment of Industrialized States located at Michigan State University. It represents 1990 census data. Compared to the 1989 population estimate derived from the 1980 census which is also available, the 1990 census data seems to provide a better estimate of the actual 1989 population in each county (Menchik, 1990). Based upon the 1990 estimate, Michigan has a population of 9.1 million people. Counties range in size from 1,707 (Keweenaw) to 2.11 million people. The largest counties by far are Wayne (2.11 million) and Oakland (1.08 million).

Michigan's population is concentrated in the southern portion of the Lower Peninsula, specifically in the three counties that constitute the Detroit metropolitan area and in Kent county. The Thumb region and the southernmost counties of the lower Peninsula, Cass, Branch, and Hillsdale, are exceptions to the overall density of the populated southern Lower Peninsula. The Upper Peninsula and

the northern portion of the Lower Peninsula are less densely populated. Exceptions include Marquette and Grand Traverse counties, which are popular tourism destinations; in addition, Bay County, Midland, and Isabella counties have moderate population densities. In the Upper Peninsula several counties have minimal populations, particularly Alger, Baraga, Keweenaw, Luce, and Schoolcraft. The population distribution in Michigan can be seen in Figure B.4.

Spatial Distribution of Per Capita Figures

A completely different picture emerges when using per capita figures. In terms of per capita lodging supply the northern counties dominate (see Figure B.5). Tourists drawn to the natural beauty, large public land holdings, abundance of lakes, beautiful shoreline and extensive forests in these regions may help to support a higher per capita lodging supply. High per capita lodging supply is observed in most of the eastern counties in the Upper Peninsula as well as Keweenaw and Gogebic counties. The northern portion of the Lower Peninsula, particularly Charlevoix, the Straits region, western coastal counties and selected inland counties with extensive state forests and plenty of inland lakes all have higher per capita lodging supply. Per capita lodging supply in the southern Lower Peninsula with the exception of Saginaw County with Frankenmuth, its major

tourist attraction, is quite limited. As illustrated in Figure B.5, limited per capita lodging supply can be observed in the Thumb counties of Huron and Salinac and in the southernmost counties of Michigan which serve as nearby recreation areas to the Detroit metropolitan area.

A similar picture emerges for per capita hotel/motel use tax (see Figure B.6). The Upper Peninsula, especially the eastern portion has a high per capita hotel/motel use tax. Leelanaw, Grand Traverse, Antrim, Charlevoix, Emmet, Crawford, and Otsego counties dominate per capita use tax receipts in the northern Lower Peninsula. Generally speaking, inland counties are less successful than coastal counties, except for Crawford and Otsego County where there are extensive State Forests and plenty of inland lakes. The southern Lower Peninsula, relatively speaking, has neither high lodging nor use tax per capita. Saginaw county appears to be the exception in the lower portion of the Lower Peninsula, due to an active business environment as well as a major attraction. Counties in the Detroit region reveal a modest per capita use tax distribution due to the general business activity along with tourists. Washtenaw and Ingham counties probably have more tax receipts than the surrounding counties due to their universities and associated activities.

Table 4.3: Variable Description

Variable Name	Description
Dependent Variable	
Use Tax p.c.	hotel/motel use tax divided by county population
Lodging Supply p.c.	number of guest rooms plus campsites divided by county population
Independent Variable	
Public Land	public lands in percentage of county area
National and State Parks	acres of National and State Parks
Streams	miles of streams
Great Lakes Shoreline	miles of Great Lakes shoreline
Lakes	acres of lakes
Access Points	number of public water access points
Attractions	(see Attraction Index
Cultural Attractions	Development in chapter 5)
Entertainment Places	
Eating / Drinking Places	
Golf Courses	number of golf courses
Highways	existence of interstate highways or freeways
Ski Areas	number of downhill ski areas

Note: p.c. stands for per capita.

Independent Variables

Out of the abundance of variables mentioned in literature and other studies ten independent variables have been chosen for the purpose of this study. The variables represent an inventory list of resources which will be used in explaining a county's potential for tourism. Table 4.3 provides a summary of the variables and Table A.2 contains the actual county-level data.

Public Lands Ratio

Michigan contains large acreage of public lands, these lands provide a great variety of recreational opportunities and attract tourists regionally and nationally. They also contribute to Michigan's image as an interesting tourist and recreation destination. For instance, Michigan has more public lands than Illinois or Wisconsin, its principal competitors for tourists in the Great Lakes region (Wells and Eidelson, 1991).

The variable public lands as percentage of the total county area was chosen for the following reasons. First, public lands are tourist attractions. Second, public lands provide for an abundance of nature-based recreation activities, like fishing and hunting, skiing, snowmobiling, hiking, swimming and boating. Third, by using the percentage of public lands rather than the acreage of public lands alone, it is possible to identify tourism development

issues, because generally the more land under public management, the less space is available for commercial recreation and tourism developments, such as resorts, lodging and eating establishments, theme parks or other attractions. Use of the ratio also controls for the county size.

Acreage estimates were acquired through the Travel, Tourism and Recreation Research Center. According to Wells and Eidelson (1991), public lands contain all lands managed by federal or state agencies that are open to the public for recreation purposes. However, that does not mean that recreation is the sole use of these lands. Under the multiple use philosophy, national and state forests are managed to provide timber, wildlife, minerals, watershed protection, and other benefits including recreation opportunities. Not included in the definition of public lands, however, are federal lands that are closed to the public (e.g. military bases, Indian reservations).

Public recreation lands include state forests, state game and wildlife areas, National Park Service areas, National Forests, national wildlife refuges, the Soo Locks, State Parks, state recreation areas, and state boating and fishing sites. Also included are specially designated areas, national wilderness areas, national landmarks, national wild and scenic rivers, state wilderness, state natural rivers, and Great Lakes bottomland preserves.

However, in Michigan almost 90 percent of public land acreage is contained within National and State forests.

The ratio of public lands as a variable is purely quantitative. It is not a comprehensive measure of recreation opportunities. Qualitative aspects, such as recreation facilities and services provided therein, the abundance of fish and wildlife resources they contain, and private sector support facilities are not represented by the variable although these are the qualitative factors that do contribute to the attractiveness of public lands. Transportation facilities that provide access to these areas and information provided to the public about all of the above are also not included in the variable, which may limit its usefulness as a predictor of tourism potential within a county.

The percentage of public lands is logically highest in counties that are not very densely populated. Therefore, counties in the Upper Peninsula have the highest percentage of public lands, with the exception of Menominee and counties in the northern part of the northern Lower Peninsula. In Schoolcraft, Mackinac, Oscoda, Crawford, and Roscommon counties, over 50 percent of the counties area are held in public lands because of extensive state and national forests (see Figure B.7).

National and State Parks

Michigan's State and National Parks contribute significantly to the state's attractiveness as a tourist destination (Spotts, 1991). They provide a wide variety of outdoor recreation opportunities and also an abundance of scenic and historic attractions. Some of Michigan's most outstanding natural attractions such as Tahquamenon Falls, the Porcupine Mountains, Pictured Rocks, or the Sleeping Bear Dunes are located within the Michigan State Park system or the National Park system.

Parks provide for a diverse array of recreation activities such as hiking, fishing, swimming, sightseeing, picnicking, and boating. They also serve as attractions themselves (Spotts, 1991).

The variable acres of National and State Parks has been chosen in addition to the percentage of public land to add a qualitative component. The existence of park units serve as indicators of natural beauty and historic values. Furthermore, parks are usually more developed for tourism purposes than national or state forest facilities, and are more accessible.

There are sixty-seven State Parks, one National Park and two National Lakeshores in Michigan. This data was made available through the Travel, Tourism, and Recreation Resource Center at Michigan State University.

National and State parks are established because of two reasons; first, to preserve outstanding natural beauty and historic values, and second, to provide recreational opportunities in natural areas for the public. Therefore, these parks can be found primarily in the very sparsely or densely populated regions indicated in Figure B.8. Rural counties in the Upper Peninsula and northern Lower Peninsula such as Keweenaw, Ontonagon, Alger, Luce, Chippewa, Benzie and Leelanaw have extensive park lands. On the other hand, large amounts of park land are also located within easy reach of major metropolitan areas in Oakland, Livingston, Washtenaw, and Jackson counties. Extensive park land can also be found in the northernmost portion of the Lower Peninsula and in Crawford county.

Water Resources

As mentioned previously, surveys indicate that water-based recreation such as boating, fishing, swimming, and canoeing are very popular recreation activities in Michigan (Spotts, 1990). Boating, for instance, is one of the largest industries in Michigan, with 709,130 pleasure crafts registered in 1989 (Talhelm, 1990).

Detailed statistics are available on fishing licence sales and on boating activities. However, these indicate a performance and, therefore, are of no use to this study, since a performance figure such as use tax receipts cannot

be explained with another performance figure. Instead the study takes advantage of the statistics available on different water resources such as the miles of Great Lakes shoreline, which are a major attraction for boaters, fishermen, and swimmers, miles of stream in each Michigan county, which is important for angling, swimming and canoeing, and the acreage of inland lakes. To add a qualitative element, the number of public access areas will be included as a variable as well -- hundreds of miles of shoreline are less valuable to tourists if there is no access. In total, four water resource variables will be included in the model building process: miles of Great Lakes shoreline and of streams, acres of lakes, and number of public access sites.

Water resource data was obtained through the Travel, Tourism, and Recreation Resource Center; however, each variable originally had a different origin. The acreage of inland lakes was provided by the Michigan Department of Natural Resources. The number of public access sites was taken from the Michigan Department of Natural Resources' "Updated Public Access Site Master List" (1990) which gives an estimate of access sites available in 1989. Stream mileage was provided by Brown (1944) in his "Michigan Streams -- Their Lengths, Distribution and Drainage Areas". Humphreys (n.d.) provided information on miles of Great

Lakes shoreline. However, the shoreline of Isle Royal is not included in this document.

Figures B.9 through B.12 show the spatial distribution of water resources in Michigan. Counties in the Upper Peninsula have the most water resources of all kinds available. Most streams and lakes are concentrated in the western part of the Upper Peninsula due to its larger land mass. Eastern counties of the Upper Peninsula have comparably more shoreline, but they also have a considerable number of lakes and miles of streams compared to other parts of the state.

The coastal counties in the southern Lower Peninsula are also rather well endowed with water resources, especially with long shorelines and an abundance of inland lakes. In this respect, Roscommon, however, dominates with its two huge inland lakes, followed by Cass County with its many small lakes. The Thumb region also has plentiful water resources, Huron and St. Clair counties both having an extensive shoreline and many miles of inland streams.

Compared to the water resources, the number of public access areas is unevenly distributed, apparently centering not only around the water resources themselves but also around population centers. Oakland, Washtenaw, and Livingstone, for instance, have quantities of access points that are out of proportion to their water resources. The western half of the Lower Peninsula has far more access

areas than the eastern half. The Upper Peninsula has numerous access points, but in proportion to its water resources there are fewer access points than might be expected.

Attractions

Visiting a tourist attraction is one of the principal motivations for taking pleasure trips in Michigan. Developed attractions play a vital role in the attractiveness of a region as a tourism destination (Gunn, 1974)

Unfortunately, there is no complete and available listing of Michigan developed attractions. To obtain an estimate, the 1989 "Michigan Travel Planner" published and distributed by the Michigan Travel Bureau as part of the "Yes M!ch!gan" campaign was content analyzed. The planner provides information about Michigan's major attractions and tourist destinations, including an overview of communities and a list of contacts for more information. Ferrario (1980) recommends the method of content analysis to estimate the number of attractions in a region. Since this planner is distributed free of cost by the Michigan Travel Bureau, the primary provider of tourist information, and is easily available to all tourists, tourists are very likely to plan their vacation with this published planning guide. It provides an overview of main attractions. It is assumed

that those attractions listed are the most likely to attract tourists to individual counties. Smaller attractions that might not be listed function as complementary entertainment rather than primary tourist drawing facilities. In any case, a complete guide is not necessary for the analysis; more important than an exact number is the spatial distribution of attractions, even if they are estimates. The different attractions are grouped into cultural attractions, which are art galleries, historic sites, museums, performing arts, bridges and tunnels; and other entertainment facilities, which are amusement parks, tours, general entertainment places, professional sports, festivals, zoos, agricultural exhibitions, arboretums, and botanical gardens. This grouping of attractions was the same structure used in the planner itself.

A threat to the validity of the data is that only members of the Chamber of Commerce who apply get listed in the tourism planner (Michigan Travel Bureau, 1990). Many small enterprises, especially, consider the fee which accompanies the listing too high and refrain from applying. On the other hand, these smaller businesses may not be primary tourism attractions within the individual counties.

Eating and drinking establishments represent a different type of attractions. Restaurants obviously provide an essential service to travelers; dining in such establishments often constitutes a recreational experience

which helps to maintain high levels of satisfaction among travelers and encourages repeat visits (Spotts, 1991).

A full listing of eating and drinking places in Michigan counties is available from the Michigan Department of Public Health, since all food service establishments have to register by county and type of establishment. Forty-one percent of all establishments can be considered table service restaurants, and 34 percent are fast food businesses (Spotts, 1991).

Again, all of these numbers are quantitative in nature. The data fails to indicate qualitative differences between highly visited attractions like Bronner's Christmas Market or Zender's in Frankenmuth and low visitation attractions such as smaller regional festivals. However, most often a highly visited attraction is accompanied by many complementary attractions which are also listed.

Most attractions are located in Michigan's population centers (see Figure B.13). Nearly all are located in the southern Lower Peninsula in cities along major highways. Several major attractions can also be found in the Upper Peninsula, primarily in Keweenaw, Houghton, Chippewa, and Marquette counties. Grand Traverse county also features a large proportion of attractions followed by Alcona, Otsego, Antrim, and Leelanaw counties in the northern Lower Peninsula, all are popular tourist destinations. However, when looking at the spatial distribution of the attractions,

one has to keep the limitations of the data in mind; only members of the Chamber of Commerce are included in the planning guide. Counties that do not have a Chamber of Commerce are therefore underrepresented. Second, numbers of attractions may have nothing to do with the importance of an attraction or its visitation.

Golf Courses

Golf is an increasingly popular sport. Recently, Michigan has been heavily promoted as a golfing vacation destination, particularly through the Michigan Travel Bureau's advertisement campaigns. The allocation of promotion dollars amounted to 30 percent of the Bureau's advertising budget (Spotts, 1991). The number of golf courses in 1989 was based upon data gathered by Rasmussen, Roy and Rasmussen in their "1990 Michigan Golfers Map & Guide"; it provides a complete listing of all golf courses in Michigan.

Although Michigan is marketed as the golfer's paradise, golf courses are concentrated exclusively in the population centers of the southern Lower Peninsula, primarily in the Detroit region and its neighboring counties, as well as in Kent, Ingham and Jackson Counties. However, a handful of golf courses are located in the tourist counties Grand Traverse, Antrim, Charlevoix, and Otsego, as Figure B.14 illustrates.

Highways

The road system plays a vital role in providing fast and convenient access to tourism regions and destinations. Tourists cannot reach a destination without access roads. The existence of highways in a county is therefore a good indicator of its accessibility. A highway provides access to a region; unfortunately it does not indicate whether tourists actually stay in a county or whether they only pass through.

The highway variable is a dummy variable which indicates whether or not a county is connected to the interstate highway of freeway system. It was obtained with the help of a map study.

The spatial distribution of interstate highways and freeways is documented in Figure B.15. With the exception of Mackinac and Chippewa Counties the Upper Peninsula is not connected to the highway system as defined by this study. The Lower Peninsula, in contrast, is very accessible by highway. With the exception of the Thumb region, the northeastern Lower Peninsula, and some counties in the northwestern part nearly all counties are connected to the highway system, with I-75 and I-94 being the most important freeway systems.

Ski Areas

Winter sports are an important element of Michigan tourism. They are important for the tourism industry because they help to minimize the effect of seasonality. The number of downhill ski areas was chosen as an independent variable. Cross country skiing is an important winter sport as well, but it is not limited to special facilities. Cross country skiing can take place in any open area, and therefore, it is difficult to derive a comprehensive measure to use in a study such as this.

The names of existing ski areas were obtained from the Michigan Travel Bureau which were then located on a map in order to determine the county these ski areas are in.

Ski areas can be found in the Detroit area, in the southwest corner of the lower Peninsula, which serves the Chicago population, and close to cities in the center of the southern Lower Peninsula (e.g. Lansing, Kalamazoo and Battle Creek). The northwestern part of the Lower Peninsula has many ski areas as well. This is where Michigan's hills are located. The highest concentration of ski areas is located in the western counties of the Upper Peninsula, where Michigan's only mountains are to be found. These areas are within easy reach for people from other Midwestern states, particularly Wisconsin and Minnesota tourists (see Figure B.16).

Limitations of the Study

This study is an attempt to relate various tourism components to the success of a county in terms of tourism potential. Despite the care with which the identification of tourism components was undertaken, the ultimate choice of variables remained to a large extent a question of arbitrary judgment. As a result, it is possible that certain items are missing from a list of those that could be studied. Also, most of the variables utilized in this study are quantitative in nature, representing tourism components but not including information about the degree of usefulness of the resource as a tourism component.

Second, this study takes advantage of secondary data which was not collected for the purpose of this study. Therefore, accuracy and appropriateness of selected variables could be problematic. This may be a problem of accuracy and validity related to the attraction data derived from the "Travel Planner" which is distributed by the Michigan Travel Bureau.

Third, this is a study of Michigan counties which can aid many counties in their tourism planning process. Unfortunately, tourism regions do not necessarily follow political county boundaries. For instance, all lodging facilities of a county might be concentrated in one part of that county and not be equally distributed.

Lastly, the sample size is small, since there are only 83 counties in Michigan. Only five counties could be reserved to test the regression model. This provides for only a crude estimate.

CHAPTER V

FINDINGS AND DISCUSSION

In this chapter general findings related to tourism components and their relationships to tourism potential of individual counties are provided. This chapter is divided into nine sections according to the steps of the regression analysis: (1) correlation analysis, (2) attraction index development, (3) division of the data set, (4) first regression analysis, (5) analysis of influential cases, (6) second regression analysis, (7) analysis of residuals, (8) test of regression results, and (9) discussion of measures of tourism potential.

Correlation Analysis

Twelve independent variables were identified for the study. The correlation matrix for the variables is presented in Table 5.1.

As can be seen in Table 5.1 major significant intercorrelations that could be threatening to the results of the regression model exist between the number of golf courses, eating and drinking establishments, and cultural as

Table 5.1: Correlation Matrix of Study Variables

	Public Land	Parks	Shore Line	Stream	Lakes	High ways
Public L.	1.0000	.2005	.3497	.1304	.3469	-.4086
Parks	.2005	1.0000	.2790	.0560	.0599	-.1565
Shoreline	.3497	.2790	1.0000	.2188	.1561	-.1118
Streams	.1304	.0560	.2188	1.0000	.1904	-.2391
Lakes	.3469	.0599	.1561	.1904	1.0000	-.1936
Highways	-.4086	-.1565	-.1118	-.2391	-.1936	1.0000
Ski Areas	.1789	.0880	-.0630	.2307	.2360	-.0238
Golf	-.4652	-.0311	-.1232	-.0412	-.0975	.4195
Entertain.	-.3627	-.0782	-.0082	-.0322	-.1879	.3610
Culture	-.2074	.0390	.1871	.0345	-.0239	.2804
Eat/Drink	-.3021	-.0112	-.0291	.0027	-.0874	.2899
Access	.2557	-.0409	.1172	.3255	.3942	-.2166

	Ski	Golf	Enter- tainm.	Culture	Eating/ Drinking	Water Access
Public L.	.1789	-.4652	-.3627	-.2074	-.3021	.2557
Parks	.0880	-.0311	-.0782	.0390	-.0112	-.0409
Shoreline	-.0630	-.1232	-.0082	.1871	-.0291	.1172
Streams	.2307	-.0412	-.0322	.0345	.0027	.3255
Lakes	.2360	-.0975	-.1879	-.0239	-.0874	.3943
Highways	-.0238	.4195	.3610	.2804	.2899	-.2166
Ski Areas	1.0000	.1559	-.0038	-.0368	.0815	.3037
Golf	.1559	1.0000	.5391	.6250	.8389	-.0569
Entertain.	-.0038	.5391	1.0000	.7331	.6445	-.1652
Culture	-.0368	.6250	.7331	1.0000	.6777	.0122
Eat/Drink	.0815	.8389	.6445	.6777	1.0000	-.0441
Access	.3037	-.0569	-.1652	.0122	-.0441	1.0000

well as entertainment facilities. Therefore, the number of eating and drinking establishments, cultural and entertainment facilities will be combined into one attraction index, since they all represent developed attractions/entertainment. Although the number of golf courses is highly related to these attractions, it was not integrated into the index. This was done purposely in order to better determine the importance of golf as a tourism component.

Unlike the entertainment variables, the four variables that represent water resources cannot be combined into an index without losing important information because they are not strongly correlated and have a different distribution over Michigan counties.

Attraction Index Development

An index is a composite measure of a variable and a data reduction device. It combines several empirical indicators of a variable into one single measure while maintaining the specific details of all individual indicators (Babbie, 1983).

The assumptions for creating an index are that all items have to be highly empirically related to each other and that each component has to add some new meaning to the evaluation. Items of the attraction index in this study are the variables eating and drinking places and culture as well

as entertainment facilities. As the correlation matrix shows, the variables are highly interrelated, and since all variables represent different types of attractions preferred by different types of tourists, new meaning is added by each component as well. Therefore, the assumptions for creating an index are fulfilled.

The index was built according to the following rules: In order to level the scales of eating and drinking establishments with cultural and other attractions, a percentage figure was calculated by dividing the number of facilities available throughout Michigan into the number of facilities contained by individual counties. The resulting figures were then multiplied by one hundred for each county. Finally, a weighted average for all three components was calculated, devaluating the eating and drinking places variable by 50 percent. Fifty percent was chosen for two reasons: First, restaurants are essential, since all tourists have to eat and drink, but they are not the main attraction that attracts tourists to an area. It is rather a factor that contributes to their comfort and satisfaction, stimulating them to repeat visits (Ferrario, 1980). Second, restaurants are likely to be more heavily used by residents than other attractions.

The corrected correlation matrix is presented in Table 5.2; it reveals moderate relationships between the other nine variables and the newly created attraction index.

Table 5.2: Correlation Matrix Including Attraction Index

	Attraction Index
Public L.	-.3251
Parks	-.0187
Shoreline	.0619
Streams	.0021
Lakes	-.1121
Highways	.3496
Ski Areas	.0109
Golf	.7394
Attractions	1.0000
Access	-.0744

Division of the Data Set

According to the rules established in the procedure section, Berrien, Crawford, Hillsdale, Kalkaska, and Ottawa counties have been randomly chosen for exclusion from the model building process in order to test the partial regression coefficients later in this chapter.

First Regression Analysis

Two regression runs were performed, one using per capita hotel/motel use tax as the dependent variable, the other employing per capita lodging supply.

The results of the multiple regression analysis are presented in Tables 5.3 and 5.4. The multiple regression coefficients of .69 for the per capita use tax and .84 for the per capita lodging supply are significantly high, implying that tourism components in this study predict the

Table 5.3: First Regression: Hotel/Motel Use Tax Per Capita and Tourism Components

	B	Beta	T	Sig T
Access	-4.9239	-.08	-.71	.46
Golf	-25.4507	-.27	-1.82	.73
Parks	.0025	.07	.71	.48
Shore	3.9323	.43	4.05	.00
Ski Areas	238.2818	.32	3.17	.00
Streams	-.6238	-.29	-2.91	.00
Lakes	.0118	.16	1.51	.14
Highways	19.3041	.01	.14	.89
Public Lands	6.1051	.16	1.33	.19
Attractions	109.4750	.28	2.05	.05
(Constant)	297.3129		1.56	.12

Multiple R = .69039; Adjusted R Square = .39853

Note: B stands for partial regression coefficient;
Beta refers to standardized partial regression coefficient;
R Square represents coefficient of determination;
Sig T refers to the observed significance level

Table 5.4: First Regression: Lodging Supply Per Capita and Tourism Components

	B	Beta	T	Sig T
Access	-.0107	.02	.20	.84
Golf	-.2433	-.24	-2.15	.04
Parks	.0002	.42	5.95	.00
Shore	.0113	.11	1.43	.16
Ski Areas	-.5192	-.06	-.85	.40
Streams	-.0039	-.17	-2.25	.03
Lakes	.0002	.24	3.13	.00
Highways	2.4773	.18	2.17	.03
Public Lands	.1898	.47	5.10	.00
Attractions	.6347	.15	1.47	.15
(Constant)	.9597		.62	.54

Multiple R = .84008; Adjusted R Square = .66182

Note: B stands for partial regression coefficient;
Beta refers to standardized partial regression coefficient;
R Square represents coefficient of determination;
Sig T refers to the observed significance level

level of tourism potential quite well. When looking at the adjusted R squares, however, 66 percent of the total variance in tourism potential can be explained using per capita lodging supply as a measure; only 40 percent of the total variance can be explained when using per capita use tax as a measure for tourism potential.

Analysis of Influential Cases

Both models were checked for influential cases by calculating the leverage for each county as defined in Chapter III. Only the three most influential cases have been excluded from the analysis since the sample size is already small. Keweenaw, Chippewa, and Wayne counties have been extremely influential cases in each model. It appears their influence may be due to the fact that Keweenaw and Chippewa are very successful tourism counties with very low population bases. Wayne county is also a successful tourism county due simply to its large population base and many attractions.

Second Regression Analysis

After excluding these three counties from the model another two regression were run which improved the results markedly (Table 5.5 and Table 5.6). The multiple regression coefficients were significantly higher in this later run compared to the first. The adjusted R square for the per

Table 5.5: Second Regression: Hotel/Motel Use Tax Per Capita and Tourism Components

	B	Beta	T	Sig T
Access	-2.5372	-.04	-.48	.63
Golf	-28.8343	-.27	-2.50	.02
Parks	.0029	.04	.51	.61
Shore	7.7808	.61	7.40	.00
Ski Areas	212.4990	.29	3.48	.00
Streams	-.6131	-.29	-3.58	.00
Lakes	.0076	.10	1.21	.23
Highways	109.5359	.08	.94	.35
Public Lands	6.1174	.16	1.68	.10
Attractions	109.4750	.37	3.44	.00
(Constant)	211.5491		.47	.64

Multiple R = .82455; Adjusted R Square = .62986; F = 13.59

Note: B stands for partial regression coefficient;
Beta refers to standardized partial regression coefficient;
R Square represents coefficient of determination;
Sig T refers to the observed significance level

Table 5.6: Second Regression: Lodging Supply Per Capita and Tourism Components

	B	Beta	T	Sig T
Access	-.0036	.00	-.08	.94
Golf	-.1746	-.19	-1.74	.08
Parks	.0000	.02	.27	.78
Shore	.0390	.34	4.26	.00
Ski Areas	-.2202	-.03	-.42	.68
Streams	-.0030	-.15	-2.01	.05
Lakes	.0002	.29	3.66	.00
Highways	2.9424	.25	2.91	.00
Public Lands	.1848	.53	5.82	.00
Attractions	.6812	.13	1.27	.21
(Constant)	-.1740		-.13	.90

Multiple R = .84294; Adjusted R Square = .66531; F = 15.71

Note: B stands for partial regression coefficient;
Beta refers to standardized partial regression coefficient;
R Square represents coefficient of determination;
Sig T refers to the observed significance level

capita use tax increased from 0.39 to 0.63. For per capita lodging supply the R square remained the same (0.66). This implies that 63 percent and 66 percent of the total variance, respectively, can be explained by the tourism components in each of the counties. In both cases the high F-coefficients (F = 13.59 and F = 15.71, respectively) suggest that the null hypothesis can be rejected -- the dependent variables are not linearly related to the independent variables.

In selecting an individual tourism component, the variable, miles of shoreline had the most explanatory power (Beta = .61) for the dependent variable of per capita use tax, followed by attractions (Beta = .37). Ski areas (Beta = .29), streams (Beta = -0.29) and golf (Beta = -0.27) have the same explanatory power, but it is only half of the shoreline variable. The other variables have no statistically significant impact. This does not necessarily mean that these components do not have any explanatory power related to tourism potential; rather, the statistically insignificant results could be explained by the small sample size or measurement problems related to the variable itself.

When using lodging supply per capita as a measure of tourism potential, the total variance is explained differently. Here, public lands (Beta = .53) followed by shoreline (Beta = .34) and lakes (Beta = .29) have the most explanatory power. In this model, attractions have less

explanatory power when measuring tourism potential in form of lodging supply per capita (Beta = .13) and ski areas are of practically no importance (Beta = -.03). Instead the highway variable gains importance (Beta = .25). However, in both models natural resources dominate over developed attractions.

Both models show negative Beta scores for golf courses and streams and very low Betas for parks. These facts need further explanation. Golf courses are primarily located in the populated southern Lower Peninsula and, therefore, have a negative sign since the dependent variables are per capita figures. The miles of stream are a very quantitative measure and give no indication of the natural beauty or attractiveness associated with a mile of stream. The stream variable includes all streams. Many streams might be too small or inaccessible for recreation purposes. Others might flow through unattractive cities. These facts might explain the negative Beta scores for streams. The lack of importance of parks as a variable in the models could be explained by the fact that Michigan Parks are located in or near rural as well as urban areas. This would nullify the relationship with the dependent variables. Therefore, the Beta scores are diminished. By excluding Keweenaw and Chippewa in the model building process, two counties have been excluded that have extensive park lands which may further lower the explanatory power of parks as a variable

in the model. Furthermore, acres of parks might not be the ideal measure of touristic attractiveness, since it fails to convey a qualitative characterization.

Analysis of Residuals

In order to test the regression assumptions a residual analysis was performed. A normal probability function which plots standardized residuals against predicted values and a histogram of standardized residuals were calculated to insure linearity and normality for the developed model. The results are satisfactory and consistent with expectations and assumptions for the model.

Furthermore, standardized residuals were calculated for each county. These standardized residuals were mapped to test whether any systematic error occurred in developing the model. A standardized residual describes the difference between an observed value and the value predicted by the model. These differences are expressed in standard deviation units above or below the mean. Therefore, a negative sign indicates an underestimation of the predicted value and a positive sign stands for an overestimation of the predicted value by the model. Ideally, standardized residuals have random variations, indicating that there is no systematic error. Figures 5.1 and 5.2 show the spatial distribution of standardized residuals which makes is easier to detect regional patterns of residuals relating to the

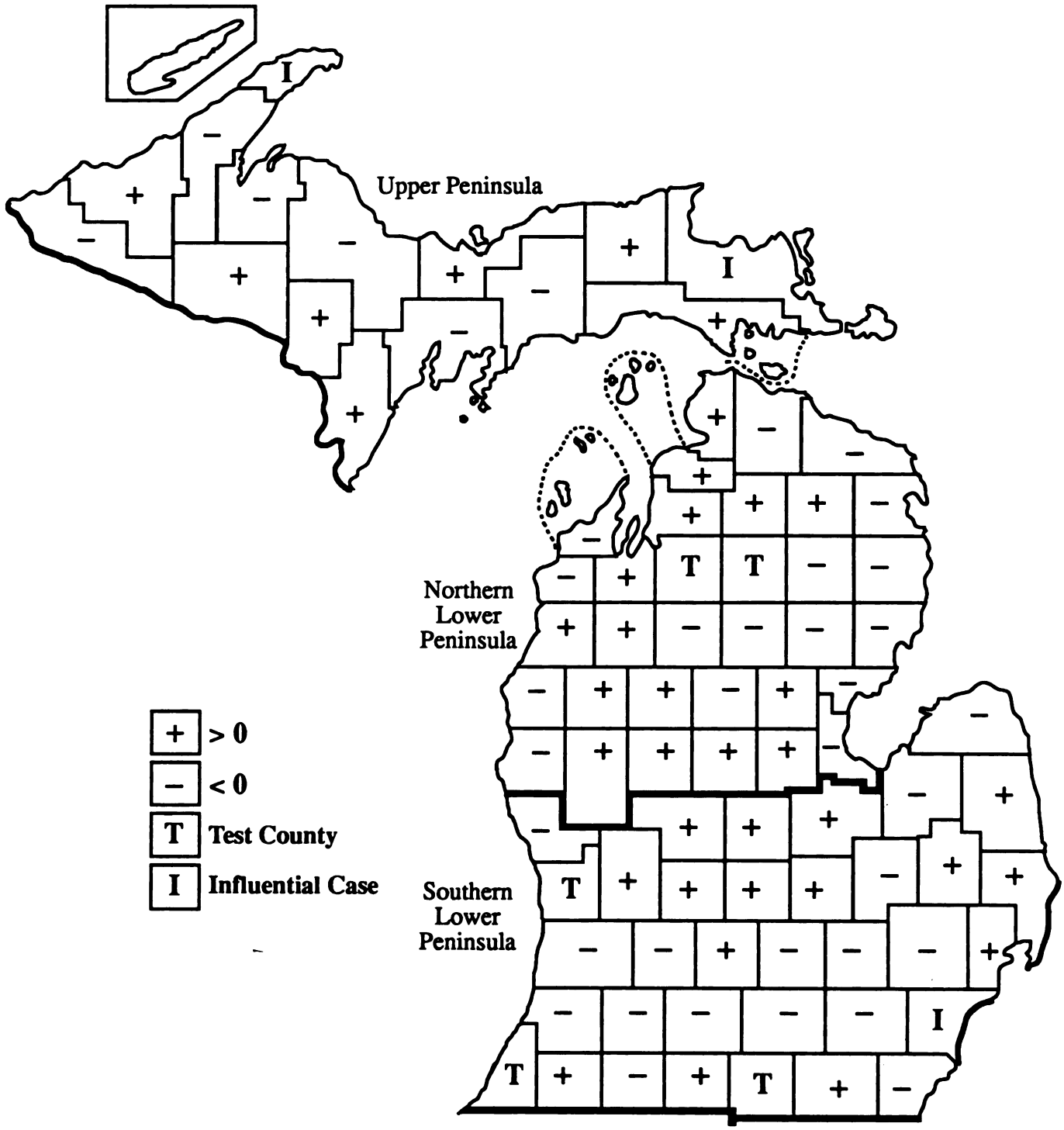

Figure 5.1: Residuals for Per Capita Hotel/Motel Use Tax

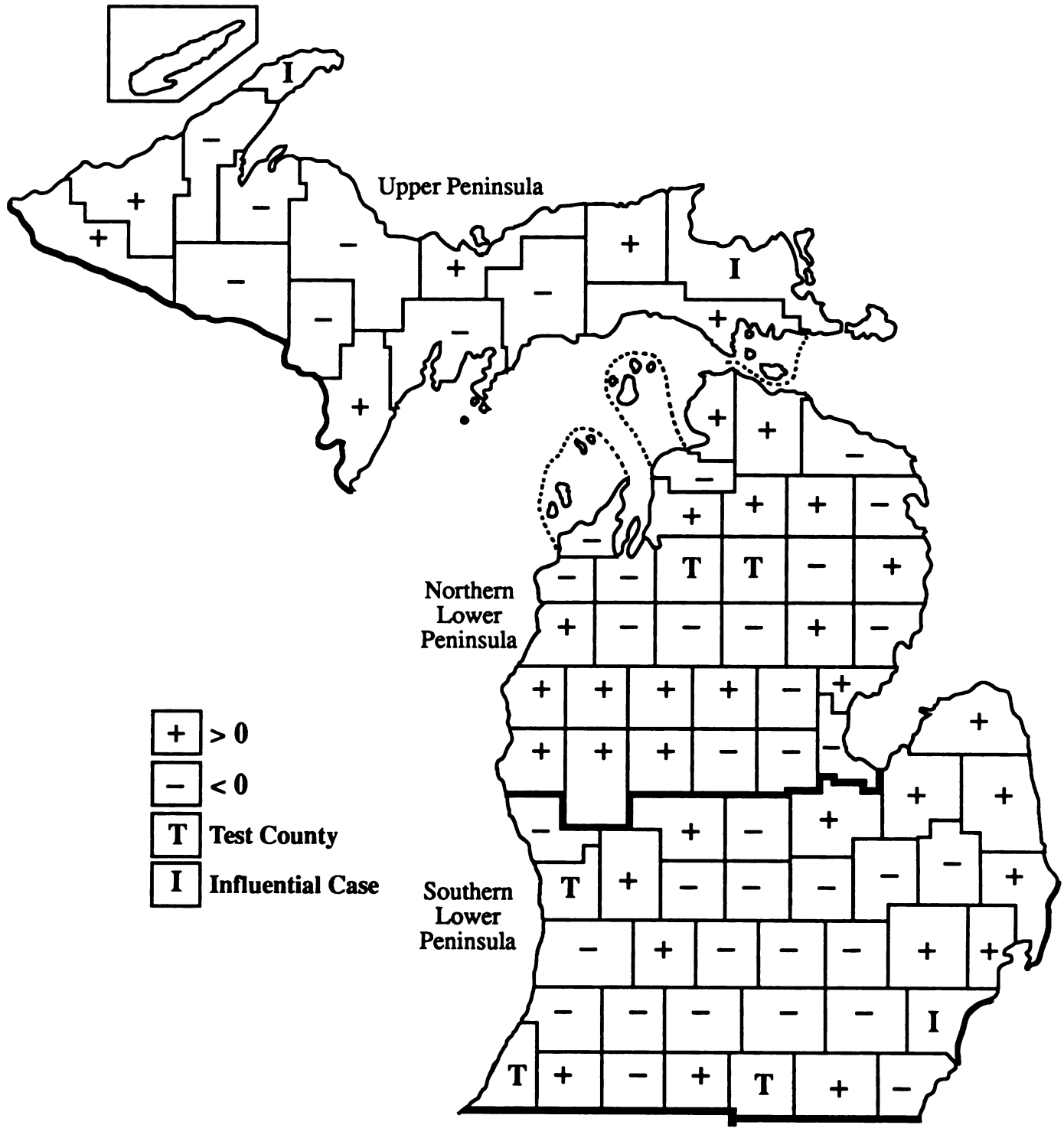

Figure 5.2: Residuals for Per Capita Lodging Supply

variables in this study. As can be seen the spatial distribution of residuals does not correspond to spatial variations of any independent variables in this study. Therefore, it can be assumed that no systematic error occurred in the model development process.

Test of Regression Results

To confirm the regression results five counties were excluded from the model development. The variables of these counties were entered into the regression equation to determine how well the model predicts the dependent variables. The predicted values were then compared to the actual observed value for each county. Since the regression results were only tested on five counties, the results are not statistically significant, but they do provide an indication of how well the model predicts the dependent variables. The equations used for the test were derived from the regression analysis. For the per capita use tax the equation was:

$$Y = 72.35 - 2.54 * X_{AC} + 211.55 * X_{AT} + 0.0029 * X_{PA} + 7.78 * X_{SH} - 0.13 * X_{ST} + 212.5 * X_{SK} + 0.0076 * X_{L} + 109.54 * X_{H} + 6.12 * X_{PL} - 28.83 * X_{G}$$

For the per capita lodging supply the equation was:

$$Y = -0.17 - 3.6 * X_{AC} + 0.68 * X_{AT} + 0.00001 * X_{PA} + 0.39 * X_{SH} - 0.003 * X_{ST} - 0.22 * X_{SK} + 0.0002 * X_{L} + 2.94 * X_{H} + 0.19 * X_{PL} - 0.18 * X_{G}$$

with

X_{AC}: number of public water access points

X_{AT}: attraction index score

X_{PA}: acres of national and state parks

X_{SH}: miles of Great Lakes shoreline

X_{ST}: miles of streams

X_{L} : acres of lakes

X_{H} : existence of highways

X_{PL}: public lands ratio

X_{SK}: number of ski areas

X_{G} : number of golf courses

The test results are presented in Tables 5.7 and 5.8. Since the predicted values are calculated from an equation that consists of positive as well as negative sums it is possible that the final value is negative. Hillsdale, for instance, has negative values because of its large number of golf courses. Due to the relatively small sample size of five there are only three ways of judging the results. First, the observed and predicted value can be compared in absolute terms. Second, the standardized residuals can be compared; the higher they are, the more inaccurate the estimates. Third, the ranks of the five counties can be compared to determine whether the counties are ranked the same when using the observed or the predicted value as a sorting criterium. Although the residuals are somewhat off

in both cases, when comparing standardized residuals the observed values are reasonably close to the regression line. Using the relative rank as a criterium, it becomes clear that the regression results should not be used to predict the absolute value of either variable but rather to indicate a relative rank or trend. According to the five test counties, both measures seem to predict the tourism potential of a county equally well.

Table 5.7: Test of Regression Results for Per Capita Use Tax

County	Observed Value	Predicted Value	Residual	Standardized Residual
Berrien	426	693	- 267	- 0.72
Crawford	1288	773	515	1.72
Hillsdale	35	- 162	197	0.53
Kalkaska	118	176	- 58	- 0.16
Ottawa	157	726	- 559	- 1.53

Note: Sample Standard Deviation of Residuals = 372

Table 5.8: Test of Regression Results for Per Capita Lodging Supply

County	Observed Value	Predicted Value	Residual	Standardized Residual
Berrien	1.97	2.25	- 0.28	- 0.09
Crawford	16.75	13.21	3.54	1.09
Hillsdale	1.60	- 0.93	2.53	0.78
Kalkaska	2.85	7.56	- 4.71	- 1.45
Ottawa	1.74	3.81	- 2.07	- 0.64

Note: Sample Standard Deviation of Residuals = 3.24

Comparison of Tourism Potential Measures with Images of Michigan Tourism Destinations

Comparing mental images of Michigan tourism destinations with the dependent variables in this study sheds light on whether the variables used in this study are adequate measures of tourism and whether these mental images reflect reality. However, an image is a mental representation of an object, person, place or event which is not physically before the observer (Fridgen, 1987). Therefore, an image is a perceived reality biased by motivations, attitudes, or demographics of an individual and based upon impressions and past experiences.

Fridgen (1987) surveyed automobile travelers stopping at Travel Information Centers in Michigan during the summers of 1982 and 1983. In a cognitive map task, respondents indicated which parts of Michigan they perceived to be recreation and tourism regions by first, circling counties that together form distinct tourism regions and by second, placing the letter X in the county that constitutes the center of that perceived tourism region. The data generated from the survey was combined to form a Tourism Location Score which made it possible to compare travelers perceptions of where tourism regions are located within which counties.

The Tourism Location Score in the Fridgen study was calculated according to the following equation:

TLS = (0.4A + 0.4B + 0.2C) * 1000,

A being percentage of X's received by each county, B being the percentage of times a county was completely circled, and C being the percentage of times a county was partially circled.

The survey was conducted in 1982 and 1983. This study, however, makes use of 1989 data. Over the course of the years images as well as facts related to tourism development are likely to have changed somewhat in some counties. Nevertheless, by comparing the image scores of the Fridgen study with the dependent variables in this study it is possible to get a general impression of how well perceptions correspond to use tax distributions and lodging supply.

As can be seen in Figure 5.3 the range of Tourism Location Scores is highest in coastal counties, primarily along Lake Michigan, at the connecting waters of Lake Michigan and Lake Huron, or on Lake Superior. The highest inland county is Roscommon County; it is located in the center of the state and contains two of the larger inland lakes within Michigan.

The image score clearly underestimates the importance of inland counties as can be seen when looking at Figures B.5 and B.6. Besides coastal counties the tourism potential measures in this study also identify inland counties in the central northern Lower Peninsula, but they neglect urban counties in the Detroit region as well as the Thumb

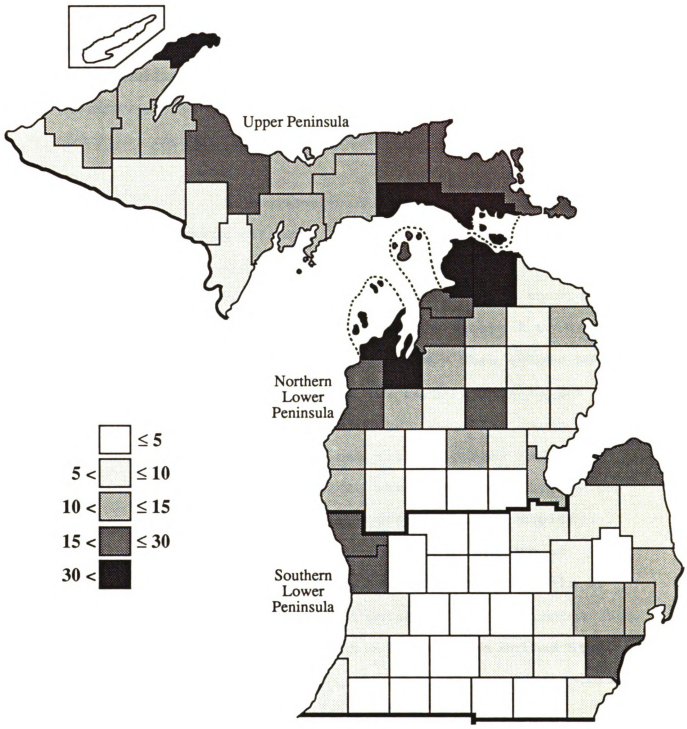

Figure 5.3: Image Scores of Michigan Counties

counties. Generally speaking though, there are corresponding results, namely the importance of the Upper Peninsula, the northern Lower Peninsula, and other coastal counties, especially in western Michigan.

Discussion of Results

Two different measures of tourism potential have been employed in this study. As can be seen from the regression results, both measures have significantly high R squares. Per capita lodging supply has a slightly higher R square than the per capita hotel/motel use tax. When comparing the test results and the results of the comparison with the image scores, both measures do well.

However, there are distinct methodological and measurement differences involved which are reflected by the Beta-coefficients of the two measures. The per capita hotel/motel use tax is not a comprehensive measure of tourism. Although hardly any residents stay at hotels or motels, a report (van Doren and Gutske, 1982) indicates that the major market for hotels and motels in the United States in 1978 consisted of only 32 percent tourists. Forty-three percent are business travellers and 17 percent are conference participants. Therefore, urban tourism is overemphasized, which is reflected by very high Beta-coefficients for attractions. On the other hand, other important tourism lodging alternatives like camping are

neglected. The per capita lodging supply variable includes hotel/motels as well as camping. Unfortunately, it is a supply figure rather than a performance figure, and, therefore, is not a complete measure either. Especially when there are high variations in occupancy rates, supply figures have to be interpreted with care (Koegh, 1984). With the very seasonal usage of campsites, the Beta-coefficient for public lands might be exaggerated, and the importance of attractions and ski areas might be underestimated.

However, the results of both models shed light on Michigan tourism. First, natural resources are very important tourism components in Michigan. Michigan has all the right to be called the "water state." Both models reveal the major importance of the Great Lakes shoreline. Streams and public water access points, though, did not contribute significantly to a county's tourism potential in this study. Public lands are another valuable natural resource. However, parks were not a significant tourism component in this model compared to public lands.

The importance of natural resources does not imply that attraction are unimportant. Considering the fact that there is only one attraction variable compared to six natural resource variables and that the attraction index is a rough estimate of all the different kinds of attractions in the

state of Michigan, the influence of attractions on the tourism potential of Michigan counties is considerable.

Since both measures convey slightly different interpretations of the variables, there probably are different users for each measure. Hotel managers who are interested in predicting the success of the hotel industry would appear to benefit from using the per capita use tax model. The Campground Association, on the other hand, would benefit more from the use of the per capita lodging supply model to study their respective contribution to tourism in the counties of Michigan. Regional planners should pay attention to the composition of their county's lodging supply. If counties have primarily hotels and motels and few campgrounds, tourism planners in these counties should use per capita use tax and vice versa.

CHAPTER VI

CONCLUSION

In this concluding chapter, a summary of the study is provided along with a brief review of the findings and conclusions. Implications of these findings are discussed along with recommendations for further research.

Summary of the Study

The present study was based on secondary data provided by various Michigan agencies. It deals with the analysis of tourism potential of Michigan counties. Ten tourism components were identified which were then related to measures of tourism potential. Measures of tourism potential in this study were per capita hotel/motel use tax, a performance figure, and per capita lodging supply, a supply figure which takes hotel/motel lodging as well as camping into account.

This study was conducted in two phases. In the first phase variables were identified and discussed in their geographical context. A spatial analysis was conducted to better understand regional differences of the variables

employed in the study. In the second phase the two measures of tourism potential were regressed on the ten tourism components identified and key variables which best explain levels of tourism potential were identified.

There were three objectives stated in Chapter I. The first specific study objective was to develop a model that predicts a county's tourism potential. Two models were developed which made use of the two different tourism potential measures. The ten independent variables were the public lands ratio, acres of National and State Parks, Miles of streams and Great Lakes shoreline, acres of lakes, number of public water access points, ski areas and golf courses, attraction index score, and the existence of highways. These variables predict both tourism potential measures equally well (R square = 0.82 and R square = 0.84, respectively).

The second specific objective was to explore relationships between measures of tourism potential and tourism components. Due to the different nature of the tourism potential measures the Beta-coefficients derived from the regression analysis vary for both measures. However, both models reflect the importance of natural resources in the state of Michigan. The shoreline and public lands are of particular importance. Attractions have also a considerable influence on tourism potential. National and State Parks as well as streams, did not have

significant explanatory power in this model. Neither do developed facilities such as water access points and golf courses (see Tables 5.5 and 5.6).

The third specific objective was to describe spatial variations of tourism in Michigan. The spatial analysis clearly shows the power of the population variable. The population is concentrated in southern Lower Michigan as well as most attractions and golf courses, whereas most natural resources are located in the northern Lower Peninsula and in the Upper Peninsula. The Upper Peninsula and the Straits region clearly have the highest potential for tourism. Middle Michigan, on the other hand is primarily an agricultural area with very little to attract tourists, although it is conveniently close to major population centers.

Conclusion

The existence of tourism components as identified by Robinson (1976), McIntosh and Goeldner (1984) and others explains a county's potential for tourism very well. Population is a very powerful factor in Michigan tourism; therefore, it is important to control for differences in county population by introducing per capita figures (Clawson and Knetsch, 1969). The two tourism potential measures, hotel/motel use tax receipts suggested by Bishop and Spotts (1990) and accommodation numbers (Pearce, 1987), do equally

well. However, both have different uses due to the different nature of the two measures.

As Gunn (1982) writes, regional analysis helps to understand the location of potential tourism destinations with respect to other features and to understand the natural and cultural resources as well as the popular images of those places. The regression results confirm the findings of Var (1977) and Richie and Zins (1987). Natural resources are of major importance in the State of Michigan. The findings also comply with the results of Deale (1983) as well as Raitz and Dakhil (1988), who emphasize the attractiveness of seashores and beaches. However, the findings of this study are specific to Michigan tourism. In order to generalize the conclusion to tourism in general, similar studies must be conducted to examine the validity of the model for different destinations, counties or states.

Implications for Tourism Planning and Management

Proper management and planning are important in order to maximize benefits from tourism. Attempts to manage and plan the growth of tourism will be enhanced if attention is paid to patterns and spatial interactions of tourism. The geographical study of Michigan tourism may lead to a better understanding of the role of the tourism industry in a county. As such, it may signal the success or failure of regional development strategies or indicate the need for

these, alert authorities and researchers to likely problem areas and suggest solutions that might be adopted.

To promote a destination effectively it is essential to know the "prime magnets" around which a marketing strategy might be developed. On the national level the results of this study might aid the Michigan Travel Bureau in better promoting Michigan. On the county level it could aid counties in better promoting their assets, attractions and potentials. Counties in the northern lower Peninsula, for instance, could more heavily promote the beauty of their public lands and the recreation activities that they facilitate. In so doing, these counties could increase tourism revenues and better compete with neighboring counties in the Upper Peninsula.

The model might also aid hotel/motel managers or campground owners in selecting potential locations for their enterprises. A campground owner, for example, could examine the data and methods included in this study to determine the most opportune locations for new lodging ventures. Also, by inserting their own tourism component data into the model equation, revenue trends in the lodging industry could be predicted by county planners. These trends could then lead to alternative, perhaps more effective, development strategies for individual counties, allowing area tourism to develop to its fullest potential.

The major importance of public lands as a tourist attraction may also help the Forest Service and other public agencies to focus their multiple use philosophy more on recreation and tourism.

Realizing the complexity of tourism in the state of Michigan, this study might help to establish tourism regions. Developing regions with similar tourism structures might help counties to pool their efforts in tourism development, promotion, and planning.

Future Research

Finally, research approaches to overcome and improve study limitations as mentioned in Chapter III are recommended in the following:

(1) Attractions are an important tourism component. For the sake of future research it is necessary to work towards a comprehensive inventory of developed attractions in the state of Michigan and elsewhere. It is also important to distinguish between different types of attractions. Then the impact of attractions on the tourism potential of a county should be reconsidered.

(2) Future studies should work towards a qualitative assessment of the research variables and a refinement of measurements. Instead of using acres of park land, for instance, the number of parks could be used

assigning different weights to State and National Parks. It would be also useful to develop a variable that qualifies the miles of streams since not all sections of streams are equally attractive.

(3) Both measures of tourism potential employed in this study are not "perfect." In order to combine the advantages of both measures, data on overall lodging performance should be collected. Visitation of hotel/motels as well as of campgrounds should be measured.

(4) Future studies should deal not only with county-level tourism. Instead or additionally, tourism regions within counties should be identified since tourism regions are not defined in terms of county borders.

(5) In order to validate the results of the study, it should be repeated for other states. The Beta-coefficients should be tested on other Great Lakes states with tourism industries similar to Michigan's like Illinois and Wisconsin.

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APPENDIX A

DATA

Table A.1: Dependent Variables

County	Use Tax (in Dollars)	Use Tax divided by Population	Number of Guestrooms	Number of Campsites	Guestrooms plus Campsites	All Lodging divided by Population	Population
Alcona	11,505	113	225	902	1,127	11.11	10,145
Alger	124,660	1,389	570	554	1,124	12.53	8,972
Allegan	107,703	119	584	1,928	2,512	2.78	90,509
Alpena	68,428	224	670	437	1,107	3.62	30,605
Antrim	289,960	1,595	1,174	390	1,564	8.60	18,185
Arenac	14,270	96	117	1,188	1,305	8.74	14,931
Baraga	29,456	370	106	249	355	4.46	7,954
Barry	7,599	15	55	1,602	1,657	3.31	50,057
Bay	61,988	55	680	332	1,012	0.91	111,723
Benzie	52,001	426	727	619	1,346	11.03	12,200
Berrien	391,539	243	1,898	1,276	3,174	1.97	161,378
Branch	61,274	148	285	1,810	2,095	5.05	41,502
Calhoun	102,517	75	1,323	818	2,141	1.57	135,982
Cass	7,696	16	107	1,670	1,777	3.59	49,477
Charlevoix	308,624	1,438	1,253	408	1,661	7.74	21,468
Cheboygan	67,597	316	2,679	2,248	4,927	23.03	21,398
Chippewa	131,607	380	1,799	1,846	3,645	10.53	34,604
Clare	29,130	117	318	929	1,247	5.00	24,952
Clinton	10,240	18	56	231	287	0.50	57,883
Crawford	157,937	1,288	543	1,511	2,054	16.75	12,260
Delta	122,610	325	841	330	1,171	3.10	37,780
Dickinson	90,095	336	551	448	999	3.72	26,831
Eaton	164,721	177	100	216	316	0.34	92,879
Emmet	548,239	2,189	1,798	920	2,718	10.85	25,040
Genesee	337,398	78	2,329	1,090	3,419	0.79	430,459
Gladwin	11,091	51	84	229	313	1.43	21,896
Gogebic	97,865	542	1,684	430	2,114	11.71	18,052
Grand Traverse	1,252,970	1,949	3,161	1,620	4,781	7.44	64,273
Gratiot	43,880	113	243	100	343	0.88	38,982
Hillsdale	15,017	35	146	548	694	1.60	43,431
Houghton	85,389	241	675	242	917	2.59	35,446
Huron	45,227	129	550	609	1,159	3.32	34,951
Ingham	124,506	44	3,886	599	4,485	1.59	281,912
Ionia	15,528	27	116	280	396	0.69	57,024
Iosco	157,006	520	1,147	1,142	2,289	7.58	30,209
Iron	28,786	218	438	441	879	6.67	13,175
Isabella	195,290	358	363	210	573	1.05	54,624
Jackson	163,020	109	932	3,525	4,457	2.98	149,756
Kalamazoo	71,159	32	2,133	633	2,766	1.24	223,411
Kalkaska	15,914	118	170	215	385	2.85	13,497
Kent	1,063,379	212	4,451	983	5,434	1.09	500,631
Keweenaw	21,079	1,235	415	249	664	38.90	1,707
Lake	22,893	267	213	688	901	10.50	8,583
Lapeer	8,003	11	89	861	950	1.27	74,768
Leelanau	257,898	1,560	1,026	577	1,603	9.70	16,527
Lenawee	34,341	38	300	3,560	3,860	4.22	91,476
Livingston	68,296	59	598	811	1,409	1.22	115,645
Luce	20,257	352	442	636	1,078	18.71	5,763
Mackinac	443,168	4,152	2,961	1,182	4,143	38.81	10,674
Macomb	517,625	72	2,981	281	3,262	0.45	717,400
Manistee	110,350	519	773	950	1,723	8.10	21,265
Marquette	148,237	209	1,106	768	1,874	2.64	70,887
Mason	90,103	353	976	2,074	3,050	11.94	25,537
Mecosta	50,197	135	221	1,522	1,743	4.67	37,308
Menominee	27,335	110	205	462	667	2.68	24,920
Midland	212,863	281	799	117	916	1.21	75,651
Missaukee	14,807	122	92	405	497	4.09	12,147

Table A.1 (cont'd.): Dependent Variables

County	Use Tax (in Dollars)	Use Tax divided by Population	Number of Guestrooms	Number of Campsites	Guestrooms plus Campsites	All Lodging divided by Population	Population
Monroe	111,233	83	655	1,207	1,862	1.39	133,600
Montcalm	5,044	10	205	1,226	1,431	2.70	53,059
Montmorency	28,737	322	289	477	766	8.57	8,936
Muskegon	79,892	50	1,444	1,514	2,958	1.86	158,983
Newaygo	11,248	29	219	1,696	1,915	5.01	38,202
Oakland	1,697,966	157	9,714	3,530	13,244	1.22	1,083,592
Oceana	30,433	136	396	2,166	2,562	11.41	22,454
Ogemaw	7,778	42	291	1,003	1,294	6.93	18,681
Ontonagon	70,866	800	425	394	819	9.25	8,854
Osceola	3,970	20	83	593	676	3.36	20,146
Oscoda	8,797	112	192	497	689	8.79	7,842
Otsego	217,976	1,214	1,177	642	1,819	10.13	17,957
Ottawa	295,266	157	843	2,426	3,269	1.74	187,768
Presque Isle	19,033	138	183	486	669	4.87	13,743
Roscommon	94,702	479	1,298	1,236	2,534	12.81	19,776
Saginaw	332,284	1,514	1,795	261	2,056	9.37	21,946
St. Clair	246,074	169	1,045	1,395	2,440	1.68	145,607
St. Joseph	42,881	73	619	1,256	1,875	3.18	58,913
Sanilac	18,092	45	318	1,080	1,398	3.50	39,928
Schoolcraft	98,945	1,192	591	602	1,193	14.37	8,302
Shiawassee	37,267	53	185	193	378	0.54	69,770
Tuscola	10,232	18	110	184	294	0.53	55,498
Van Buren	83,897	120	582	736	1,318	1.88	70,060
Washtenaw	976,272	345	3,216	438	3,654	1.29	282,937
Wayne	2,508,767	119	15,795	810	16,605	0.79	2,111,687
Wexford	150,041	569	669	1,205	1,874	7.11	26,360
Total	15,919,966		96,503	4,689,240	3,769,741		9,105,303

Table A.2: Independent Variables

County	Public Land Ratio	National & State Parks	Shore-line	Streams	Lakes	Water Access Areas	Highway Existence	Ski Areas	Attrac-tion Index	Golf Courses
Alcona	27.2	549	27.4	362	11,842	8	0	0	0.03	2
Alger	40.7	36,740	120.4	709	8,679	9	0	0	0.22	1
Allegan	8.7	909	24.0	517	7,031	28	1	1	0.99	12
Alpena	11.7	1,270	61.0	301	12,747	9	0	0	1.25	1
Antrim	13.2	0	26.5	264	17,879	32	0	2	0.80	8
Arenac	12.1	0	47.3	156	0	9	1	0	0.04	2
Baraga	20.7	7,593	69.9	696	6,651	22	0	0	0.44	1
Barry	6.4	5,000	0.0	272	8,565	33	0	1	1.08	6
Bay	1.6	143	36.2	50	112	8	1	0	1.59	6
Benzie	32.3	10,991	24.8	104	17,016	23	0	1	0.45	4
Berrien	0.6	2,066	13.7	500	2,271	13	1	1	2.92	11
Branch	0.1	413	0.0	325	7,468	17	1	0	0.86	3
Calhoun	0.0	0	0.0	540	3,688	17	1	0	2.91	9
Cass	1.1	0	0.0	229	8,250	24	0	1	0.10	6
Charlevoix	19.8	3,188	102.4	215	22,266	20	0	1	0.26	6
Cheboygan	35.8	1,430	34.5	420	48,523	23	1	0	0.28	3
Chippewa	40.3	26,228	456.0	800	9,015	26	1	0	1.72	5
Clare	14.0	36	0.0	331	4,041	16	1	2	0.63	3
Clinton	2.5	2,678	0.0	319	484	6	1	0	0.28	5
Crawford	60.9	9,724	0.0	204	2,730	31	1	2	0.03	2
Delta	40.3	712	198.7	514	3,092	24	0	1	0.72	4
Dickinson	44.8	0	0.0	645	4,992	26	0	1	0.92	3
Eaton	0.1	0	0.0	207	407	5	1	0	1.35	7
Emmet	24.5	7,871	75.0	98	8,288	7	1	3	0.30	3
Genesee	0.0	0	0.0	355	3,413	5	1	0	2.87	16
Gladwin	26.2	365	0.0	473	6,349	12	0	0	0.23	2
Gogebic	43.8	9,767	30.1	1,204	27,253	15	0	4	0.07	2
Grand Traverse	21.2	746	55.5	168	13,464	26	0	0	2.13	6
Gratiot	3.7	0	0.0	241	1,165	3	1	0	0.64	4
Hillsdale	0.7	0	0.0	298	2,776	9	0	0	0.29	4
Houghton	30.2	516	50.6	923	21,391	29	0	1	2.11	3
Huron	2.3	1,278	92.5	942	76	13	0	0	0.92	6
Ingham	1.3	34	0.0	234	533	4	1	0	3.96	19
Ionia	2.8	4,018	0.0	464	1,727	15	1	0	0.67	4
Iosco	37.9	70	36.2	259	10,102	11	0	0	0.87	3
Iron	33.0	316	0.0	902	21,376	31	0	1	0.44	2
Isabella	0.5	0	0.0	330	1,511	3	1	0	0.49	5
Jackson	3.3	12,963	0.0	324	8,523	9	1	0	2.51	17
Kalamazoo	1.6	3,086	0.0	365	8,477	19	1	0	2.08	13
Kalkaska	42.4	0	0.0	284	3,733	26	0	0	0.40	1
Kent	1.5	0	0.0	772	5,786	24	1	2	2.90	23
Keweenaw	36.5	133,964	100.5	271	4,957	11	0	0	1.01	1
Lake	46.7	0	0.0	250	2,639	36	0	0	0.23	1
Lapeer	2.9	4,061	0.0	594	3,448	8	1	0	1.10	7
Leelanau	22.1	45,589	151.4	58	17,003	17	0	1	0.67	2
Lenawee	0.9	3,498	0.0	622	3,934	8	0	0	0.79	8
Livingston	4.7	12,059	0.0	469	7,725	11	1	1	0.93	10
Luce	50.0	10,688	31.0	658	12,478	29	0	0	0.42	1
Mackinac	51.2	1,951	298.4	347	21,467	22	1	0	2.69	4
Macomb	0.7	1,984	26.5	296	895	6	1	0	1.89	25
Manistee	30.9	201	25.4	276	7,041	23	0	0	0.90	4
Marquette	23.3	1,124	79.4	1,906	22,401	62	0	2	0.97	2
Mason	19.9	4,116	27.5	238	8,180	26	1	0	0.91	2
Mecosta	4.2	0	0.0	293	8,497	25	1	0	0.08	2
Menominee	13.8	650	41.3	815	3,803	17	0	0	0.26	0
Midland	12.4	0	0.0	309	2,409	2	1	0	0.71	2

Table A.2 (cont'd.): Independent Variables

County	Public Land Ratio	National & State Parks	Shore-line	Streams	Lakes	Water Access Areas	Highway Existence	Ski Areas	Attrac-tion Index	Golf Courses
Missaukee	27.5	0	0.0	209	4,287	7	0	1	0.02	1
Monroe	2.0	1,035	56.6	459	265	10	1	0	1.27	12
Montcalm	4.8	0	0.0	477	5,099	29	1	0	0.31	6
Montmorency	37.4	290	0.0	306	8,846	20	0	0	0.03	3
Muskegon	7.0	2,541	26.9	394	9,966	12	1	0	2.97	11
Newaygo	20.7	0	0.0	484	7,816	20	0	0	0.26	4
Oakland	4.9	28,062	0.0	469	17,792	36	1	3	4.32	41
Oceana	16.6	2,871	27.4	224	2,938	5	1	0	0.44	2
Ogemaw	26.3	4,329	0.0	381	4,122	28	1	0	0.23	3
Ontonagon	38.1	49,610	56.2	1,282	10,391	8	0	2	0.04	2
Osceola	5.1	0	0.0	301	1,611	19	1	0	0.23	1
Oscoda	56.4	0	0.0	219	2,380	10	0	1	0.40	1
Otsego	29.6	62	0.0	198	4,905	19	1	3	1.01	6
Ottawa	0.5	376	25.0	307	4,709	15	1	1	2.89	10
Presque Isle	19.7	5,822	68.7	301	13,594	20	0	0	0.25	1
Roscommon	54.8	960	0.0	204	37,536	9	1	0	0.51	5
Saginaw	4.6	0	0.0	593	1,400	8	1	1	5.34	11
St. Clair	2.5	1,862	164.2	1,007	0	4	1	0	1.24	9
St. Joseph	0.7	0	0.0	734	23,121	27	0	0	0.70	4
Sanilac	1.4	238	40.5	307	631	0	0	0	0.68	5
Schoolcraft	64.8	956	64.1	959	385	12	0	0	0.43	1
Shiawassee	0.3	0	0.0	292	8,136	18	1	0	0.51	6
Tuscola	5.6	0	20.1	184	908	7	0	0	0.48	7
Van Buren	0.4	661	13.4	324	4,737	28	1	1	1.50	4
Washtenaw	3.3	14,134	0.0	372	6,810	18	1	1	4.14	14
Wayne	0.4	944	75.4	391	1,886	10	1	0	11.98	31
Wexford	38.9	248	0.0	254	6,297	14	1	1	0.48	4
Total	20.2	485,586	3,003	6,350	671,137	1,406		44	100.00	519

APPENDIX B

MAPS ON SPATIAL DISTRIBUTION OF EACH VARIABLE

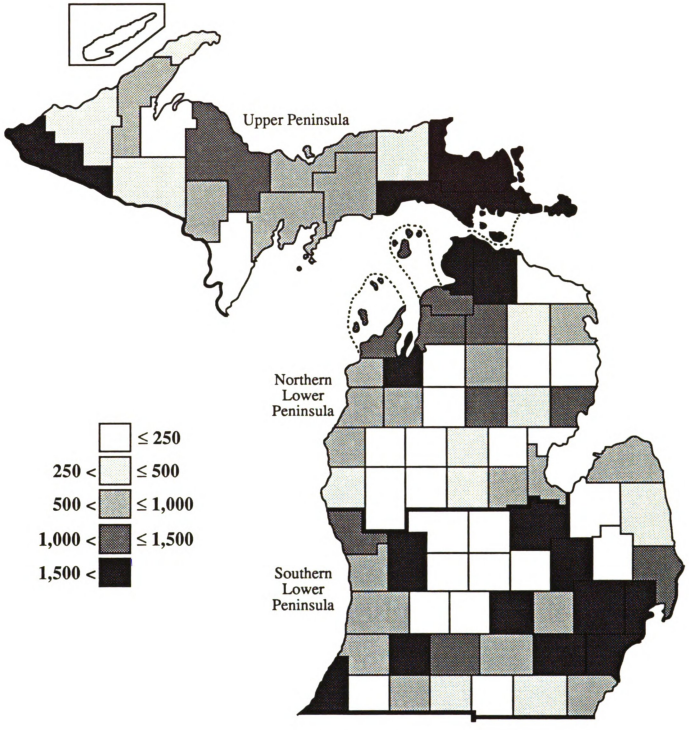

Figure B.1: Spatial Variation in the Location of Guest Rooms

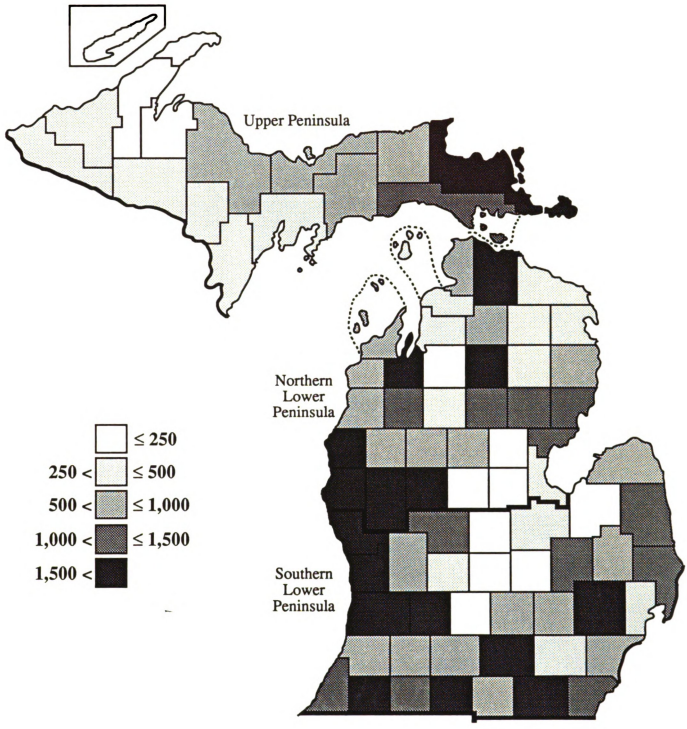

Figure B.2: Spatial Variation in the Location of Campsites

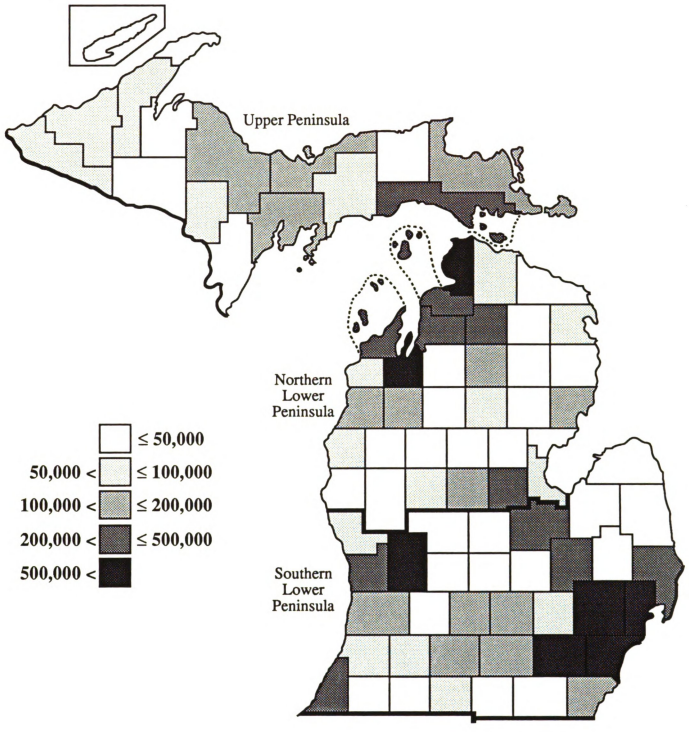

Figure B.3: Spatial Variation in Hotel/Motel Use Tax

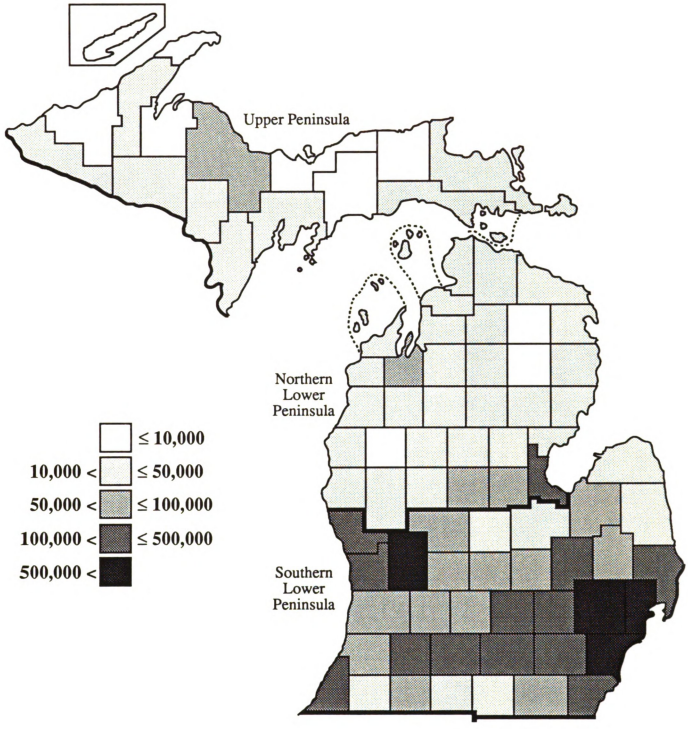

Figure B.4: Spatial Variation in County Population

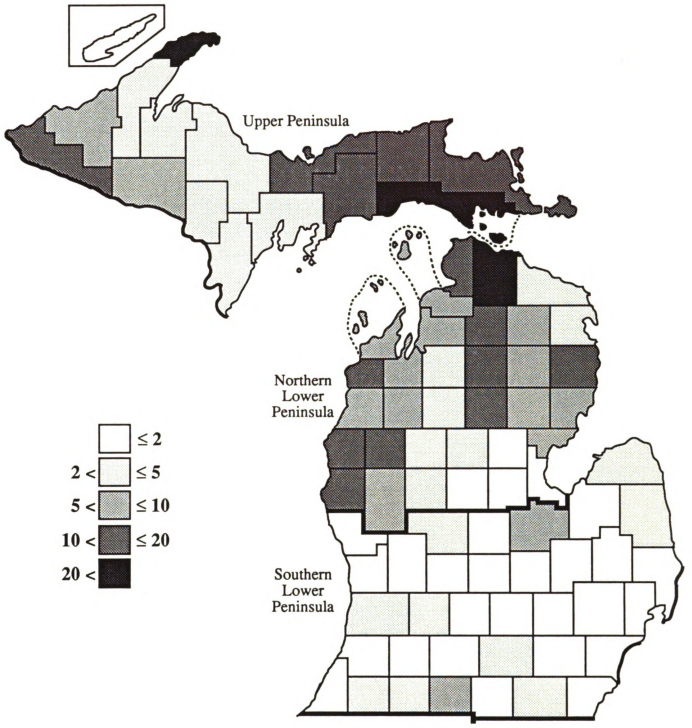

Figure B.5: Spatial Variation in Per Capita Lodging Supply

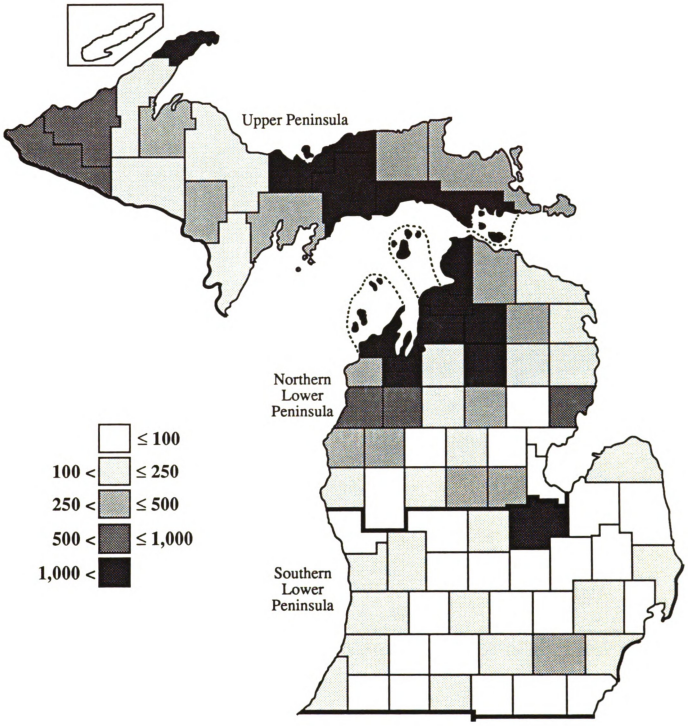

Figure B.6: Spatial Variation in Per Capita Hotel/Motel Use Tax

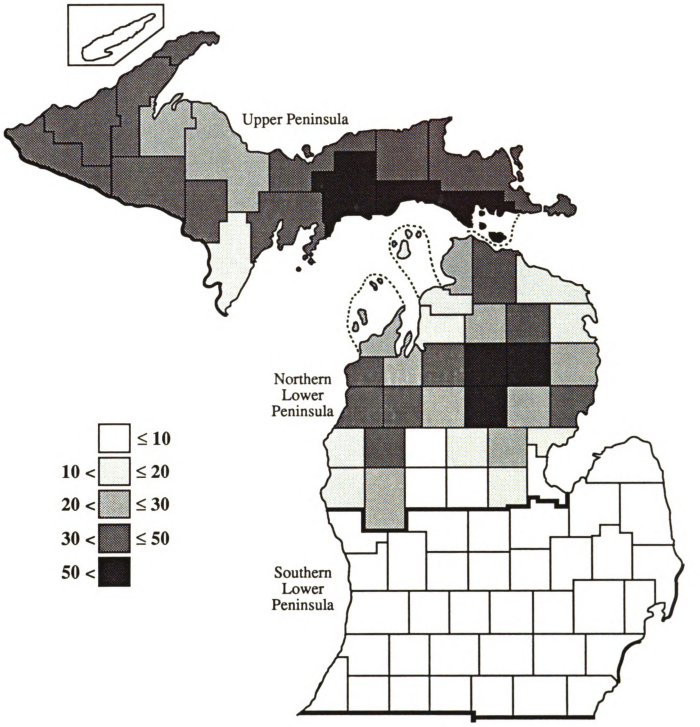

Figure B.7: Spatial Variation in Public Lands Ratio

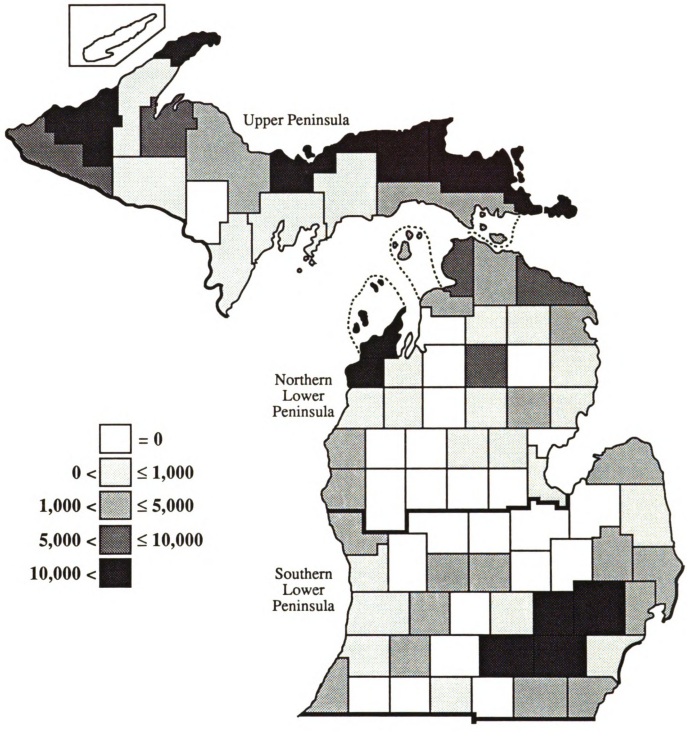

Figure B.8: Spatial Variation in the Location of National and State Parks

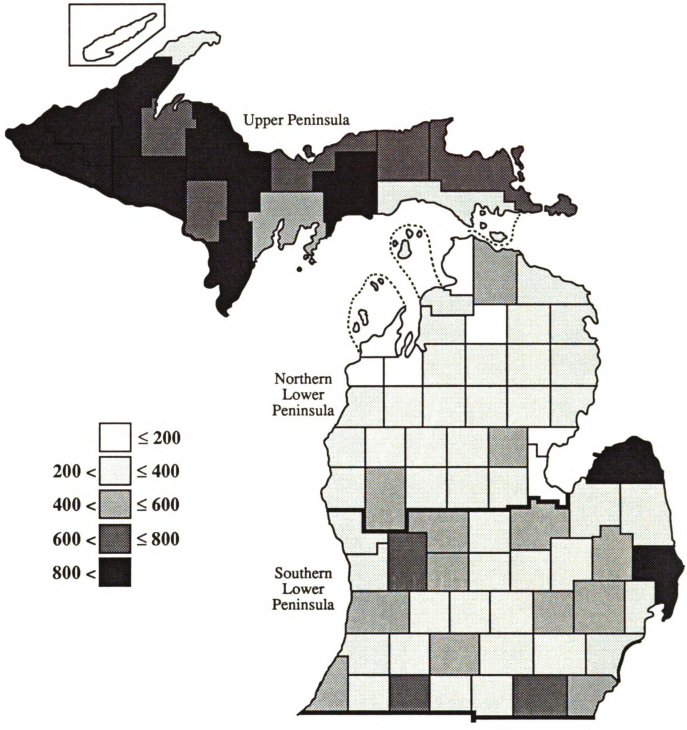

Figure B.9: Spatial Variation in Miles of Stream

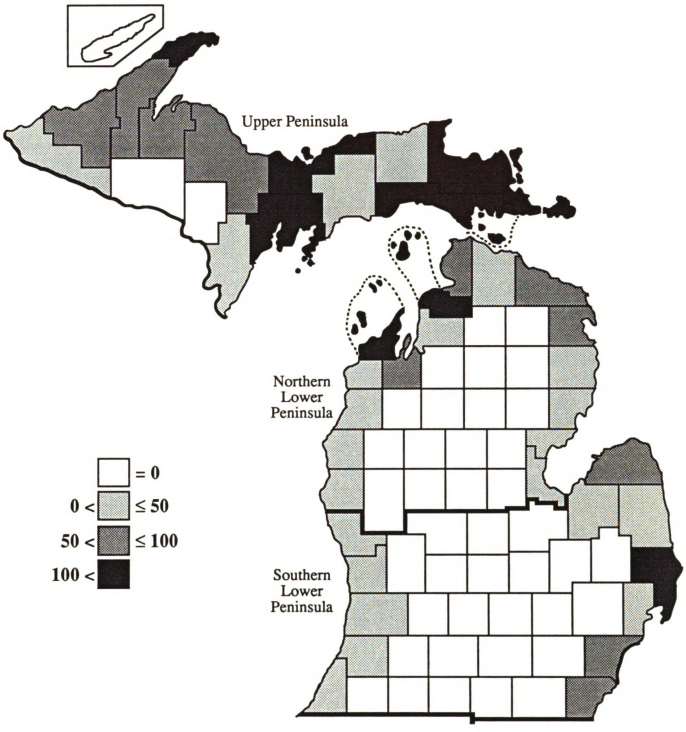

Figure B.10: Spatial Variation in Miles of Shoreline

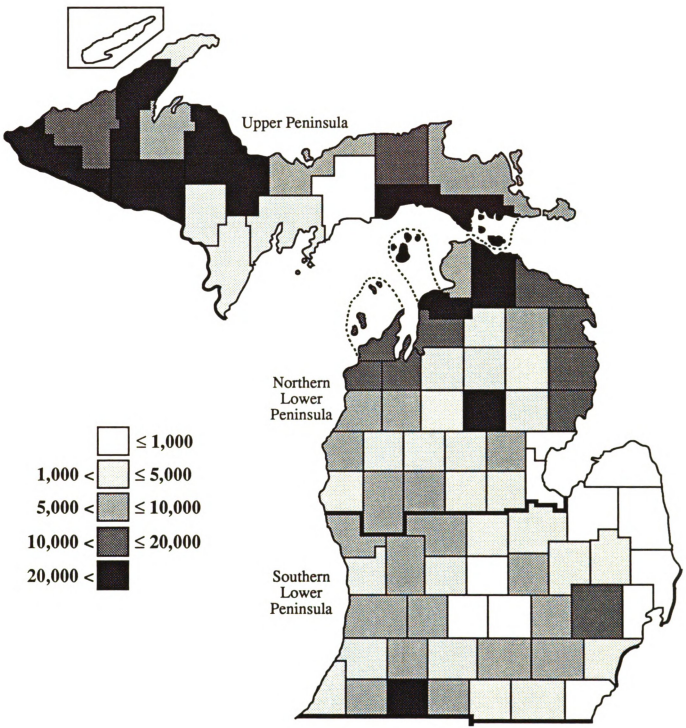

Figure B.11: Spatial Variation in Acres of Lakes

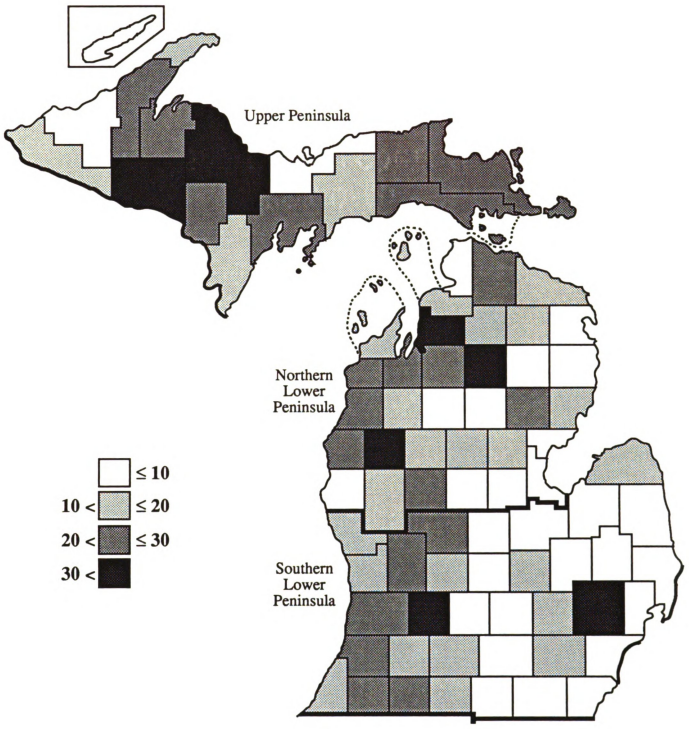

Figure B.12: Spatial Variation in the Number of Public Water Access Points

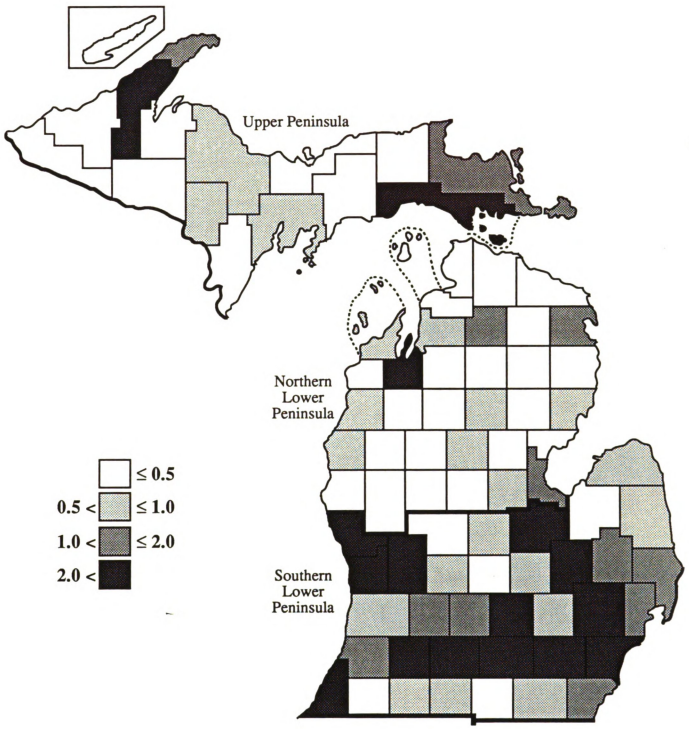

Figure B.13: Spatial Variation in the Attraction Index Score

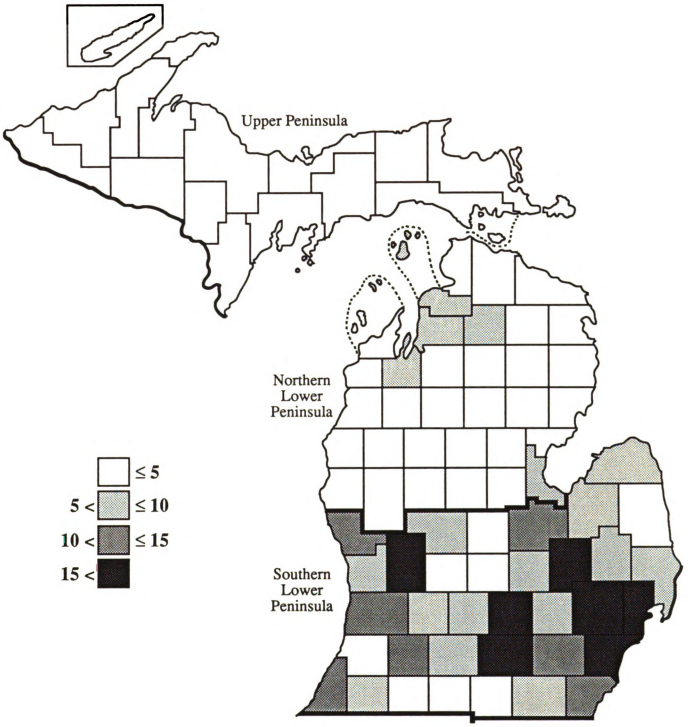

Figure B.14: Spatial Variation in the Number of Golf Courses

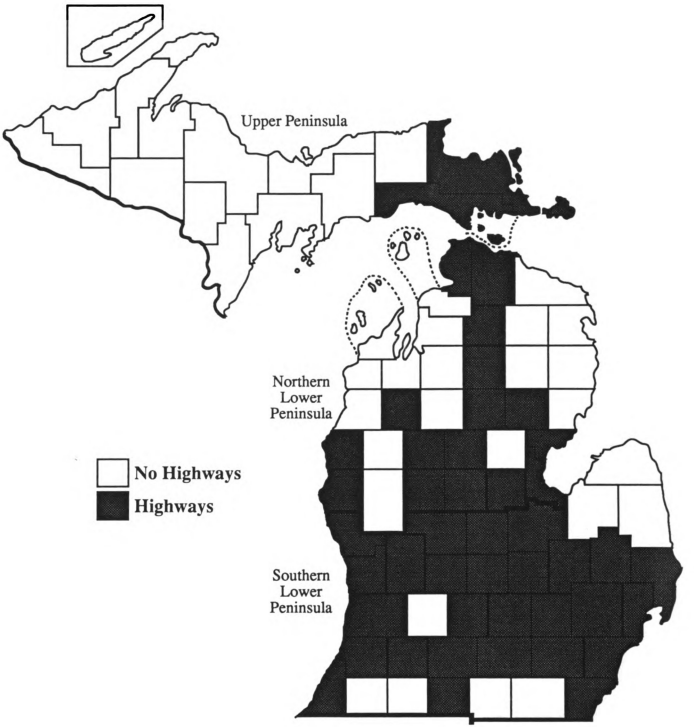

Figure B.15: Spatial Variation in the Existence of Highways

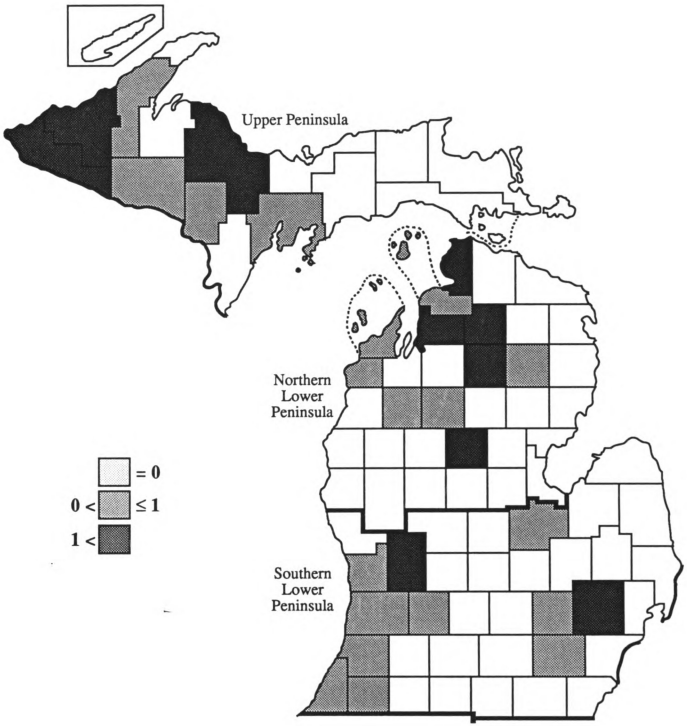

Figure B.16: Spatial Variation in the Number of Ski Areas