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Factors Influencing Manufacturing Development in South Dakota

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FACTORS INFLUENCING MANUFACTURING DEVELOPMENT IN SOUTH DAKOTA

BY

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This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable as meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

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CHAPTER I

INTRODUCTION: PURPOSE AND OBJECTIVES

Problem Situation

The increased level of manufacturing activity in rural[1] areas over the past twenty years is a reversal of the previous trend of manufacturing firms to locate in metropolitan areas. Metro areas have traditionally been considered as least cost locations due to agglomeration economies, availability of skilled labor pools, access to markets and transportation, and a wide range of services. However, diseconomies of locating in these large metro areas--such as pollution, crime, and congestion--have given rise to entrepreneurs' consideration of nonmetro areas as alternative location sites. This is evidenced by the trend of manufacturing employment growth during the 1960's, which showed United States nonmetro manufacturing employment increase by 3.4 percent versus a metro gain over this same period of 1.7 percent.[2]

Manufacturing employment growth in South Dakota has benefited from this trend, posting a 20 percent or 2,600 employee increase over the decade of the 1960's and a substantial 49 percent increase from 1970 through 1977 (see Table I-A). Over 70 percent of the increased manufacturing employment from 1960 through 1977 occurred among those industries producing durable goods. Figure 1 illustrates the

Table I-A. Employment by Major Sectors in South Dakota, 1960, 1970, 1977[1/].

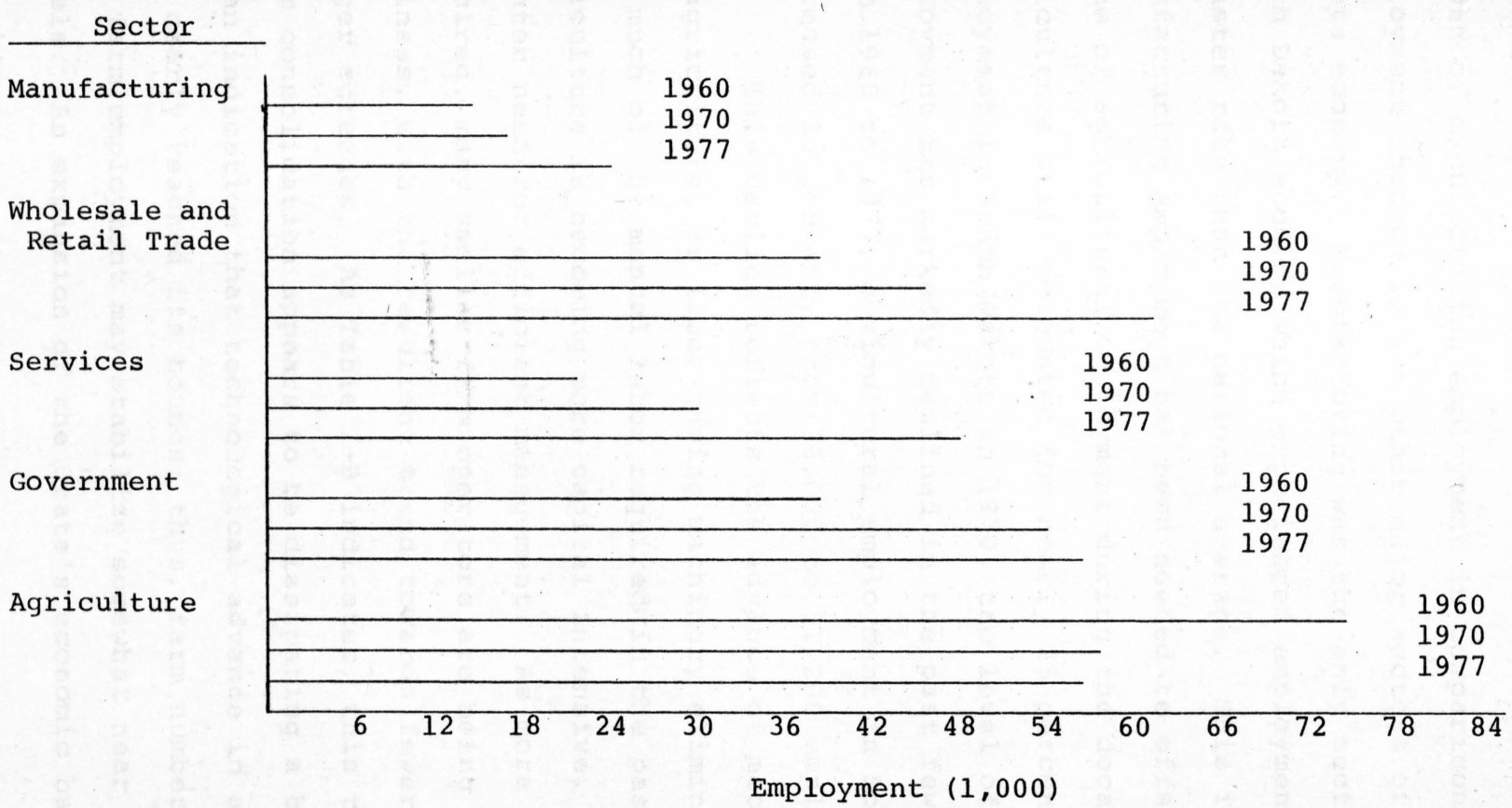
Sector	1960 Employment (1000)	1960 % of Total	1970 Employment (1000)	1970 % of Total	1977 Employment (1000)	1977 % of Total	%change 1960-70	%change 1970-77
Manufacturing	13.1	6.1	15.7	6.7	23.4	8.4	19.8	49.0
Durable Goods	3.2	1.5	5.9	2.5	10.5	3.8	84.4	78.0
Non-durable Goods	9.9	4.6	9.8	4.2	12.9	4.6	1.0	31.6
Non-Manufacturing	128.4	59.0	159.3	68.5	203.2	73.1	30.9	27.6
Mining	2.4	1.1	2.2	1.0	2.6	.9	- 8.3	18.2
Contract Construction	11.4	5.2	7.4	3.2	12.4	4.5	-35.1	67.6
Transportation, Utilities	10.1	4.6	10.5	4.5	12.6	4.5	4.0	20.0
Wholesale & Retail Trade	38.4	17.7	46.5	20.0	62.3	22.4	21.1	34.0
Finance, Ins., Real Estate	5.6	2.6	7.4	3.2	10.1	3.6	32.1	36.5
Services	21.5	9.9	32.0	13.8	46.6	16.8	48.8	45.6
Government	39.0	17.9	53.3	22.9	56.6	20.4	36.7	6.2
Total Non-ag Wage and Salary Employment	141.5	65.1	175.0	75.2	226.6	81.6	23.7	29.5
Agricultural Employment	76.0	34.9	57.7	24.8	51.2	18.4	-24.1	-11.3
Total Employment[2/]	217.5	100.0	232.7	100.0	277.8	100.0	7.0	19.4

Source: Jewel Husby, South Dakota Department of Labor, Research and Statistics Section, June 25, 1980, unpublished data received in a letter to reseacher.

1/ Totals not all exact due to rounding.

2/ Total employment is represented as the total of agricultural employment plus non-ag wage and salary employment. Non-agricultural, self-employed and unpaid family workers, and domestic workers in private households are not included in the total.

Figure 1. Employment in Major Sectors of South Dakota Economy for 1960, 1970, and 1977.



Source: Jewel Husby, South Dakota Department of Labor, Research and Statistics Section, June 25, 1980, unpublished data received in a letter to researcher.

growth of manufacturing employment in comparison to the employment changes in the other major sectors of the South Dakota economy. Manufacturing was the only sector of the South Dakota economy which experienced employment growth at a faster rate than the national average. This increase in manufacturing employment has been needed to offset the decline of agricultural employment during the decade. While agriculture still accounted for nearly 25 percent of the employment in South Dakota in 1970, the level of agricultural employment has markedly declined in the past few decades. From 1960 to 1977, agricultural employment in South Dakota decreased 33 percent, from 76,000 to 51,200 employees.

This decline reflects the advance of mechanization in agriculture, as labor-saving machinery eliminates the need for much of the manual labor required in the past. Also, agriculture is becoming more capital intensive, with a greater need for efficient management. As more capital is required, many smaller farm operators are being driven out of business, with the resultant trend towards fewer farms with larger acreages. As Table I-B indicates, this trend toward farm consolidation appears to be dissipating a bit. This may be an indication that technological advance in agriculture has nearly reached its bounds; thus, farm numbers, farm size, and farm employment may stabilize somewhat near the present levels. An expansion of the State's economic base is needed

Table I-B. Number of Farms and Average Farm Size in South Dakota for 1930, 1960, 1970-77[1/].

Year	Number of Farms	% Change	Average Size of Farms in Acres	% Change
Old Definition				
1930	83,200		439	
1960	58,400	-29.8	781	77.9
1970	46,500	-20.4	978	25.2
1971	45,500	- 2.2	1,000	2.2
1972	44,500	- 2.2	1,022	2.2
1973	44,000	- 1.1	1,034	1.2
1974	43,500	- 1.1	1,046	1.2
New Definition				
1975	43,500	0	1,045	0
1976	43,000	- 1.1	1,057	1.1
1977	42,500	- 1.2	1,069	1.1

Source: South Dakota Department of Labor, Research and Statistics Section, South Dakota Annual Planning Report No. 9 (Aberdeen, South Dakota: May, 1979), p. 22.

1/ Prior to August, 1975, the USDA defined a farm as a unit consisting of at least 10 acres and selling $50 worth of produce or, with lesser acreage, selling $250 worth of produce. As of August, 1975, the new definition of a farm is any unit which sells over $1,000 worth of produce, regardless of size.

to reduce the dependency of South Dakota's economy on the fortunes of agriculture and to provide alternative employment opportunities for displaced farm workers. Increased levels of manufacturing activity is an effective means of broadening the base of South Dakota's economy and providing much needed employment opportunities.

These employment opportunities are needed to reverse the trend of out-migration experienced in the 1960's and 1970's. As shown in Table I-C, net out-migration amounted to 92,560 persons for the 1960's. This out-migration continued at a reduced pace from 1970 to 1977, posting an out-migration of 12,257 persons. (See Table I-D.) A closer examination of the characteristics of the out-migrants from the 1960's period reveals that population loss was particularly heavy among the younger, more educated and trained persons who would have reached 20 to 44 years of age in 1970. A net loss of 52,536 persons, or 22 percent of persons in this age group, occurred during the 60's. The mortality rate among this age group is generally considered quite low; therefore, this loss accounts for approximately 56 percent of the total out-migration for South Dakota in this period. A further breakdown reveals that the rural portion of this age group declined by a much more rapid 34 percent.

As out-migration of the younger segment of the population continues, South Dakota is increasingly becoming

Table I-C. Out-migration from South Dakota 1960-1970.

1960 Census of Population	680,514
Natural Increase (Births-Deaths)	+ 78,303
1970 Population by Natural Increase	758,817
1970 Census of Population	- 666,257
Net Out-migration	92,560

Source: South Dakota Department of Labor, Research and Statistics Section, South Dakota Annual Planning Report No. 9 (Aberdeen, South Dakota: May, 1979), p. 8.

Table I-D. Out-migration from South Dakota 1970-1977.

1970 Census of Population	666,257
Natural Increase (Births-Deaths)	+ 34,000
1970 Population by Natural Increase	700,257
1977 Population	- 688,000
Net Out-migration	12,257

Source: U.S. Department of Commerce, Bureau of the Census, "Current Population Reports", Population Estimates, Series P-26, No. 78-41, June 1979, p. 3.

dominated by an elderly age structure. This is evidenced by the fact that the over-75-years-of-age population interval increased by approximately 38 percent in South Dakota between 1960 and 1970.[3] These elderly people are generally immobile in terms of relocating to new localities. Many retired farmers move into the nearest town. As younger people leave these towns, there is a heavier burden on those remaining to support public services. Diseconomies of small scale provision of public services become evident as less users are available for such services as telephone, electricity, and school bus service, with a resultant increase in cost per user. This is especially burdensome on the elderly with fixed incomes, as increased service costs take a greater proportionate share of their income.

Another potential consequence of the exodus of the young people from the state is declining primary and secondary school enrollments, since those young families leaving the state often have children of school age. As enrollments drop, cost per pupil increases in order to maintain the same level of educational services for the remaining students. Out-migration is not only leaving a void in rural areas, but is also contributing to the overcrowding of larger cities and the resultant congestion costs. An expansion of manufacturing employment in rural areas of South Dakota can assist in reducing this out-migration and thereby retain more of the

younger segment of the population.

While South Dakota has much to offer in the way of resources, both natural and human, planners must recognize that there is a limited quantity of these resources at hand. To efficiently utilize these resources, planners need to concentrate on sound spatial organizations for future economic activities, including manufacturing activity. Economically sound location patterns should reflect spatial variations in labor costs and availability, access to transportation and raw materials, and differences in market potentials of various areas. Consideration must also be given to particular characteristics and requirements of certain industries which may tend to limit their usefulness in expanding South Dakota's economic base and employment opportunities. An examination of recent industrial location patterns in South Dakota with respect to community and labor shed characteristics of the communities in which industries have located can be beneficial in projecting and planning for expected manufacturing growth in the future. By identifying factors found to be significant in industrial location, state and local planners can more effectively concentrate their efforts on improving those variables within the community's control so as to attract more industry.

Objectives

The general objectives of this study are two-fold:

(1) To explore how the extent and type of rural industrialization being experienced in South Dakota differs among types of communities and local labor sheds.

(2) To draw policy and planning conclusions that can be used by rural industrial development entities at the community, district, and state levels in South Dakota.

To achieve these two general objectives, the following specific study objectives will be pursued:

(1) To determine relationships between the magnitude of manufacturing employment growth and various community and local labor shed characteristics.

(2) To determine relationships between the type of manufacturing growth and various community and local labor shed characteristics.

(3) To determine those location factors which can be affected by policies and programs of industrial development entities at the community, district, and state levels in South Dakota.

(4) To integrate those location factors found to be significant into a viable development strategy.

Study Procedures

A projection of future industrial location sites is generally based on the assumption that entrepreneurs will act rationally and choose that site which offers a high probability of success. Certain factors relating to transportation, labor force, education, and agglomeration economies are hypothesized to be influential in determining a firm's location. Although certain existing conditions, such as energy costs, may dramatically change in the future, most economic and social conditions can be expected to remain fairly stable in the years immediately ahead. Thus, analysis of the recent spatial distribution of manufacturing activity can provide useful insights into probable location trends in the future. Several statistical methods will be utilized in this thesis to discern which factors have been relevant in past locational decisions of manufacturing firms in South Dakota.

Statistical analysis performed on the data in this study was accomplished through the use of an IBM 370 J48 computer. The system of computer programs used was the Statistical Package for the Social Sciences (SPSS). Subprogram REGRESSION was used for the regression analysis. This subprogram utilized a forward stepwise inclusion procedure in which the order of inclusion of the independent variables is determined by the respective contribution of

each variable to explained variance.

Subprogram CROSSTABS was used in obtaining chi-square statistics. These were utilized in determining whether a systematic relationship exists between two variables. Subprogram BREAKDOWN was used to obtain one-way analysis of variance statistics, which were used to test whether the means of subsamples into which the sample data are broken are significantly different from one another.[4]

Multiple regression analysis was used to examine relationships between a dependent variable and the values taken by a set of explanatory or independent variables. Two alternative dependent variables were used in this study: 1) the absolute change in manufacturing employment, and 2) the percentage change in manufacturing employment. Manufacturing employment change was measured between the years 1971 and 1977.

The independent variables represent various socio-economic characteristics of counties. The county was chosen as the measurement unit for the regression analysis. These independent, or explanatory, variables were conceptualized as belonging within four broad categories of locational inducement factors: 1) labor force availability, 2) economic structure and agglomeration factors, 3) transportation access, and 4) educational facilities. Regression models were developed for analysis of manufacturing

employment growth for the entire State and for non-metro areas of South Dakota, thus excluding Minnehaha and Pennington counties from this latter analysis.

An analysis of variance procedure was utilized to determine significant relationships among types of transportation facilities used by industrial firms and the frequency of such use by city size and type of industry. Chi-square analysis was employed to test the effectiveness of actions taken by local development corporations and other community modifiable actions relating to site availability and quality. Due to an insufficient number of observations in many cases, the chi-square analysis was often rendered statistically invalid. Although not always statistically conclusive, various relationships among community and industry types have been presented as part of a broad descriptive analysis in order to provide a general overview of the present level and spatial distribution of manufacturing activity in South Dakota.

Primary data for the analysis were obtained through mail survey questionnaires. One questionnaire was sent to a sample[5] of manufacturing firms[6] in the State; information was requested concerning factors influencing each firm's location decision, water use, and transportation access and utilization. Another questionnaire was sent to all local development corporations in the State. This questionnaire

was concerned with site availability, facilities made available at such sites, financial aid to firms, and each local development corporation's perceived role in attracting industry. Copies of these questionnaires and related information are presented in Appendix B. Data for other variables, primarily those included in the regression analysis, were collected from several secondary sources which are enumerated in Appendix C.

NOTES

[1] Census reports classify cities with populations of over 50,000 as metropolitan areas. For purposes of this thesis, rural will denote those incorporated places with fewer than 40,000 persons in 1970, which includes all of South Dakota exclusive of Sioux Falls and Rapid City. The terms rural and non-metropolitan will be used interchangeably throughout.

[2] Thomas L. Dobbs, Planning for Rural Industries - Local Employment, Extension Circular 722, (Brookings: South Dakota State University, Cooperative Extension Service, 1979), p. 3.

[3] Calculated with data from: Marvin P. Riley, Bruce G. Breamer, and Eugene T. Butler, The Age and Sex Structure of the Population of South Dakota, 1960 and 1970, Bulletin 599, (Brookings: South Dakota State University, Rural Sociology Department, 1972), pp. 16-20.

[4] Norman H. Nie, Statistical Package for the Social Sciences, 2nd ed. (U.S.A.: McGraw-Hill, 1975), p. 259.

[5] See Appendix A for sampling procedure.

[6] Unless otherwise noted, data referred to as from the "Manufacturing Firm Survey" are from this sample of manufacturing firms.

CHAPTER II

REVIEW OF LITERATURE

A multitude of theories have resulted from the extensive work which has been undertaken in the area of industrial location and development. Exposition will be limited here to those works which were instrumental in developing present day location theory and those theories thought to be particularly relevant to the development of the South Dakota economy.

A review of literature pertaining to various factors identified in these theories will be presented, with particular emphasis placed on those factors relating to manufacturing growth in rural areas. Several empirical studies dealing with the locational determinants of manufacturing activity will be examined in regard to their study procedures and findings which may be applicable to manufacturing growth in South Dakota.

Theories of Firm Location and Growth

Differences in employment and income levels of various areas around the country illustrates the fact that economic activity has a spatial dimension, i.e., certain areas are found to be more desirable or profitable based on some locational advantage. Thus, location decisions of firms must take into account the heterogeneity of various

areas with respect to access to raw materials, markets, labor, and transportation facilites, among other cost relevant variables.

Through the years, industrial location theories have been developed which attempt to identify those factors thought to be instrumental in determining industrial location. Development of these theories has evolved along two main lines of thought concerning regional development. The neoclassical theories take a microeconomic approach in which the comparative advantage of a region is exploited to attain maximum profit. Price differentials among inputs and outputs are also recognized as leading to substitution among these factors. The second approach to area development, encompassing income-employment growth theories, stresses a macroeconomic view of development whereby aggregate savings, investment, exports, and engineering interdependencies assume a dominant role. This latter approach is discussed in this chapter under the "export base" heading.

Neoclassical Approach. Location theory based on the neoclassical structure was primarily initiated by the works of the German scholar, Johann Heinrich vön Thunen. The theory proposed by vön Thunen in 1826 is principally related to agricultural production, but it can also be adapted to account for industrial location.

Vön Thunen bases his theory on the existence of a homogeneous land surface in which labor and capital are assumed immobile and a central city is considered the consumption center. Land use is determined by the distance from this central market. The cost of goods in regions outside the city is the city market price less the cost of transportation from that region to the city. Therefore, the type of production which takes place in areas surrounding the city depends on the cost of transportation which a good can bear.[1] Production of a relatively high valued good will thus take place in a region distant from the consumption center, since it can bear the high transport costs and still earn a normal profit. The major weakness of vön Thunen's theory is his assumption of a homogeneous land surface surrounding a central market, thus ignoring spatial differences in demand.

Nearly 100 years later, another German, Alfred Weber, expanded on vön Thunen's least-cost location theory. Once again, transportation was deemed to be of primary importance; however, labor and material costs were also recognized as exerting an influence on the location process. With these considerations in mind, Weber believed that industrial location would take place at the source of raw materials, at the point of consumption, or at some point in between. If only transport costs are considered, a good which loses

weight during processing will tend to cause the firm to locate near the source of raw materials, whereas if it is a weight gaining product, the firm will be market oriented.[2]

In arriving at these conclusions, Weber assumed that raw materials are dispersed unequally and a number of consumption centers are scattered about. Therefore, no producer could obtain monopolistic advantages due to location since numerous consumption centers imply perfect competition and an unlimited market. The labor supply is also assumed to be constant and unlimited at a certain wage rate.[3]

Labor is influential if the savings in labor costs by moving to a different location are greater than the increased transportation costs incurred by making such a move. Another influence which may be felt in the absence of transport or labor differences is agglomeration or deglomeration effects. Agglomeration effects--such as better service, nearness to customers, and economies of scale--will cause firms to centrally locate. Deglomerating forces--such as high rent, congestion, crime, and pollution--result in a dispersed pattern of industrial location.[4]

The greatest criticism of Weber's theory is his assumption of perfectly competitive markets. By not taking demand considerations into account, each seller is faced with the same demand curve and market price. This would

allow the producer with the least-cost location to benefit by selling more at the given market price and receiving more profit per unit of sale at this price.[5]

If quantity demanded is allowed to vary with price, then the greatest total consumption varies with each different price, since the market area will change and individual firm demands will change in different proportions. Therefore, for each change in price, a new optimal firm location is formed. This makes it impossible to find the point of minimum cost as proposed by Weber, since "as soon as the boundaries of the market area are changeable, the average freight costs would be smallest if nothing were sold beyond the location of the factory - indeed, if the factory itself were finally to disappear!"[6]

Demand considerations were incorporated in Edgar Hoover's concept of market areas. Hoover recognized that a certain degree of market control can be gained if a firm locates in an area where no other firm is present. The area immediately surrounding this site is considered the market area and will be under the firm's control if prices are kept down to a level which assures a normal profit, thus keeping rivals away.[7]

Hoover's basic approach followed the lines of Weber's least-cost theory in that transportation and production costs are considered as the primary determinants of plant location.

Thus, the optimum location, assuming production costs are constant, is where transport costs are minimized.[8]

In a departure from the Weberian framework, Hoover explores the impact of locational interdependence among firms. Recognition is given to the agglomeration potential of better transport services, a more flexible labor market, improved fire and police protection, and more banking facilities. Insurance, interest, and utility rates may also be reduced by agglomeration.[9] The inclusion of these institutional factors stresses Hoover's concern with all factors affecting plant location, versus Weber's concern with only those factors affecting all industrial location.

Hoover's failure to explore locational interdependencies in detail may be his greatest weakness. In deriving his market and supply areas, he assumes the location of the consumption and production points and derives the market and supply areas from there. Hoover then turns back to transportation and production costs to derive the optimum location in a competitive framework. This does not account for the effects of locational interdependencies on the optimum plant location.[10]

Since Hoover, location theory has become progressively more concerned with demand and market areas. The primary contribution to this school of thought came in 1940 when the German economist August Lösch advanced the first

general location theory with demand as the major spatial variable. Lösch did not intend to explain industrial location in the real world, for as he puts it: "The real duty of the economist is not to explain our sorry reality, but to improve it. The question of the best location is far more dignified than determination of the actual one."[11]

In contrast to Weber's theory, which does not consider demand as a spatial factor, Lösch goes to the other extreme and does not consider spatial cost variations. These cost variations are ignored by Lösch's assumptions of a homogeneous surface with evenly distributed materials and population.

These assumptions, in addition to Lösch's equilibrium conditions, imply equal costs for all firms in the industry regardless of their location, identical market areas for all firms, constant freight rates, and that identical f.o.b. factory prices will be charged by all firms.[12] Thus, the firms will be in a monopolistic competition situation.

The market area of each firm will be identical under these conditions. The optimal plant location will be indeterminate, as identical profits will be realized by locating at any point on the homogeneous surface. If costs were allowed to fluctuate, a least-cost location could be determined which would maximize profits. Another

shortcoming of Lösch's general location theory is the failure to account for agglomeration economies which tend to draw firms together, creating a distortion of the market areas. Although there are many unrealistic assumptions which detract from the usefulness of Lösch's theory, its significance in bringing demand considerations more fully into the realm of location criteria should not be overlooked.

In an effort to integrate the least-cost and locational interdependence approaches, Melvin Greenhut uses the maximization of total profits as the objective of optimal location. Greenhut's theory assumes that firms entering a competitive industry will locate where demand can be met at the least cost. This demand continually changes as more firms enter the market and seek profit maximizing locations. Demand per firm will decline until locational equilibrium is reached, at which time: 1) marginal revenue equals marginal cost, 2) average revenue (i.e. factory price) is tangent to average cost, and 3) plants are dispersed in such a way that relocation of any plant will result in losses.[13]

Greenhut's theory is broader than Lösch's theory in that costs are allowed to vary and the entry of new firms may influence costs. Greenhut also takes account of agglomeration benefits; thus, firms do not need to be evenly dispersed--as Lösch assumes. However, like Lösch,

transportation costs are not considered in the optimal solution to plant location.

Greenhut stressed personal factors in his consideration of plant location determinants other than profit maximization. Personal contact with the consumer is desirable in some situations where a competitive advantage may thereby be obtained. Psychic income is also considered as a personal factor. These personal factors illustrate a new line of thought in which total personal satisfaction is maximized, rather than just profits.

Another neoclassical theory which has particular relevance to South Dakota is the natural resource theory. Quite simply, this theory advocates the utilization of a region's resources whenever marginal returns exceed marginal costs.[14] Due to South Dakota's abundance of natural resources, there has been a proliferation of natural resource based industries, predominantly relating to the agricultural sector. These industries are generally considered basic industries, as their output is primarily for export to markets outside the producing area.

The natural resource theory can be viewed as a link between the neoclassical location theories and the aforementioned income-employment growth theories. While the natural resource theory is neoclassical in its emphasis on profit, the means of acquiring this profit--namely, through

exports of basic industry products--serves as the central tenet of the export base theory.

Export Base Approach. According to the export base theory, expansion of an area's "basic", or export, activities will in turn lead to further expansion of other aspects of the local economy. Essentially, by producing goods for export outside the region, the exporting region attracts income from outside the region. This raises per capita income in the exporting region and generally stimulates increased levels of spending, investment, and employment in the exporting region via the multiplier process. This, in turn, leads the way to the expansion of non-basic industries, generally entailing expansion of the service sector to accomodate the basic sector industries.

The forces involved with the export base theory are instrumental in implementing the place prosperity approach to development as advocated by Tweeten and Brinkman.[15] This development strategy is applicable to places such as South Dakota which suffer from outmigration of young people as well as underemployment and low levels of income and industry. Local jobs are created as exports are promoted, leading to an expansion of the local economy.

To promote the place prosperity approach, local development entities can make community improvements such as training of the local labor force, improving community

services, granting tax and utility concessions, providing industrial site facilities, and conducting surveys of the labor skills and labor availability.[16] These tasks are often initiated and organized by a local development organization.

Applicability To South Dakota. As can be seen by this brief exposition of several development and location theories, there is no clear-cut concensus as to the essential ingredients for stimulating economic activity in general and manufacturing activity in particular. Certain elements which are applicable to the problem situation at hand must be drawn from various theories.

Indeed, South Dakota's economy can be seen as developing according to several lines of thought previously mentioned. The past development of the South Dakota economy can be viewed in the neoclassical framework which emphasizes comparative advantage of regions. The comparative advantage previously enjoyed by South Dakota has been in the area of natural resources. While this is still a major inducement for continued economic expansion, the abundance of low-skilled, cheap labor in rural communities is expected to play a major role in attracting future industrial activity.

This low-cost labor supply has the potential, as judged by recent experience, to attract labor intensive industries which require few specialized skills. Assuming

many of these industries to be export-oriented, there will be additional capital entering the community. A portion of this capital is in turn used for further community investment. As more capital is accumulated, more capital intensive industries may enter the community, thus raising the wage level and income in the community. Thus, the expansion of a community's basic or export industries, as per the export base theory, leads to the improved economic well-being of the community.

Many theories of industrial development and location have been mentioned. No single theory can completely explain the development and location of economic activity; however, the theories do provide a base from which future theories and explanatory models can be constructed. Perhaps this statement by August Lösch best summarizes the dilemma of finding the optimum location: "There is no scientific and unequivocal solution for the location of the individual firm, but only a practical one: the test of trial and error."[17]

Several factors have been identified which are thought to have a bearing on the decision of where to locate a manufacturing plant. The following section presents a review of several studies in which many of the aforementioned location determinant factors have been analyzed for their effectiveness in attracting manufacturing activity.

Review Of Empirical Literature

Research concerning factors influencing the location of manufacturing firms in nonmetropolitan areas became most prevalent during the 1960s and 1970s. No clear-cut set of factors has emerged from these various studies which can explain past manufacturing growth or can be used to project future manufacturing growth in every instance. However, several factors, both within and beyond a community's control, have been identified as exerting a locational influence in most situations.

Most studies have identified those factors which are largely beyond a community's control as being of primary importance in firm location decisions. In a review of several studies examining location factors for new industrial plants, Tweeten and Brinkman conclude that the four major factors most frequently cited as affecting the location of new industrial plants are considered to be markets, labor, raw materials, and transportation.[18]

However, these factors are recognized by Tweeten and Brinkman as being of primary importance in determining the general area of a plant location. Once the firm's requirements concerning these general factors are met, certain community modifiable factors may be instrumental in attracting a firm to a particular community. This is evidenced by Brinkman's findings from a 1973 survey of managers of small

firms (generally 25 to 100 employees) in Kansas. More than half the managers rated community modifiable factors as being very important in the selection of the final location site. The three most influential factors identified as being within a community's control included site related facilities, financial assistance, and the community attitude toward industrialization.[19]

A geographical hierarchical location search procedure utilized in selecting plant location sites was recognized in a study conducted by Wise, Fuller, and Goode.[20] Interviews with managers of selected manufacturing firms in a nine-county area surrounding Pittsburgh revealed that the importance of various location factors differ according to whether the general region, the area, or the specific site for the plant location is being considered.

Market oriented factors were most commonly cited as influencing the selection of the general region. When considering which area within the region to locate in, the factors relating to raw materials, labor, sales, and business contacts came into play. Factors within the community's control were most frequently mentioned as influencing the decision of the specific site within the area. These factors concern facilities available at the site, community facilities and taxes, availability of buildings and real estate at reasonable prices, the water

and sewer system, and the community attitude toward industrial growth.[21]

This multi-stage location decision process has also been recognized by several other researchers. Dennis K. Smith noted that certain basic requirements are needed by particular types of industries. A region must fulfill these basic requirements before that type of industry will consider locating there. Thus, community officials must first assess which industries can profitably locate within the region and then concentrate on improving those specific community attributes which may influence firms from these industries to locate in their community rather than in another community within the region.[22]

McMillan also noted that certain prerequisite factors--such as labor, markets, transportation, and raw materials--are essential for nearly all industry. Since these factors are largely beyond a community's control, McMillan believes that, rather than speculating on excessive services and facilities for a particular firm, a community's best policy for promotion of industrial activity is to follow "a continuous and sound program of financial control, orderly and continuous planning, and the maintenance of a constructive, broad based, community attitude which encompasses the entire scope of good business climate."[23]

A study conducted by Dorf and Emerson isolated differences among nonmetropolitan communities with populations of over 2,500 and less than 50,000 and analyzed whether variations in manufacturing plant location or expansion were related to these differences. The study area included the West North Central region of the U.S. (Minnesota, Kansas, Iowa, Missouri, Nebraska, North Dakota, and South Dakota). Analysis was restricted to plants with over 100 employees located in communities selected by a 25 percent stratified random sampling of communities from the aforementioned population interval. Factor analysis was used to distinguish differences in characteristics among communities and regression analysis was employed to analyze variations in manufacturing activity among the various community types over the 1960 to 1970 study period.[24]

Of the sixteen variables being examined, the three main determinants of plant location, all beyond community control, were found to be community size, distance from urban areas, and stability of the labor force. A low property tax rate and a good housing supply were the only community modifiable variables which were of moderate significance.[25] Dorf and Emerson's analysis concerned only those firms with over 100 employees. Hence, applicability of their findings to the present study of manufacturing activity in South Dakota is of limited value, since the majority of firms in

nonmetropolitan South Dakota employ fewer than 100 persons.

Regression analysis was also used by Weaver and McMillan to examine the change in manufacturing employment in Wisconsin cities of between 2,500 and 10,000 persons for the period 1960 to 1970. The independent variables under consideration were designated as state variables (those variables beyond a community's control) and policy variables (those variables within a community's control). Several interaction variables were also entered into the equations to account for nonlinear relationships or interaction among the independent variables.[26]

The results of Weaver and McMillan's analysis indicated that the community modifiable variables are significant in explaining the percent change in manufacturing employment. Provision of building assistance to firms proved to be significant at the 1 percent level, while taxes and the fire insurance grade of the community showed significance at the 5 percent level. None of the state variables representing market, transportation, or labor force proved to be significant at the 5 percent level.[27]

The fire insurance grade was taken to be a proxy for the quality of public services in the Weaver-McMillan study. Thus, provision of adequate community services and building assistance is viewed as being instrumental in promoting manufacturing employment growth. The fire protection

rating and related site quality factors were also found to be significant plant location determinants in a study of 565 nonmetropolitan communities in Kentucky and Tennessee conducted by Smith, Deaton, and Kelch. Other factors within a community's control which were found in that study to be significant at the 5 percent level include site ownership by a public body, educational expenditures per pupil, and the availability of industrial revenue bond financing.[28]

The regression results of Smith, Deaton, and Kelch's model also indicated that interstate access within the county and the presence of a four year college or university, factors which are both largely beyond community control, were significant at the 5 percent level. Labor availability and community population did not have significant impacts on the location of plants in communities. The authors concluded that appropriate community action can greatly enhance a nonmetro community's potential for attracting new manufacturing firms.

In contrast to these findings, a study by Oehrtman, Doeksen, and Childs found that variables representing community characteristics, as well as industrial inducement options such as tax incentives and loans, were inconsequential in generating increased manufacturing employment in Oklahoma over the period 1963 to 1971. A linear multiple regression

equation was derived for each of the seven community size intervals studied as well as for each of the eight two-digit SIC codes under consideration.[29]

The type of industry proved to be the most prominent factor associated with manufacturing employment change by city size in the Oklahoma study. Employment change in those communities of under 15,000 population was found to be most heavily concentrated among the producers of textile mill products (SIC = 22), apparel and related products (SIC = 23), furniture and fixtures (SIC = 25), and primary metals (SIC = 33). Market, labor, and transportation variables were generally found to be insignificant in explaining manufacturing employment change by industry type or city size.

Several past studies dealing with fiscal incentives as locational inducements have been reviewed by Cornia, Testa, and Stocker in an attempt to determine the impact of these incentives. It was recognized that nonfiscal factors generally predominate in the location decision, especially for the selection of the region and the general areas within the region. Fiscal factors may become more influential when deciding on a final site within an area.[30]

Overall, Cornia, Testa, and Stocker conclude that "the overwhelming consensus is that tax and fiscal concessions rarely have much effect on interstate or interregional choices of industrial location." However, it was noted that

if marked variations exist between the tax burdens of adjacent states, differences may be apparent in the location of industrial activity.[31]

This thesis was further advanced by Dahl in a comparison of tax rates and business activity in Minnesota versus its neighboring states.[32] Dahl noted that state and local taxes paid per $1,000 of personal income received increased by only 3 percent between 1962 and 1969 in Minnesota, while in neighboring states the increase ranged from 13 to 30 percent. Over this same period of time, the growth in manufacturing employment was faster in those Minnesota counties adjacent to neighboring states than in the counties of neighboring states adjacent to Minnesota's borders.

In comparison, from 1969 to 1976, state and local taxes paid per $1,000 of personal income received increased by 18 percent in Minnesota while neighboring states' tax efforts all decreased; the decreases ranging from - 1 percent to -8 percent. Manufacturing employment growth over this period experienced a 32 percent increase in the counties bordering Minnesota, while Minnesota's border county manufacturing employment actually decreased by 3 percent.[33] Although this variation in the tax levels between Minnesota and its neighboring states is not the sole cause of the marked decline in manufacturing employment of Minnesota border counties, this evidence does lend support to the

contention that taxes are influential in a firm's location decision when choosing between adjacent states with differing tax rates.

The role of local development corporations (LDCs) in community development was explored in a study of North Dakota LDCs by Schaff. Interviews were conducted with officials of four effective LDCs from each community size interval of 1) less than 1,000, 2) between 1,000 and 2,500, and 3) more than 2,500 persons. It was found that the LDCs from the larger cities tended to attract more industry, and hence more jobs, than the LDCs of the smaller communities, which tended to concentrate more on general community development--with the retail and service sectors receiving more attention than manufacturing.[34]

A central concern noted by officials of the LDCs in all city sizes was in regard to the lack of capital to effectively carry out industrialization programs. This was especially prevalent among the LDCs of smaller cities, where funds were often lacking to develop industrial sites.[35]

This question of adequate financing to promote industrial development was addressed by Bornitz in a study of funds available for industrial development in South Dakota. Based upon past levels of capital investment in industrial development within the state and projections of future needs for such development, Bornitz concluded that "a sufficient

amount of investment capital is generated in South Dakota to finance a sustainable rate of industrial development."[36]

In a related study, Tauer noted that:

> Financial restrictions are not hindering industrial development efforts that are directed at attracting large, well established firms to locate a plant or expand in South Dakota. But, development efforts aimed at the smaller, younger firms are hindered since these firms are experiencing difficulties obtaining funds.[37]

Another portion of Tauer's study dealt with the factors affecting industrial location in South Dakota. Based upon the responses to a mail survey of all manufacturing and processing firms in the state, the home community of the owner was clearly the dominant location factor. Other important factors cited were the availability of abundant, cheap labor, closeness to markets, availability of raw materials, and good transportation.[38]

Many ideas and factors concerning the location of industrial activity and the resultant employment potential of these industries have been identified from the various theories and studies reviewed in this chapter. Selected studies which are particularly relevant for establishing the methods and variables to be utilized in the present study are further delineated in the following chapter.

Notes

[1] John R. Fernstrom, Bringing in the Sheaves (Corvallis, Oregon: Oregon State University Extension Service, 1974), p. 29.

[2] M. L. Greenhut, Plant Location in Theory and in Practice (Chapel Hill, North Carolina: The University of North Carolina Press, 1956), p. 9.

[3] David M. Smith, Industrial Location (New York: John Wiley & Sons, Inc., 1971), p. 114.

[4] Harry W. Richardson, Regional Economics (New York: Praeger Publishers, Inc., 1972), p. 56.

[5] Greenhut, p. 23.

[6] August Lösch, The Economics of Location (New Haven, Connecticut: Yale University Press, 1954), p. 28.

[7] Edgar M. Hoover, The Location of Economic Activity (New York: McGraw-Hill Book Company, Inc., 1948), p. 49.

[8] Smith, Industrial Location, p. 127.

[9] Hoover, p. 120.

[10] Hoover, pp. 47-48.

[11] Lösch, p. 4.

[12] Richardson, pp. 106-107

[13] Greenhut, p. 285.

[14] Luther Tweeten and George L. Brinkman, Micropolitan Development (Ames, Iowa: The Iowa State University Press, 1976), p. 63.

[15] Tweeten and Brinkman, p. 84.

[16] Tweeten and Brinkman, p. 85.

[17] Lösch, p. 29.

[18] Tweeten and Brinkman, pp. 246-247.

[19] Tweeten and Brinkman, p. 248.

[20] J. Karl Wise, Theodore E. Fuller, and Frank M. Goode, Spatial Dimensions in Plant Location Decisions, Bulletin 822, (University Park, Pennsylvania: The Pennsylvania State University, Agricultural Experiment Station, 1978), p. 1.

[21] Wise, Fuller, and Goode, p. 9.

[22] Dennis K. Smith, Industrial Plant Location Decisions: Implications for Community Action (Blacksburg, Virginia: Virginia Polytechnic Institute and State University Press, 1975), p. 3.

[23] T. E. McMillan, Jr., "Why Manufacturers Choose Plant Locations vs. Determinants of Plant Location," Land Economics, 41(1965), 246.

[24] Ronald J. Dorf and M. Jarvin Emerson, "Determinants of Manufacturing Plant Location for Nonmetropolitan Communities in the West North Central Region of the U.S.," Journal of Regional Science, 18 (1978), 110-112.

[25] Dorf and Emerson, p. 119.

[26] Robert Weaver and Melville McMillan, Factors Influencing Manufacturing Employment Change in Small Wisconsin Cities: 1960-1970, Research Bulletin R2776, (Madison, Wisconsin: University of Wisconsin, College of Agricultural and Life Sciences, 1975), p. 4.

[27] Weaver and McMillan, p. 9.

[28] Eldon D. Smith, Brady J. Deaton, and David R. Kelch, Location Determinants of Manufacturing Industry in Rural Areas, Staff Paper 67, (Lexington, Kentucky: University of Kentucky, Department of Agricultural Economics, 1978), p. 9.

[29] Robert L. Oehrtman, Gerald A. Doeksen, and Dan Childs, "Factors Affecting Plant Location by Type of Industry and Community Size in Oklahoma"(Stillwater, Oklahoma: Oklahoma State University, Department of Agricultural Economics , n.d.) p. 14.

[30] Gary C. Cornia, William A. Testa, and Frederick D. Stocker, State-Local Fiscal Incentives and Economic Development (Columbus, Ohio: The Academy for Contemporary Problems, 1978), p. 8.

[31] Cornia, Testa, and Stocker, p. 15.

[32] David S. Dahl, "A Cloudy Future for Minnesota Business," Federal Reserve Bank of Minneapolis Quarterly Review, Spring 1979, pp. 17-23.

[33] Dahl, pp. 19-21.

[34] Harold Francis Schaff, "An Evaluation of Selected Local Development Corporations in North Dakota," unpublished M.S. Thesis, North Dakota State University of Agriculture and Applied Science, 1978, p. 88.

[35] Schaff, p. 19.

[36] Timothy D. Bornitz, "Study of the Availability of Funds to Finance Industrial Development in South Dakota," unpublished M.S. Thesis, South Dakota State University, Department of Economics, 1975, p. 79.

[37] Loren W. Tauer, "The Role of Commercial Banks in Industrial Development in South Dakota," unpublished M.S. Thesis, South Dakota State University, Department of Economics, 1975, p. 107.

[38] Tauer, p. 32.

CHAPTER III

FRAMEWORK OF ANALYSIS

Use of Principal Studies

Hypothesized relationships examined in this study are presented in this chapter. Recognition is made of statistical techniques and variables found in works reviewed in the preceding chapter which were used to develop methods and variables utilized in this study.

The study conducted by Weaver and McMillan was quite similar to the present study in that regression analysis was used to identify factors associated with manufacturing employment change in small Wisconsin communities.[1] Several of the independent variables examined by Weaver and McMillan were also included in the present study. The concept of a location index, which measures a community's proximity to larger population centers, was adapted to reflect the smaller size population centers in South Dakota as well as the greater distance between these centers in South Dakota.[2]

Other variables in Weaver and McMillan's study which were adapted for inclusion in the present study include the percent of the civilian labor force employed in manufacturing in the base year, the tax level of each county, and the fire insurance rating of the largest city in each county. Weaver and McMillan believed the unemployment rate represents the

economic well-being of an area, whereas the total family income was hypothesized to represent the size of the local economy. The present study used the county unemployment rate and the county per capita income variables as measures of the general economic condition in each county. County size (in terms of labor availability) was represented by the absolute population of each county.[3]

Transportation factors were represented in the regression analysis of the present study by dummy variables denoting interstate access either within a county or within an adjacent county. This is an extension of the interstate access variable incorporated in the study performed by Smith, Deaton and Kelch, in which only interstate access within the county was considered.[4]

Smith, Deaton, and Kelch also recognized other variables in their regression analysis which are similar to those in the present study; these include the fire protection rating, base year population, and the presence of a four year college or university. Other variables dealing with site quality, site ownership, and the availability of bond financing were included in their regression analysis.[5] These latter three variables were analyzed in the present study by means of general descriptive analysis.

Regression analysis was also used to explore the

growth of manufacturing activity in a study by Oehrtman, Doekson, and Childs[6] and in another by Dorf and Emerson.[7]

Like the analysis of local development corporation (LDC) activities conducted by Schaff, the present study examines the various activities of LDCs according to the size of city in which they are located and according to their profit-nonprofit status. Site-related characteristics, financing activities, and LDCs' perceived roles in industrial development were explored in both Schaff's study and the present study.[8]

Hypothesized Relationships

The general hypothesis of this study is that the degree and type of industrialization in a community is directly attributable to community and labor shed characteristics. As mentioned in Chapter I, these community and labor shed characteristics can be thought of as falling within four categories of locational inducement factors. Specific hypotheses dealing with each variable within these categories are presented in the following chapter, where each variable is explained. Attention is given here to the four broad classifications of locational inducement factors, as well as community actions relating to site facilities and financing.

Labor Force

It is hypothesized that the existence of an ample supply of cheap labor will favorably affect manufacturing employment growth in the State. As manufacturing firms often must train their employees anyway, the low skill level of much of South Dakota's work force may not be a detriment--and may in fact be a boon--to expanding manufacturing activity, since low skills generally imply low wages, which in turn attract manufacturing. This relationship can be expected to exist primarily for labor intensive manufacturing firms with relatively low technology production processes.

Agglomeration

A sizeable population base and agglomeration factors are also expected to aid a community's industrialization potential. Agglomeration economies of scale can be realized in the provision of services to several manufacturing firms in the same locale. A large population base can be viewed as both a potential labor supply and a potential market for a firm's goods.

Transportation

Access to adequate transporatation, in order that raw materials can be received and output can be distributed relatively cheaply, is hypothesized to assist a community's industrialization efforts. The availability of alternative

forms of transportation--such as truck, rail, and air--and access to an interstate highway are expected to enhance manufacturing activity in a community.

Educational Facilities

The existence of post-secondary educational facilities in a county is also hypothesized to promote increased manufacturing employment growth. As graduates of these facilities are retained in the community, the work skills available in the labor pool of a community with a post-secondary facility will be of a more diverse, higher quality nature. This may in turn lead to the attraction of industries requiring a more skilled labor pool. Management personnel are also more easily drawn to these communities, since they will have post-secondary educational facilities at hand for their children and since cultural amenities are more readily available for their personal enjoyment.

Other Factors

There are also other factors not neatly included in these categories which will be examined in this study. These deal with actions which can be encouraged by individual communities or promotional organizations within communities, such as local development corporations, in attempts to enhance their industrialization potential. Local action such as making industrial sites available, providing

facilities at these sites, and providing financing assistance to firms are believed to be important attractions to industry.

Quantitative Methods

The hypothesized relationships mentioned above will be more fully developed in the following chapters. The remaining portion of this chapter identifies the statistical techniques used to test these hypotheses and the data utilized in these tests.

A forward stepwise regression procedure was utilized in examining the relationships between the change in manufacturing employment and variables representing labor, agglomeration, transportation, and educational factors. Secondary sources were used for data concerning these socioeconomic characteristics of South Dakota counties.

The existence of an adequate labor supply to support increased manufacturing employment growth was measured by several alternative variables. Unemployment, underemployment, labor force participation (both female and total), and age structure variables were used in assessing the labor force characteristics of counties.

A second group of variables entering the regression analysis concern the impact of agglomeration factors on manufacturing employment growth. Variables representing the agglomeration potential of a county include persons per

square mile, location index, prior industrialization, and population. Related to the agglomeration potential of a county is its general economic structure, which is represented in this study by the percent of persons below the poverty level and by the per capita income in counties.

Access to an interstate highway, either within the county or within an adjacent county, was used to represent one aspect of transportation availability. This was entered into the regression analysis in a dummy variable format. Analysis of variance and general descriptive analysis were utilized to examine differences among firms from communities of various sizes and among firms of selected Standard Industrial Classification (SIC) code categories as to their use of truck, rail, and air transportation facilities. Necessary data were gathered through the use of mail survey questionnaires sent to selected new manufacturing firms.

The educational variables included in the regression analysis concerned the availability of a four year college or university and of a post-secondary vocational education facility in the county. As in the case of the interstate access variable, the availability of post-secondary educational facilities was represented by dummy variables.

The other two variables included in the regression analysis were the fire insurance rating of the largest city

in the county and the tax level of the county. As with the other variables included in the regression analysis, these variables were also measured with secondary data.

Where sufficient numbers of observations allowed valid statistical tests, chi-square tests were used to discern differences among activities of LDCs according to the city size which the LDC was located in and the profit-nonprofit status of the LDC. Data for this analysis were obtained through mail survey questionnaires sent to all local development corporations in the State. Information was requested concerning site provision and ownership, site facilities, financial assistance to firms, and each LDC's perceived roles in industrial development. A general description of the findings from this survey is provided where insufficient observations precluded valid statistical tests.

The mail survey questionnaires sent to the manufacturing firms called for information concerning facilities available at the industrial site, the influence of an LDC on the firm's location decision, the type of building first used by the firm, and the type of financing used by the firm for this building and adjacent industrial land. This information was analyzed according to the size of city which the firm located in and the two-digit SIC code category of the firm. Insufficient observations existed to conduct

statistically valid tests; thus, a general descriptive approach was used.

The factors examined in this study can be thought of as being either beyond a community's control or within a community's control. The variables included in the regression analysis, with the exception of the fire insurance rating and the tax variables, are generally considered to be beyond a community's control. The factors concerning site related activities, financial assistance to firms, general LDC activities, and the aforementioned fire insurance rating and tax variables are considered to be within a community's control.

The regression models and all the variables analyzed in it are found in Chapter IV. Regression results concerning factors beyond a community's control are discussed in more detail in Chapter V. Analyses of community modifiable factors, including regression results concerning the fire insurance rating and tax variables, are reviewed in Chapter VI.

Notes

[1] Robert Weaver and Melville McMillan, p. 3.

[2] Weaver and McMillan, p. 5.

[3] Weaver and McMillan, pp. 5-6.

[4] Smith, Deaton, and Kelch, p. 7.

[5] Smith, Deaton, and Kelch, p. 7.

[6] Oehrtman, Doeksen, and Childs, p. 3.

[7] Dorf and Emerson, pp. 110-112.

[8] Schaff, pp. 88-90.

CHAPTER IV

INTRODUCTION TO REGRESSION MODEL AND VARIABLES

Introduction and Description of Past Location Trends for Manufacturing Activity

A general overview of the structure of manufacturing activity in South Dakota will be presented in this chapter to acquaint the reader with location factors which appear to have been influential in the recent past.

As mentioned in Chapter I, manufacturing employment provided 2,600 new jobs in South Dakota during the 1960's. This represents nearly a 20 percent increase over the decade, as compared with a national growth rate of 15 percent for the same period. Table IV-A illustrates that manufacturing employment in South Dakota tends to be concentrated in the larger cities of the state. In terms of the number of new firms which responded to the mail survey, the smaller towns have fared rather well. However, as the average monthly employment per firm figures indicate, the new firms locating in the smaller communities of less than 1,000 persons tend to have fewer employees per firm than firms from the larger city size intervals.

As shown in the table, 64 percent of the incorporated places in South Dakota have a population of less than 500, accounting for 13 percent of the population in incorporated places of less than 30,000 persons. However, only 6 percent

Table IV-A. Monthly Manufacturing Employment in 1978 and Other City Characteristics by City Size Intervals (exclusive of Sioux Falls and Rapid City).

City Size Intervals (population)	City Characteristics								
	Towns* (1970)		Population* (1970)		New Firms** (1970-77)		Total Monthly** Manufacturing Employment-1978[1]		Average Monthly** Manufacturing Employment Per Firm-1978[2]
	No.	%	No.	%	No.	%	No.	%	No.
1 = <499	195	64	37,785	13	21	17	290	6	14
2 = 500-999	56	18	41,139	14	17	13	431	9	25
3 = 1,000-2,499	33	11	50,374	17	25	20	1,263	25	51
4 = 2,500-4,999	11	4	41,256	14	10	8	367	7	37
5 = 5,000-9,999	4	1	30,562	10	8	6	294	6	37
6 = 10,000-30,000	6	2	93,224	32	46	36	2,371	47	52
Totals	305	100	294,340	100	127	100	5,016	100	40

Sources: *Riley, Marvin P. and Robert T. Wagner, Reference Tables: Population Change of Counties and Incorporated Places in South Dakota, 1950-1970, Bulletin 586, (Brookings, South Dakota: South Dakota State University, Rural Sociology Department, 1971), pp. 21-29.

**Manufacturing Firm Survey

1/ Seasonal variations in manufacturing employment occur among some manufacturing firms. This figure takes these seasonal fluctuations into account; thus, it is actually the average total monthly manufacturing employment in 1978 for each city size interval.

2/ This figure is the total monthly manufacturing employment in 1978 divided by the number of new firms in each respective city size interval.

of the average monthly manufacturing employment from those new firms surveyed took place in this size of community. At the other extreme, 47 percent of the average monthly manufacturing employment from the survey is found within communities in the 10,000-30,000 population interval, which comprises only 2 percent of the towns in South Dakota and accounts for 32 percent of the population in incorporated places of less than 30,000 persons.

In a study by Tauer, manufacturing firms were surveyed and asked why their particular locations were chosen. Of the firms which located in South Dakota between 1969 and 1974, the most important location factor was that the city was the home community of the owner. This was especially true for those firms employing fewer than 25 persons. Firms with larger employment rolls rated access to markets and labor as being most significant; they also indicated that nearness to raw materials and favorable tax policies were influential.[1]

In terms of city size, those firms studied by Tauer which located in the small cities cited low labor costs and access to raw materials as being important, whereas firms locating in larger cities rated abundant labor and market access as being influential.

As Table IV-B indicates, food and kindred product firms [Standard Industrial Classification (SIC=20)] ,

Table IV-B. Percentage of Totals, Selected Manufacturing Statistics for South Dakota: 1958, 1963, 1967, 1972.

	1958 %	1963 %	1967 %	1972 %
FOOD AND KINDRED PRODUCTS				
Number of Establishments	36	28	25	21
All Employees	64	60	50	42
Payroll	67	65	56	49
Value Added	71	68	55	45
PRINTING AND PUBLISHING				
Number of Establishments	29	29	29	28
All Employees	12	12	10	9
Payroll	11	10	9	8
Value Added	9	9	9	8
LUMBER AND WOOD				
Number of Establishments	10	9	9	9
All Employees	8	5	6	9
Payroll	6	4	5	8
Value Added	4	3	4	8
STONE, CLAY AND GLASS PRODUCTS				
Number of Establishments	8	12	11	11
All Employees	5	6	5	5
Payroll	4	5	5	5
Value Added	4	5	5	4
PERCENTAGE IN FOUR MAJOR CATEGORIES				
Number of Establishments	83	78	74	69
All Employees	89	83	71	65
Payroll	88	84	75	70
Value Added	88	85	73	65
PERCENTAGE IN ALL OTHER CATEGORIES				
Number of Establishments	17	22	26	31
All Employees	11	17	29	35
Payroll	12	16	25	30
Value Added	12	15	27	35

Source: Pat Bowar, Manufacturing in South Dakota: 1958-1972, Bulletin No. 115, (Vermillion, South Dakota: The University of South Dakota, Business Research Bureau, December 1975), p. 5. Calculations are based on data in the Census of Manufacturers for 1958, 1963, 1967, and 1972.

although declining in importance, have traditionally provided the most employment opportunities in manufacturing in South Dakota. As the overall State economy has diversified, agriculture has diminished in importance and the relative magnitude of employment in the related food and kindred product industries has also declined. Employment as a percentage of the total in the other three major categories listed in Table IV-B has remained relatively stable, while the employment percentage in the "All Others" category has more than tripled, indicating a diversification of the South Dakota manufacturing sector.

Overall, South Dakota has maintained a relatively stable position in terms of manufacturing activity as a percent of regional and national manufacturing activity (See Table IV-C). Although manufacturing activity in South Dakota has been increasing, it is still a rather insignificant portion of both midwestern and national manufacturing activity.

General Regression Format

This past level of manufacturing activity and associated locational trends, along with relevant economic theory, provided the basis for the selection of factors which are thought to have a bearing on the location decisions of firms. These variables were entered into

Table IV-C. Relative Position of South Dakota Manufacturing.

	South Dakota as Percent of Midwestern States Total*				South Dakota as Percent of U.S. Total			
	1963 (%)	1967 (%)	1972 (%)	1963-72 Change (Pct.Pts.)	1963 (%)	1967 (%)	1972 (%)	1963-72 Change (Pct.Pts.)
No. of Establishments	2.54	2.62	2.50	-.04	.19	.20	.19	0
No. of Production Workers	1.23	1.25	1.39	+.16	.06	.08	.10	.04
Payrolls	1.08	1.04	1.10	+.02	.08	.07	.08	0
Value Added	1.08	.94	1.10	+.02	.07	.07	.08	.01

Source: Pat Bowar, Manufacturing in South Dakota: 1958-1972, Bulletin No. 115, (Vermillion, South Dakota: The University of South Dakota, Business Research Bureau, December 1975), pp. 16, 28. Calculations are based on data in the Census of Manufacturers for 1958, 1963, 1967, and 1972.

* States considered as Midwestern include Colorado, Iowa, Minnesota, Missouri, Nebraska, North Dakota, Kansas, and South Dakota.

several alternative multiple regression models in order to identify the variables which appear best able to explain the growth of manufacturing activity in rural areas of South Dakota. Data limitations for the explanatory variables to be used in the regression equations precluded analysis of manufacturing employment change by individual towns in this portion of the study. Thus, the area used as the unit of analysis for the regression models is the county. Analysis results with data recorded at the county level can be expected to provide reasonably reliable estimates of relevant industrial location factors.

The generalized form of the regression model is as follows:

$$Y_i = \alpha_0 + \alpha_i D_i + \ldots + B_i X_i + \ldots + \mu_i$$

where

Y_i = dependent variable representing the change in county manufacturing employment

D_i = dummy explanatory variables representing county transportation and educational facilities

X_i = explanatory variables representing various other socioeconomic characteristics of South Dakota counties

μ_i = stochastic disturbance term

A complete list of these variables is presented in Table IV-D.

Table IV-D. Specification of Variables to be Used in Regression Analysis of Manufacturing Employment Change.*

DEPENDENT VARIABLES:

Y_1 = ABCHME = absolute change in manufacturing employment (1971-77)
Y_2 = CHMFEM% = percentage change in manufacturing employment (1971-77)

INDEPENDENT VARIABLES:

Transportation Access

D_1 = ROAD1 = interstate access within adjacent county, 1970
D_2 = ROAD2 = interstate access within county, 1970

Educational Facilities

D_3 = COLLEGE = four year college or university in county
D_4 = VOED = post-secondary vocational education facility in county

Labor Force Availability

X_1 = UNEMPLOY = county unemployment rate, 1970
X_2 = UNDEREMP = underemployment, 1970
X_3 = ECUTINDX = economic utilization index, 1970
X_4 = LFPR = total labor force participation rate, 1970
X_5 = FLFPR = female labor force participation rate, 1970
X_6 = AGE = age structure, 1970

Economic Structure and Agglomeration Factors

X_7 = POP70 = county population, 1970
X_8 = PRIORIND = prior degree of industrialization in county, 1970
X_9 = PPSQMILE = persons per square mile, 1970
X_{10} = LOCINDEX = location index
X_{11} = PERCAPIN = per capita income, 1969
X_{12} = POVERTY = percent of persons below poverty level, 1970
X_{13} = FIRE = fire protection rating, 1970
X_{14} = TAX = taxes, 1970

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* The acronym noted in each case is that used in the computer files.

Dependent Variables

Two measures representing the degree of manufacturing activity were specified as the dependent variables. These include both the absolute change in manufacturing employment (ABCHME) and the percent change in manufacturing employment (CHMFEM%). The change in manufacturing employment was thought to be a better indicator of manufacturing growth than the change in the number of manufacturing establishments, due to the variability in the number of employees per firm. One of the primary objectives in attracting manufacturing activity is to stimulate employment opportunities in order to reduce out-migration; thus, the change in manufacturing employment appears to be the appropriate measure of the dependent variable for this study.

Caution must be exercised in interpreting the results of models using CHMFEM% as the dependent variable, since an extreme score for CHMFEM% for a county is often due to a very low level of manufacturing employment for the county in the base year. Thus, any change in the manufacturing employment rolls represents a sizeable percentage change.

This is illustrated by the case of Marshall County, in which manufacturing employment rose from 11 to 178 over the study period, representing an increase of 1,518 percent. Another instance is Ziebach County, in which the 100 percent decline in CHMFEM% represented the loss of all 6 employees

engaged in manufacturing at the beginning of the study period. In contrast is a county such as Brown, in which a 7 percent increase represents an additional 124 manufacturing employees. Manufacturing employment data for South Dakota counties is presented in Table IV-E.

Independent Variables

County manufacturing employment growth is considered to be a function of many factors. Most factors are not within the county's control. However, action at the community level can be instrumental in attracting firms. Information based upon past studies of manufacturing firm locations and industrial location theory provided the basis for the selection of a set of independent variables hypothesized to bear upon a firm's location decision. As mentioned earlier, these explanatory variables can be thought of as representing four general categories of locational inducement and include labor, economic structure and agglomeration, transportation, and education factors. The following independent variables, which are hypothesized to be important determinants of industrial location, are analyzed in this study. These variables are measured by the use of secondary data sources identified in Appendix C.

Table IV-E. Population and Manufacturing Employment Data for South Dakota Counties.

County	Population 1970	Manufacturing Employment 1971	Manufacturing Employment 1977	Absolute Change 1971-77	Percent Change 1971-77
Aurora	4,183	17	13	- 4	- 24
Beadle	20,877	871	981	110	13
Bennett	3,088	18	21	3	17
Bon Homme	8,577	45	309	264	587
Brookings	22,158	277	903	626	226
Brown	36,920	1,741	1,865	124	7
Brule	5,870	43	52	9	21
Buffalo	1,739	7	L	*	*
Butte	7,825	D	82	*	*
Campbell	2,866	19	34	15	79
Charles Mix	9,994	8	23	15	188
Clark	5,515	136	126	-10	- 7
Clay	12,923	170	254	84	49
Codington	19,140	843	1,334	491	58
Corson	4,994	0	L	*	*
Custer	4,698	160	177	17	11
Davison	17,319	472	809	337	71
Day	8,713	119	108	-11	- 9
Deuel	5,686	12	30	18	150
Dewey	5,170	5	15	10	200
Douglas	4,569	15	56	41	273
Edmunds	5,548	25	23	- 2	- 8
Fall River	7,505	80	84	4	5
Faulk	3,893	3	L	*	*
Grant	9,005	368	447	79	22
Gregory	6,710	23	43	20	87
Haakon	2,802	39	D	*	*
Hamlin	5,520	7	56	49	700
Hand	5,883	39	59	20	51
Hanson	3,781	17	11	- 6	- 35
Harding	1,855	1	11	10	1,000
Hughes	11,632	100	125	25	25
Hutchinson	10,379	70	157	87	124
Hyde	2,515	0	L	*	*
Jackson	1,531	4	L	*	*
Jerauld	3,310	13	13	0	0
Jones	1,882	1	L	*	*
Kingsbury	7,657	45	125	*	*
Lake	11,456	277	572	295	107
Lawrence	17,453	185	522	337	182
Lincoln	11,761	420	406	- 14	- 3
Lyman	4,060	41	L	*	*
McCook	7,246	90	111	21	23
McPherson	5,022	20	23	3	15
Marshall	5,965	11	178	167	1,518
Meade	17,020	105	336	231	220
Mellette	2,420	0	D	*	*
Miner	4,454	14	85	71	507
Minnehaha	95,209	6,174	6,834	660	11
Moody	7,622	13	66	53	408
Pennington	59,349	2,033	2,602	569	28
Perkins	4,769	33	57	24	72
Potter	4,449	31	38	7	23
Roberts	11,678	25	139	114	456
Sanborn	3,697	54	118	64	119

Shannon	8,198	D	154	*	*
Spink	10,595	31	21	- 10	- 32
Stanley	2,457	5	L	*	*
Sully	2,362	0	L	*	*
Todd	6,606	120	18	-102	- 85
Tripp	8,171	48	43	- 5	- 10
Turner	9,872	22	97	75	341
Union	9,643	140	874	734	524
Walworth	7,842	78	24	- 54	- 69
Washabaugh	1,389	0	0	0	0
Yankton	19,039	1,021	1,381	360	35
Ziebach	2,221	6	0	- 6	-100
South Dakota	666,257	17,064	23,048	5,984	35
U.S.	204,878,000	18,623,000	19,682,000	1,059,000	6

Sources: a) Population data for South Dakota and the individual counties were obtained from William H. Bergman, Bulletin No. 108, Handbook of Manpower Statistics for South Dakota (Vermillion, South Dakota: University of South Dakota, Business Research Bureau, 1973) pp. 50-209.

b) Manufacturing employment data were obtained from annual computer printouts of employment and income data from the Bureau of Economic Analysis, U.S. Department of Commerce.

c) Data for the United States were obtained from the Council of Economic Advisors and the President, Economic Report of the President (Washington, D.C.: U.S. Government Printing Office, January, 1980) pp. 233, 242.

L = Less than 10 persons engaged in manufacturing employment.

D = Manufacturing employment data could not be published due to disclosure problems resulting from an insufficient number of firms engaged in manufacturing.

* = Statistic could not be calculated due to lack of data in one or both of the years of analysis. Thus, these counties are excluded from the regression analysis.

Labor Force Availability

X_1 = UNEMPLOY = county unemployment rate, 1970. It is hypothesized that industrial employment growth will have an inverse relationship to a county's unemployment rate in 1970, as measured in the 1970 census. This reflects the idea that a high unemployment rate serves as an indicator of depressed economic conditions in the area, rather than as an indicator of potential additional labor for a new firm.

X_2 = UNDEREMP = underemployment, 1970. Underemployment exists when persons are employed in positions which do not fully utilize their capabilities or are employed in part-time positions because they cannot find a full-time job. The measure used here to quantify underemployment is derived "by dividing the number who worked less than an arbitrarily selected 40 weeks in 1969 by the total of the labor force who worked any in 1969; the results being expressed as a percent."[2] Caution must be used in interpreting the underemployment measure for counties such as Brookings and Clay which have a high proportion of students who are employed part time and are not necessarily seeking full-time employment. A considerable degree of underemployment in a county is expected to favorably influence manufacturing employment growth in that county. This underemployment measure reflects a "hidden" labor supply which is not revealed by the unemployment statistics.

X_3 = ECUTINDX = economic utilization index, 1970.

An alternative measure of underemployment is provided by the economic utilization index. This index has been developed by the Economic Research Service of the United States Department of Agriculture. It is the ratio of a group's actual median income to its warranted earning capacity. The warranted earning capacity is an expected income measure for a population group in a county (given the characteristics of age, education, work experience, labor force participation, and occupational distribution of the workers) compared with a national level population group with the same characteristics. A low rating indicates that the population group in that particular area has not utilized its labor supply to full potential. Thus, an increased level of employment, including certain types of manufacturing employment, can theoretically be supported from the existing labor pool.

X_4 = LFPR = labor force participation rate, 1970.

The labor force participation rate is expected to exhibit an inverse relationship with industrial employment growth. A low labor force participation rate indicates a potential labor supply is available in the county. This is similar to the underemployment variable in that the potential labor supply is in a sense hidden, not being accounted for in the unemployment figures.

X_5 = FLFPR = female labor force participation rate, 1970. The same relationship is expected for the female labor force participation rate variable as for the total labor force participation rate. This variable is included because it is believed that the female labor force participation rate will increase as new jobs become available in an area. This is due to several factors, including a family's need for a second income to cope with inflationary pressures, an increased acceptance of women in the workplace, and changing family patterns which reveal families with few or no children--thus allowing both husband and wife an opportunity to find employment outside the home. Female labor has been especially attracted to industries which require good manual dexterity and offer light work, such as sewing operations or electronic assembly.

X_6 = AGE = age structure, 1970. The age structure variable is measured by the percent of the 1970 population in the 15-39 age group. It is hypothesized that, assuming this age group can be retained in the community, this is the approximate age interval where the majority of the increase in manufacturing employment will come from. This stems from the premise that this group can be expected to become the most skilled, productive workers due to their increased educational level. Thus, a high proportion of the population within this interval is expected to enhance

a county's potential for manufacturing employment growth.

Economic Structure and Agglomeration Factors

X_7 = POP70 = county population, 1970. The population of a county is hypothesized to be positively associated with growth potential. It is hypothesized that a large population base is associated with a large labor pool from which firms may draw workers, rather than as a potential market for the firms's products, since much of what is produced in South Dakota is goods for export or intermediate goods. Public and private services, which are generally conducive to industrial growth, are also more prevalent with a large population base.

X_8 = PRIORIND = prior degree of industrialization in county. The ratio of manufacturing employment to total employment (including both ag and non-ag employment) in the base year of 1970 serves as an indication of a county's comparative advantage for industry. It is expected that if a county already has a high degree of industrialization in the base year, there will probably be a greater likelihood of continued industrial expansion.

X_9 = PPSQMILE = persons per square mile, 1970. Due to the variability in population density and dispersion within counties of South Dakota, a persons-per-square-mile variable was included to measure the degree of concentration of a county's population. As concentration increases--i.e.,

the higher the number of persons per square mile--there is expected to be a greater chance of increased manufacturing employment, due to a greater potential labor supply within commuting distances of towns.

X_{10} = LOCINDEX = location index. The location index is the sum of the weighted populations (1970) of the three largest trade centers within 80 miles of the county's largest city, where the weights are the reciprocal of the distance to the trade centers. In equation form, this would be stated as $X = \sum_{i=1}^{3} \frac{C_i}{D_i}$, where X = the location factor for the largest city in the county, C = the population of the three largest cities within 80 miles of this city, and D = the distance in miles from this city to the three largest cities within 80 miles. This variable represents a measure of proximity to larger external markets, suppliers, service and shopping centers, and urban amenities which are hypothesized to be conducive to increased levels of manufacturing activity. Thus, a high location index rating--indicating proximity to these trade centers--is expected to favorably affect manufacturing employment growth. Trade centers are identified in this study as cities of over 5,000 population, including those in neighboring states.

X_{11} = PERCAPIN = per capita income, 1969. Manufacturing activity increases can be expected to be most

prevalent in those counties exhibiting the highest levels of per capita income. A higher level of per capita income is generally associated with an increased level of support for public services and a resultant increased quantity and quality of services. Greater per capita income may also suggest a higher proportion of skilled workers in the county. The market potential of an area is also enhanced by high levels of per capita income.

X_{12} = POVERTY = percent of persons below poverty level, 1970. A large portion of the population below the poverty level may indicate a low level of support for services and a relatively unskilled work force in the area. Poverty is thus expected to be inversely associated with growth in manufacturing employment.

X_{13} = FIRE = fire protection rating. The fire protection rating of the largest city in the county in the base year of 1970 will serve as a proxy for a county rating. The rating is based upon several factors, including: 1) access to water, 2) existence of a volunteer versus a full-time employed fire department, and 3) the number of trucks or size of the department. The rating is based on a 0-10 scale, with 0 indicating the best protection rating. A favorable fire protection rating will aid in lowering insurance costs to firms, thus creating lower operating costs and facilitating greater potential for increased

industrial expansion. It is also generally associated with an increased quantity and quality of municipal services.

X_{14} = TAX = A tax variable which accounts for taxes paid per thousand dollars of market value of real estate, centrally assessed, and telephone outside will be utilized in this study. The property valuations are for the year ending December 31, 1970. A close approximation to market value for real estate is obtained by dividing the given real estate full and true assessment[3] by the appropriate assessment-sales ratio[4] for each county. The centrally assessed and telephone outside[5] are brought up to market value by dividing each by the state determined figure of 60 percent.[6]

The tax variable is arrived at by dividing the taxes paid on land and lots,[7] both ag and non-ag, by the market value approximations of real estate, centrally assessed, and telephone outside. This could be represented in equation form by the following:

$$X_{14} = TAX = \frac{A}{\frac{B}{C} + \frac{D}{E}}$$

where

A = taxes on land and lots (both ag and non-ag)

B = full and true assessed value of real estate in the county

C = county assessment-sales ratio

D = centrally assessed and telephone outside

E = .6; this is the state determined figure to apply to full and true value in order to estimate market value

It is hypothesized that taxes are viewed as a cost to the firm, rather than as an indication of the service level of a community. Therefore, a high tax rate is expected to detract from a county's industrialization potential.

Transportation Access

D_1 = ROAD1 = interstate access within adjacent county, 1970.

= 1 if a county's closest access to an interstate highway is within an adjacent county

= 0 if otherwise (interstate access is within county or no access within county or adjacent county)

D_2 = ROAD2 = interstate access within county, 1970.

= 1 if direct access to interstate highway is within the county

= 0 if otherwise (interstate access is within adjacent county only or no access within county or adjacent county)

Following is an example of possible road access combinations.

D_1	D_2	County	Interstate Access
0	1	Brookings	Interstate in county
1	0	Lake	Interstate in adjacent county only
0	0	Beadle	No interstate in county or adjacent county

D_1 will equal zero and D_2 will equal one if an interstate is accessible within the county, as in Brookings County. The intercept is represented by the case of a county, such as Beadle, not being accessible to an interstate either within the county or within the adjacent county; i.e., D_1 and D_2 will both equal zero. Lake County exemplifies the third alternative, whereby D_1 equals one and D_2 equals zero, indicating access to an interstate highway only within an adjacent county.

Access to an interstate is hypothesized to be an asset in attracting manufacturing activity. This access allows firms within the county to import raw materials and distribute manufactured goods easily and at lower costs than would otherwise be possible. However, interstate access may not be as important today as it was at one time, due to a rather well developed system of paved secondary roads which currently provide extensive coverage of most areas of South Dakota.

Educational Facilities

D_3 = COLLEGE = presence of a four year college or

university, 1970.

= 1 if a college or university which offers four year programs is present within the county

= 0 if otherwise

The existence of a college or university within the county should aid a county's industrialization potential by providing a more technically trained and educated work force than is available in counties without such higher education facilities. Industries characterized by higher technology and wages would be most likely to locate near a college or university to draw on this higher skilled labor market. The cultural amenities generally found in a college environment and the availability of nearby higher education for their children are particularly conducive to attracting top management personnel.

D_4 = VOED = presence of a post-secondary vocational education facility, 1970.

= 1 if a post-secondary vocational education facility exists within the county

= 0 if otherwise

As in the case of the college variable, the existence of post-secondary vocational education facilities within a county is expected to favorably influence manufacturing employment growth. In particular, it is expected that certain industry types which draw heavily on particular

skills will locate near a vo-tech school which teaches those skills.

Caution is advised in interpreting the results concerning the VOED variable, as only three post-secondary vocational education facilities existed in the state during the 1970 base period. These facilities were located in Mitchell, Watertown, and Sioux Falls, towns which are also reasonably large population centers. Thus, the individual effect of post-secondary education facilities on manufacturing employment may be difficult to discern in this analysis.

Results

Analysis was initially done on all counties in South Dakota. Later regression runs excluded the two most populated counties of South Dakota--Minnehaha and Pennington. A comparison of the results from the two different sets of data is useful in discerning differences between manufacturing employment growth in rural areas and the state as a whole.

A forward stepwise inclusion procedure was utilized, whereby the order of inclusion of the dependent variables is determined by the respective contribution of each variable to the explained variance of the dependent variable. Thus, the variable which explains the greatest amount of variance unexplained by the variables already present in

the equation enters the equation at each successive step. Initially, all the explanatory variables were included in the model. Several different regression models were then tried with various combinations of independent variables allowed for inclusion.

Variables to be included in the final equations were selected on the basis of the significance of their beta coefficients, the magnitude of the overall coefficient of determination (R^2), and considerations of theoretical completeness. Results of the regression runs with all the variables included and with only those variables selected for the final equation are presented in Tables IV-F and IV-G.

Results with Absolute Change in Manufacturing Employment as the Dependent Variable

All Variables and All Counties. Model A of Table IV-F includes all the explanatory variables as well as all the counties in the data set.[8] With this model specification, nearly 77 percent of the variance in absolute change in manufacturing employment (ABCHME) is explained. However, adjusting for the number of variables entered into the equation, the explained variance is indicated by the adjusted R^2 in Table IV-F. The adjusted R^2 is presented for purposes of comparison of two or more R^2 values. Since R^2 is a nondecreasing function of the number of explanatory variables in the equation, as the number of explanatory variables

Table IV-F. Regression Results with Absolute Change in Manufacturing Employment as Dependent Variable.

Independent Variables	Expected Sign	Absolute Change in Manufacturing Employment (Y_1)							
		ALL COUNTIES				RURAL COUNTIES[1]			
		Model A		Model B		Model C		Model D	
		Beta	F Value	Beta	F Value	Beta	F Value	Beta	F Value
X_1 = UNEMPLOY	-	-.9422	.093			.0240	.016		
X_2^1 = UNDEREMP	+	.0481	.143	[2]	[2]	-.0259	.020	[2]	[2]
X_3 = ECUTINDX	-	.0362	.075			-.0167	.009		
X_4 = LFPR	-	.0310	.027			-.0282	.015		
X_5 = FLFPR	-	-.1176	.278	-.1258	1.711	-.2002	.501	-.1615	1.993
X_6 = AGE	+	.1182	.748	.1324	1.488	.1154	.413	.1468	1.237
X_7 = POP70	+	.5316	5.996**	.3100	7.562**	.1707	.461	.1908	1.650
X_8 = PRIORIND	+	-.9657	.215			-.0910	.304		
X_9 = PPSQMILE	+	-.2987	1.428			.1871	.258		
X_{10} = LOCINDEX	+	.476	.114			-.0566	.077		
X_{11} = PERCAPIN	+	[2]	[2]			[2]	[2]		
X_{12} = POVERTY	-	.0167	.015			-.1212	.279		
X_{13} = FIRE	-	[2]	[2]			-.0008	.000		
X_{14} = TAX	-	.1614	1.732	.1455	2.235	-.0313	.020	.1342	1.179
D_1 = ROAD1	+	.0459	.145	.0320	.126	.0292	.036	.0426	.146
D_2^1 = ROAD2	+	.0468	.187	.0682	.506	.0530	.165	.0580	.275
D_3 = COLLEGE	+	.3710	6.271**	.3314	6.819**	.3296	2.515	.3699	6.078**
D_4 = VOED	+	.3713	7.453**	.2610	7.859**	.2967	3.276*	.3384	10.856**
R^2		.7673		.7536		.6545		.6441	
Adjusted R^2		.6609		.7077		.4710		.5747	
Overall F		7.212		16.437		3.566		9.275	
Critical F @ 5% level		F_{35}^{16} = 1.94		F_{43}^{8} = 2.17		F_{32}^{17} = 1.95		F_{41}^{8} = 2.18	

1/ Minnehaha and Pennington County were excluded from the regressions concerning rural counties.

2/ Included in regression design, but additional contribution to explained variance did not meet the default F-value tolerance level of .01 of the stepwise regression program; therefore, this variable was not brought into the equation.

F values for individual Betas; critical F_{40}^{1} = .05 = 4.08 = ** = significant at 5% level.
= .10 = 2.84 = * = significant at 10% level.

increases, R^2 will also increase. To facilitate comparison of two or more R^2 values, the number of explanatory variables in each model must be accounted for. Thus, the adjusted R^2 is used to control for the number of explanatory variables present in a model and is herein utilized as a standard of comparison for different regression models.

Several signs of the individual beta coefficients proved to be contrary to what was expected. Most notable were persons per square mile (PPSQMILE) and taxes (TAX). The inverse relationship between PPSQMILE and the ABCHME may be the result of the correlation between PPSQMILE and the absolute population variable (POP70). Alternative runs which were made with PPSQMILE included and POP70 excluded resulted in PPSQMILE exhibiting a positive sign, thus indicating that when the confounding influence of the POP70 variable is removed, the hypothesized relationship exists. The positive association between TAX and ABCHME may indicate that firms do not view higher tax costs as a substantial determinant in their location decision or that higher taxes serve as an indication of a higher level of services in the county.

Only three variables proved to be significant at the 5 percent level: POP70, COLLEGE, and VOED. This tends to suggest that manufacturing employment growth is most prevalent in those areas with large population bases and,

hence, larger labor supplies and potential markets. The significance of the education variables may indicate that firms are attracted to areas in which there is expected to be a more skilled, educated work force. It must be remembered that those counties with college and voed facilities tend to also have the larger population bases; thus, there may be some confounding of the effects of the educational facilities and the inherent population base present in counties with such facilities.

Selected Variables and All Counties. Model B was then specified (with all the counties still in the data set) which attempted to include only the most relevant factors associated with the absolute change in manufacturing employment. The following final equation consisting of nine variables was specified, which contributed most significantly to the explanation of the variance in the dependent variable.

$$Y_i = \alpha_0 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + B_2 X_2 - B_5 X_5 + B_6 X_6 + B_7 X_7 + B_{14} X_{14} + \mu_i$$

Only eight variables actually entered the equation, as the underemployment variable (UNDEREMP) did not come in on the last step, due to an insignificant F value which precluded further computations.

These eight variables accounted for 75 percent of the variance in the dependent variable. Adjusting for the number of explanatory variables in the model lowers the

explanatory power of the model to approximately 71 percent, which is a slight improvement over the previous model which included all the variables.

Once again, POP70, COLLEGE, and VOED were the only variables proven to be significant at the 5 percent level. The importance of these three variables is evidenced by the fact that 70 percent of the variation in the dependent variable was explained by the introduction of these three factors alone, with 55 percent of the variation being accounted for by POP70 on the initial step. Thus, for the state as a whole, a large population base seems to best explain the absolute change in manufacturing employment.

The TAX variable was the only variable with a sign contrary to expectations in Model B. As in Model A, none of the variables representing labor force or transportation characteristics were of significance. Both equations, as evidenced by their respective overall F values, are significant at the 5 percent level at least.

Metro Counties Excluded. The absolute change in manufacturing employment was then considered as a function of the explanatory variables with data included for all South Dakota counties except Minnehaha and Pennington counties. The results as presented in Table IV-F indicate that both Model C, with all explanatory variables included, and Model D, with only the variables found to represent the "best fit"

equation, are statistically significant overall at the 5 percent level. However, their explanatory power, as indicated by the adjusted R^2, decreased considerably from the earlier models with all South Dakota counties included in the data set. Less than 50 percent of the variance in ABCHME was explained by Model C, while the eight variables included in Model D accounted for an "adjusted" 57 percent of the variation.

These eight variables which represent the "best fit" equation of Model D were chosen on the basis of the significance of their individual beta coefficients and the magnitude of the adjusted R^2. The same eight variables which were chosen for the "best fit" equation with all counties included were also found to be the most significant factors associated with the absolute change in manufacturing employment for the nonmetro counties.

Only the education facilities variables--COLLEGE and VOED-- proved significant at the 5 percent level in Model D. VOED was highly significant in Model D and was the only variable significant in Model C. POP70 was not significant in any of the models involving only rural counties, which might suggest that manufacturing activity which takes place outside the major population centers of Minnehaha and Pennington county does not rely as heavily on a large population base. The significance of the education variables

seems to imply that ABCHME is dependent on the skill level of the work force. The education variables may also serve as a proxy for an increased level of cultural amenities which enhance the quality of life in the county and increase the general willingness of people to live and work in such an environment. Most other variables were of such an insignificant nature that reliable conclusions cannot be drawn concerning their individual impact on ABCHME.

Results with Percentage Change in Manufacturing Employment as the Dependent Variable

Quite different results were observed when the percentage change in manufacturing employment (CHMFEM%) was specified as the dependent variable. None of the models, as indicated by the overall F statistics in Table IV-G, proved to be significant at the 5 percent level. However, several individual beta coefficients were significant in the various models.

All Variables and All Counties. The regression of the CHMFEM% on the set of all explanatory variables for all South Dakota counties, as shown in Model E of Table IV-G, yielded a rather low adjusted R^2 value of .10. The two variables PRIORIND and POVERTY were significant at the 5 percent level, while POP70 and UNDEREMP showed significance at the 10 percent level. Contrary to expectations, PRIORIND exhibited an inverse relationship with CHMFEM%. This

Table IV-G. Regression Results with Percent Change in Manufacturing Employment as Dependent Variable.

Independent Variables	Expected Sign	Percent Change in Manufacturing Employment (Y_2)							
		ALL COUNTIES				RURAL COUNTIES			
		Model E		Model F		Model G		Model H	
		Beta	F Value	Beta	F Value	Beta	F Value	Beta	F Value
X_1 = UNDEREMPLOY	-	2/	2/			.1237	.236		
X_2 = UNDEREMP	+	.3525	2.930*	.3013	3.018*	.2858	1.335	.3107	3.034*
X_3 = ECUTINDX	-	2/	2/			-.0841	.125		
X_4 = LFPR	-	.4006	1.964			.3943	1.482		
X_5 = FLFPR	-	-.4881	2.587	-.3658	4.749**	-.5567	2.175	-.3663	4.782*
X_6 = AGE	+	-.1638	.510	-.1293	.503	-.1601	.392	-.1474	.553
X_7 = POP70	+	.9714	3.751*	.2870	2.252	.2048	.373	.1464	.458
X_8 = PRIORIND	+	-.6402	8.459**	-.4475	5.732**	-.5807	6.951**	-.3966	5.022**
X_9 = PPSQMILE	+	-.5387	1.407			.1459	.084		
X_{10} = LOCINDEX	+	.2670	1.403			.1400	.262		
X_{11} = PERCAPIN	+	-.3208	1.854			-.3421	1.843		
X_{12} = POVERTY	-	-.5940	5.183**	-.3059	4.597**	-.7984	5.117**	-.3101	3.708*
X_{13} = FIRE	-	.4952	1.692			.4050	1.4444		
X_{14} = TAX	-	.0692	.092			-.1220	.169		
D_1 = ROAD1	+	-.2338	1.613	-.1052	.449	-.2789	1.776	-.0960	.360
D_2 = ROAD2	+	-.9038	.265	-.0433	.068	-.0946	.282	-.0503	.099
D_3 = COLLEGE	+	.2126	.795			.1146	.171		
D_4 = VOED	+	.2306	1.032			.1016	.209		
R^2		.3836		.2808		.4046		.2799	
Adjusted R^2		.1018		.1470		.0589		.1394	
Overall F		1.361		2.099		1.170		1.992	
Critical F @ 5% level		$F_{35}^{16} = 1.94$		$F_{43}^{8} = 2.17$		$F_{32}^{17} = 1.95$		$F_{41}^{8} = 2.18$	

1/ Minnehaha and Pennington County were excluded from the regressions concerning rural counties.

2/ Included in regression design, but additional contribution to explained variance did not meet the default F-value tolerance level of .01 of the stepwise regression program; therefore, this variable was not brought into the equation.

F values for individual Betas; critical F_{40}^{1} = .05 = 4.08 = ** = significant at 5% level.
= .10 = 2.84 = * = significant at 10% level.

$$Y_i = \alpha_1 - \alpha_1 D_1 - \alpha_2 D_2 + B_2 X_2 - B_5 X_5 - B_6 X_6 + B_7 X_7 - B_8 X_8 - B_{12} X_{12} + \mu_i$$

The adjusted R^2, although still low, improved to nearly .15. As in the previous model, PRIORIND and POVERTY are significant at the 5 percent level. Also significant at the 5 percent level is the female labor force participation rate (FLFPR) variable. Underemployment was once again significant at the 10 percent level.

This combination of variables indicates that the percent change in manufacturing employment will be most rapid in those counties which have had little prior industrialization, a low level of poverty, and an available labor force (as evidenced by high underemployment and low female labor force participation). Total labor force participation rate (LFPR) was entered in several equations but it did not prove significant; thus, it seems that manufacturing firms are attracted to areas where there is a potential supply of female workers. This is consistent with the significance of UNDEREMP, since underemployment is generally high among females, due to their limited role in rural area work forces until recently.

Metro Counties Excluded. When analysis was restricted to only rural counties, the model with all variables included had a very low adjusted R^2 of

approximately .06. Thus, very little of the percent change in manufacturing employment is explained by this combination of variables. Of the individual variables, PRIORIND and POVERTY once again proved significant at the 5 percent level.

The adjusted R^2 improved to nearly 14 percent when the number of variables was reduced to those which contributed most significantly to the explanation of the explained variance of the dependent variable. These turned out to be the same variables as specified in the final equation for all counties. FLFPR and PRIORIND once again were significant at the 5 percent level and inversely related to CHMFEM%. UNDEREMP and POVERTY showed significance at the 10 percent level. The transportation and education variables did not prove significant in the models involving CHMFEM% as the dependent variable.

In general, the results from the regression runs involving all counties and those runs with Minnehaha and Pennington county excluded were quite similar. Thus, in terms of explaining CHMFEM% statewide, basically the same variables proved significant, whether or not the metro counties were included in the analysis.

Summary

The specification of absolute change and percentage change in manufacturing employment as alternative dependent variables produced quite divergent results. However,

essentially the same factors proved significant in explaining manufacturing employment growth for rural counties as for the entire state.

Overall, the absolute change in manufacturing employment throughout the state appears to be a function of the educational variables. With Pennington and Minnehaha counties included in the analysis, the influence of a large population base also takes on significance as an attraction to manufacturing activity. Access to the interstate highway system, either directly or indirectly, did not have a significant impact on absolute increases in manufacturing activity. Those variables representing labor force availability also proved inconsequential in the regression runs made on absolute employment changes.

The percent change in manufacturing employment appears to be an inverse function of a county's female labor force participation rate, prior industrialization, and level of poverty. A positive association was noted with the degree of underemployment in a county. Accordingly, the greatest percentage increases in manufacturing employment can be expected in those counties which have not attracted much industry in the past and which have an abundant female labor force from which to draw on.

Although these results indicate that there is no readily identifiable set of variables which can completely

explain manufacturing activity in the state, certain general conclusions can be drawn. As more emphasis is placed on the absolute change in manufacturing employment as a means of stimulating a local economy and reducing out-migration, there will be more consideration given to factors affecting this variable.

The existence of an ample population base has proven to be a major determinant of manufacturing activity changes in the past. To a certain extent, as industry moves more to rural areas, this factor can be expected to diminish in importance. However, certain areas of South Dakota are so sparsely populated that consideration must be given as to whether an adequate population base exists to support increased manufacturing employment.

The existence of post-secondary educational facilities in a county is also viewed as a strong attraction to industry. This is consistent with the finding that low levels of poverty are conducive to manufacturing employment growth, since communities with such educational facilities can be expected to have a more skilled work force, which will attract higher paying jobs and thus raise the income level of the community. Manufacturing employment is expected to grow most in percentage terms in those areas where it has not already been present; this is due to the expected availability of an untapped labor supply, especially among the female

population.

Access to an interstate system did not significantly affect manufacturing growth in any of the models tried. This was contrary to prior expectations. Thus, manufacturing activity which has taken place thus far seems to be adequately served by the extensive series of paved secondary roads in the state. The tax variable also proved insignificant in all the models in which it was entered; thus, indicating that tax rate differentials among counties are not an overriding concern in a manufacturing firm's location decision. These findings may not be applicable to manufacturing growth in every instance, but they do provide a general basis for prediction of future rural industrial expansion in the state.

Notes

[1] Tauer, p. 34.

[2] William H. Bergman, Handbook of Manpower Statistics for South Dakota, Bulletin No. 108, (Vermillion, South Dakota: The University of South Dakota, Business Research Bureau, July 1973), p. 224.

[3] Full and true assessment is derived by dividing the taxable value by .6. Full and true assessment was obtained from the Annual Statistical Report of the Department of Revenue (Pierre, South Dakota: Department of Revenue, 1971), pp. 44-45.

[4] The assessment-sales for each county is the ratio of assessed value of property to the actual sale price of property in the county. The ratio is weighted according to the percent of the land classified as urban or rural. This ratio was obtained from the South Dakota Thirteenth Annual Report Sales Ratio (Pierre, South Dakota: Department of Revenue, 1970), p. 6.

[5] Centrally assessed includes property valuations for railroads, telegraph, electric light, power, gas, water, and telephone inside corporate city limits. Telephone outside is the property valuation for telephone outside the corporate city limits. These property valuations were obtained from the Annual Statistical Report of the Department of Revenue (Pierre, South Dakota: Department of Revenue, 1971), pp. 44-45.

[6] Sixty percent is the state determined figure which is applied to the full and true property value in order to derive the taxable value. For centrally assessed property and telephone outside property, it can be assumed that full and true assessments accurately reflect market values.

[7] Taxes paid on land and lots, both ag and non-ag, is obtainable from the Annual Statistical Report of the Department of Revenue (Pierre, South Dakota: Department of Revenue, 1971), pp. 34-35.

[8] As noted in Table IV-E, data limitations precluded calculation of manufacturing employment change for several counties. Thus, it must be remembered that the regression results are not based on all South Dakota counties, but rather only on those counties from which manufacturing employment change could be computed.

CHAPTER V

FACTORS BEYOND COMMUNITY CONTROL

Most industrial location studies have concluded that the variables most influential in attracting manufacturing firms tend to be beyond the realm of community control. With the exception of the tax variable and the fire protection rating, the variables introduced in the regression equations of the preceeding chapter are considered to be largely beyond a community's control. This chapter will contain a more detailed explanation of the role which each of these variables which are beyond community control is expected to play in rural industrialization and the influence they have exerted in South Dakota.

Exposition of these variables will be presented within the framework of the four broad locational inducement categories defined in Chapter I.

Labor Force Availability

One of the central concerns in choosing a profitable location for a manufacturing firm is the availability of an adequate labor force. Most firms will tend to locate where their labor requirements, in terms of both quantity and quality, can be sufficiently met from the existing labor pool in the area. This is especially true of labor intensive industries--such as food processing and apparel

fabrication--which draw largely from unskilled labor supplies.

For purposes of this study, the availability of an adequate labor supply to support increased manufacturing employment in a community is assessed by several alternative variables. One such variable is the unemployment rate in the base period, 1970 (UNEMPLOY), which is hypothesized to be an indicator of the general economic condition of an area. This is an especially strong indicator among those counties which are a part of an Indian reservation, where unemployment is generally high and manufacturing activity is traditionally low. Not taking these reservation counties into account, the unemployment rate would probably be more accurately viewed as a measure of potential additional labor than as an indicator of economic strength or weakness of an area.

The unemployment rate in South Dakota averaged 3.7 percent in 1970 and 3.2 percent in 1977, at the end of the study period. This compares to a 4.9 percent U.S. unemployment average in 1970 and 7.0 percent in 1977. A considerable degree of variability exists among the unemployment rates of various segments of the South Dakota population. Most notable is the difference between the 3.2 percent unemployment rate for the white labor force aged 16 and over and the 18.5 percent unemployment rate exhibited

by the non-white labor force aged 16 and over in 1970.

Discounting the fact that pockets of high unemployment do exist within the state, the percent unemployed in South Dakota is traditionally well below the national average. Thus, "unemployed" persons (as traditionally defined) may be viewed as a somewhat limited source of potential additional labor. As indicated in the regression results in Tables IV-E and IV-F, the unemployment variable did not prove to be significant as an explainer of manufacturing employment growth in any of the models in which it was entered.

Another measure which is used as an indicator of labor potentially available in an area is the labor force participation rate. This variable measures the percent of the civilian population aged 16 years and over who are included in the civilian labor force. A comparison of an area's labor force participation rate with the rate of a neighboring area, or the state, or the nation will yield an approximation of potential additional labor which may be available if further employment opportunities existed.[1]

Both total and female labor force participation rates were analyzed in the regression equations. The total labor force participation rate (LFPR) proved to be insignificant in explaining manufacturing employment growth in all models in which it was entered. The female labor force

participation rate (FLFPR) was also insignificant in the regression models in which the absolute change in manufacturing employment was specified as the dependent variable. However, with the percent change in manufacturing employment as the dependent variable, the FLFPR did assume statistical significance at the 5 percent level in models F and H. As expected, an inverse relationship was exhibited between FLFPR and the dependent variable.

These results would seem to suggest that the existence of a relatively untapped female labor supply, as indicated by a low FLFPR, is influential in attracting manufacturing employment growth. This is especially true among more rural areas with little prior industrialization. Housewives are rapidly becoming incorporated into the work force of these rural areas to fill the labor needs of light industries such as apparel fabrication and electronic assembly--where their manual dexterity can be utilized.

A very important source of potential additional labor in South Dakota, and one which is difficult to empirically quantify, is the underemployed worker. Underemployment exists when workers are not used to their full potential. This may result from laborers working less hours than they would desire or by working in tasks which do not fully utilize their skills and abilities.

This underutilization of manpower is quite

pronounced in South Dakota. This is the plight of many small-scale farmers who cannot efficiently utilize their labor in the limited production operations which their farms entail. Off-farm employment opportunities are needed to absorb this surplus labor. Another cause of underemployment among farm laborers stems from the seasonality of agricultural employment, which creates a need for alternative employment in the off-season. This seasonality of employment is also evident in the tourism industry.

Two measures of underemployment have been utilized in this study. One measure is the economic utilization index (ECUTINDX), explained in Chapter IV. According to this index, South Dakota's labor force was earning 93.7 percent of its expected potential income in 1969. When entered into the regression equations, this variable did not prove to be significant in explaining manufacturing employment growth.

An alternative indicator of underemployment measures the number of people who worked less than 40 hours per week in 1969 as a percent of those who worked any in 1969 (UNDEREMP). This is an indication of the number of laborers who are employed part-time and may be available for full-time employment. Of course, it must be recognized that a portion of those working part-time--such as college

students--may not be seeking full-time employment.

The percent of persons in the civilian labor force who worked part-time in 1969, as indicated by this measure, stood at 32 percent for the state, versus a 28 percent national rate. This would seem to indicate that a sizable labor supply is at hand to support increased employment opportunities. The UNDEREMP variable did prove significant at the 10 percent level in several of the models with percent change in manufacturing employment as the dependent variable. Thus, a large number of presently part-time workers in a county may provide the labor needed for increased manufacturing activity.

Another characteristic of the labor force that is hypothesized to be influential in attracting manufacturing employment growth is related to the age structure of an area. A young labor force is expected to act as a stimulus in drawing employment opportunities due to a general higher education level among the younger members of the population as compared to older members. Also, younger workers have more working years ahead of them. If this younger-aged segment can be retained in South Dakota, the workers in it should be able to learn needed skills quickly and thus provide a quality labor pool from which manufacturing employment needs can be met in the future.

The percent of the 1970 population included in the

15-39 age interval was used as the age structure variable (AGE). This was the age group which was thought to hold the greatest potential for attracting manufacturing employment growth. However, the regression results did not show this variable to be significant. As expected, a high degree of correlation was noted between the age variable and the existence of a college in a county. The underemployment indexes also showed considerable correlation with the college and age variables. Thus, the employment opportunities available in the early 1970s in South Dakota counties with a high proportion of young people did not appear to offer enough higher skilled jobs to efficiently utilize these counties' labor pools.

As evidenced by the regression results concerning the variables taken to represent labor force availability, this group of factors did not prove to be of major consequence in attracting manufacturing employment growth. Only a low level of prior female participation in the labor force appeared to significantly enhance a county's industrialization potential.

Labor force considerations which were not explicitly brought into the regression equations also need to be recognized as exerting a possible influence on the employment decisions of manufacturing firms. One such consideration is that the general pay scale is quite low in South Dakota,

thus allowing firms to offset increased costs in other areas--such as job training. South Dakota's labor force is also considered to be quite innovative and willing to provide a day's work for a day's pay. This positive work attitude is exemplified by the state's right-to-work laws and relative lack of employee strikes in South Dakota.

Economic Structure and Agglomeration Factors

As an industrial firm contemplates its location decision, consideration is given to what services are available in a prospective community. Oftentimes, the presence of other firms already located in an area will have caused a host of specialized services--such as engineering, legal, financing, and transportation services--to locate in the area and to be available at low per unit costs. These agglomeration economies are generally associated with larger communities, where the population base can provide both labor inputs and a potential market for a firm's products.

Several variables dealing with population, prior industrialization, and market accessibility are used in attempting to measure an area's agglomeration effects on manufacturing growth. The agglomeration potential of an area is also influenced by the general economic structure of the area. As the economic well-being of a county increases, a greater level of services can be supported,

which can be expected to aid a county's industrialization potential. The economic structure of a county is represented, in part, by variables which measure the income and poverty level of the county. The fire protection rating and the tax level of the county are also used as proxies for the service level and economic well-being of a county.

Agglomeration Factors. Of those variables representing agglomeration factors, the population of a county in the base year of 1970 (POP70) appears to be of greatest importance. In the regression models with the absolute change in manufacturing employment as the dependent variable, POP70 was significant at the 5 percent level in models A and B, which deal with all counties in the state. The insignificance of POP70 in models C and D, dealing only with rural counties, suggests that the effect of excluding the two most populated counties of the state, Minnehaha and Pennington, markedly reduces the impact which POP70 has on manufacturing employment growth.

Notwithstanding this observation, a sizable population base does appear to enhance a county's industrialization potential. As hypothesized, this is due in large part to the existence of an extensive labor supply from which increased manufacturing employment can be supported. The diversity of skills which can be found in the labor pool of a more populated area may be of equal

or greater importance.

A progressive, reinforcing pattern often occurs as industry which requires skilled workers enters an area. Oftentimes, demand for skilled laborers which can not be met from the existing labor pool is filled by skilled workers who move into the area. Another source of skilled labor are the workers who had earlier left their home area because of lack of employment opportunities relating to their particular skill but return as their skills can be utilized.

Thus, skilled labor responds to employment opportunities by moving to places where their skills can be utilized; in so doing, this increases the population of the affected community. This influx of skilled laborers may provide the impetus for attracting more industry which draws on these and other skills. In this fashion, the employment needs of manufacturing firms and the quality and quantity of the labor force in an area progress concurrently.

When several firms locate in close proximity to one another, certain economies of scale in the provision of services can be realized. The existence of service industries in the area can thus aid in attracting manufacturing firms.

As a community grows, there is generally a need for a greater variety of services which are desired and can be

supported by the increased population base. These services are generally of a personal nature, including repair shops, expanded shopping opportunities, dining, and entertainment. The increased cultural amenities can be especially influential in attracting more management and professional personnel.

Another indicator of the agglomeration potential of an area is the persons per square mile (PPSQMILE) variable. A high degree of correlation can be expected between PPSQMILE and POP70. Thus, when these two variables are both included in a regression model, it is difficult to separate their individual effects. However, when PPSQMILE was included in some models (which are not reported in Tables IV-F and IV-G) in which POP70 was excluded, the results were not significantly different from the results of models with both variables included.

The significance of the PPSQMILE variable seems to indicate that a concentrated population base is not of great importance to manufacturing employment growth in South Dakota. This may be due in part to the existence of an adequate system of paved secondary roads in the state which allows extensive commuting. Thus, the absolute population of a county or labor shed is believed to be more influential than the number of persons per square mile.

The location index (LOCINDEX) of a county is used as

another indicator of agglomeration economies. This variable is intended to measure the effect of proximity to major trade centers on manufacturing employment growth in a county. Nearness to major trade centers is expected to enhance shopping facilities as well as bring the manufacturer nearer to potential markets and suppliers. However, as evidenced by the insignificance of the LOCINDEX variable in all models tried, proximity to trade centers appears to be of limited value in influencing a manufacturing firm's location decision within South Dakota.

One further variable used to measure possible agglomeration economies is the degree of prior industrialization (PRIORIND) that existed in the county in the base year, 1970. It is hypothesized that a high level of industrialization in a community will aid in promoting further industrial growth. This is largely due to the belief that incoming firms can limit their operating costs by utilizing facilities and services which are already present, rather than incurring the added costs associated with the initial provision of these facilities and services.

PRIORIND proved to be too insignificant to draw any meaningful conclusions concerning its effect on the absolute change in manufacturing employment. However, PRIORIND exhibited significance at the 5 percent level in all of the models involving the percent change in manufacturing

employment as the dependent variable. However, the directional relationship was opposite of what was hypothesized, indicating the greatest percent change in manufacturing employment occurred in those counties with the least amount of prior industrialization.

This significant inverse relationship between PRIORIND and the percent change in manufacturing employment may be attributed to the fact that many of the counties which enjoyed a substantial percentage increase in manufacturing employment did so due to a very low level of manufacturing employment in the county during the base year. Hence, any absolute change in the manufacturing employment rolls represented a sizable percentage change.

Overlooking this observation for the moment, the inverse relationship would seem to support the national trend of manufacturing firms moving more to rural areas. This may be so in South Dakota, as manufacturing firms seek out rural labor markets which have generally been untapped by previous manufacturing concerns.

Economic Structure. As mentioned earlier, the agglomeration potential of an area is influenced somewhat by the economic structure and well-being of the area. The variables taken herein to represent the economic well-being of an area proved to be for the most part insignificant in explaining manufacturing employment growth. The lone

exception is the poverty measure (POVERTY), which exhibited significance at the 5 percent level in Models E, F, and G, in which the percent change in manufacturing employment was the dependent variable.

The inverse relationship exhibited by the POVERTY variable implies that those counties with the lowest levels of poverty were the most successful in increasing manufacturing employment growth during the study period. This may indicate that as less of the populace is poverty-stricken, there can be expected to be broader support for public services (such as streets, sewers, police protection, and education) which aid in attracting industry. Conversely, a high degree of poverty may indicate a generally depressed economic structure which would not be conducive to manufacturing employment growth.

The other variable beyond community control which represents the economic structure of the area, per capita income (PERCAPIN), did not appear to be a significant causal variable in the models tried. The individual influences of the PERCAPIN variable on manufacturing employment growth may not be accurately measured in the present regression models, due to its high simple correlation (-.63) with the poverty measure.

Although insignificant, this variable can be thought of as measuring the service level of the county.

As PERCAPIN rises, a greater level of support for public services can be expected. In addition to this expected increased support for public services, the market potential of an area may also be enhanced with a higher level of PERCAPIN.

Judging from the results of the regression analysis, the absolute population of an area appears to be the overriding agglomeration-economic structure variable in explaining the absolute change in manufacturing employment. However, the percentage change in manufacturing employment is greatest in those counties exhibiting a low poverty level and a low level of prior industrialization.

Transportation Access

In considering where to locate a manufacturing firm, entrepreneurs must give careful consideration to their transportation needs. Adequate facilities must exist to handle any special needs of a firm. Thus, a firm which processes bulky or heavy materials may be able to save on transport costs by locating in an area served by a railroad. On the other hand, if emphasis is placed on fast, regular delivery service, an entrepreneur may desire to locate near an interstate where there may be easier access to customers.

The influence of access to an interstate highway on manufacturing employment growth is assessed in this study by the use of dummy variables denoting access to an interstate

either within a county (ROAD 2) or within an adjacent county (ROAD 1). Contrary to expectations, neither interstate access variable proved significant in explaining manufacturing employment growth. Furthermore, in the regression models with the percent change in manufacturing employment as the dependent variable, interstate access actually had a negative influence.

As previously noted, this may be due to the existence of a system of paved secondary roads within the state which have adequately served the transportation needs of South Dakota manufacturers. Thus, other factors are considered to be of more importance than transportation, at least as measured by these interstate access variables.

Other aspects of transportation relating to the mode of transportation used by manufacturers in the state is analyzed in this study by the use of data collected from the mail survey of manufacturing firms. The responding firms noted the percent of their goods and materials shipped by the following transportation modes: 1) truck owned, 2) truck not owned, 3) rail, 4) air, and 5) other.

The mean percent of goods shipped and materials received by each of these methods of transportation is presented in Table V-A for each SIC category considered in this study. An analysis of variance procedure is utilized in determining whether there exists a significant difference

Table V-A. Transportation Mode for Shipping Goods and Receiving Materials: Mean Percent of Volume by Each Mode for Selected SIC Categories.[1/]

SIC Categories	Transportation Mode: Shipping Goods (%) Truck Owned	Truck not Owned	Rail	Air	Other	Total	Receiving Materials (%) Truck Owned	Truck not Owned	Rail	Air	Other	Total	Number of Firms
20	43	43	11	2	1	100	34	58	6	2	0	100	25
23	73	26	0	1	0	100	61	34	2	2	1	100	11
24	57	39	4	0	0	100	18	65	13	1	3	100	12
26	0	0	100	0	0	100	0	0	0	0	0	100	1
28	51	45	0	0	4	100	28	33	24	0	15	100	7
30	37	63	0	0	0	100	17	81	2	0	0	100	7
32	80	18	0	1	1	100	48	52	0	0	0	100	9
34	31	69	0	0	0	100	25	75	0	0	0	100	4
35	48	48	0	0	4	100	25	70	4	0	1	100	22
36	24	59	0	2	15	100	6	93	0	1	0	100	7
37	42	36	0	3	19	100	30	55	0	1	14	100	12
38	0	98	1	1	0	100	0	92	8	0	0	100	2
All Categories	48	43	4	1	4	100	30	61	5	*	4	100	119
ANOVA[2/]	.13	.19	.00	.99	.06		.10	.02	.07	.99	.00		

Source: Manufacturing Firm Survey

1/ The mean percentages have not been weighted by the tonnage shipped by individual firms within the SIC categories. The mean percentages for "All Categories" is weighted by the number of observations from each SIC category.

2/ A low value for the ANOVA statistic, generally from .00 to .10, denotes a significant variation among the mean percent of goods or materials transported by the various SIC categories for particular transportation mode.

* Less than 1%.

in the extent which firms in the various SIC categories utilize each transport method.

In terms of shipping goods, the difference among SIC categories is most pronounced in the frequency of use of railroads. The producer of paper and allied products (SIC=26) relied entirely on the railroad for shipping its products. As only one firm existed in this SIC category, it is difficult to draw conclusions concerning the influence of rail transport on this category as a whole. At the other extreme, eight of the twelve SIC categories did not utilize railroads at all for shipping their goods. Thus, the presence of a railroad for shipping a firm's goods appears to be of little importance for the great majority of manufacturing firms in the survey.

The only other transportation method to have any significant (at the 10 percent significance level or greater) difference among its use by the various SIC categories is denoted by "Other" in Table V-A. Producers of electrical machinery (SIC=36) and transportation equipment (SIC=37) used transportation methods other than truck, rail, or air to ship 15 and 19 percent of their goods, respectively. Based on questionnaire responses from firms which used alternative forms of transportation, the primary other forms of transportation consisted of Parcel Post and United Parcel Service (UPS).

The overall importance of trucking--as evidenced by its carrying of 91 percent (48 by truck owned and 43 by truck not owned) of the manufacturer's goods--should be noted. Other than the single reporting firm which produces paper (which, as noted, relies entirely on rail transport), only the transportation equipment category (SIC=37) carries less than 80 percent of its goods by truck.

This reliance on trucking is also evident in the receiving of materials by the manufacturing firms in the survey. The trucking mode accounts for 91 percent of all materials received. Significant differences among the frequency of use by the various SIC categories were shown at the 2 percent and 10 percent level for materials received by trucks not owned by the firm and trucks owned by the firm, respectively. Firms producing chemicals and allied products (SIC=28) were the only SIC group to use trucks for less than 80 percent of their material transport. This group used rail most extensively, with 24 percent of their materials received by this means.

Table V-B differentiates the use of each method of transport for firms from various city size intervals. The predominance of truck transportation is again noted. The use of trucks for shipping goods is fairly equal among firms in the different city size intervals. Significant differences among the frequency of use by firms from the various city

Table V-B. Transportation Mode for Shipping Goods and Receiving Materials: Mean Percent of Volume by Each Mode for Selected City Size Intervals.[1/]

City Size Intervals (population)	Transportation Mode: Shipping Goods (%) Truck Owned	Truck not Owned	Rail	Air	Other	Total	Receiving Materials (%) Truck Owned	Truck not Owned	Rail	Air	Other	Total	Number of Firms
1 = 499	37	44	4	*	14	100	20	63	5	*	12	100	17
2 = 500-999	41	48	5	0	6	100	25	59	11	*	5	100	16
3 = 1000-2499	60	34	2	2	2	100	52	40	7	*	*	100	24
4 = 2500-4999	71	29	*	*	0	100	34	66	*	*	*	100	10
5 = 5000-9999	37	49	8	6	0	100	18	76	6	*	*	100	7
6 = 10,000-30,000	46	47	5	*	2	100	24	68	3	2	3	100	45
All Intervals	48	43	4	1	4	100	30	61	5	*	4	100	119
ANOVA[2/]	.29	.71	.88	.10	.05		.04	.09	.54	.80	.19		

Source: Manufacturing Firm Survey

1/ The mean percentages have not been weighted by the tonnage shipped by individual firms within the SIC categories. The mean percentages for "All Categories" is weighted by the number of observations from each SIC category.

2/ A low value for the ANOVA statistic, generally from .00 to .10, denotes a significant variation among the mean percent of goods or materials transported by the various SIC categories for a particular transportation mode.

* Less than 1%, totals may not add to 100% in all cases, due to rounding."

size intervals were shown at the 4 percent and 9 percent level for materials received by trucks owned by the firm and trucks not owned by the firm, respectively. Firms located in cities of 1,000 to 5,000 persons tended to utilize trucks owned by the firm more often for receiving materials than did firms in the larger cities.

No particular city size appears to utilize air or rail transport to a greater degree than others. There is a higher percent of use in the under 1,000 population range for the transport method demarked "Other". Thus, firms locating in these smaller communities rely more on alternative transportation modes--such as the United Parcel Service--to move their goods and materials.

Overall, the significance of transportation access as an inducement for locating manufacturing activity appears to be inconsequential. In particular, access to an interstate highway, either within the county or within an adjacent county, does not appear to significantly aid a county's industrialization potential. In viewing the type of transport facilities used most frequently by manufacturing firms included in the sample survey, there was found to exist a heavy reliance on truck transportation.

The insignificance of the interstate access variable, coupled with the preponderance of truck transport by manufacturing firms, would seem to indicate that the system

of paved secondary roads within the state adequately serves the transportation needs of these manufacturing firms. The use of truck transport allows firms to maintain flexibility in their location decisions, thereby allowing other factors to exert a stronger influence on an entrepreneurs' location decisions.

Educational Facilities

The existence of post-secondary education facilities within a county is hypothesized to be positively associated with manufacturing employment growth. A certain proportion of graduates from these facilities can be expected to remain within the community following graduation if employment opportunities become available and thus provide a general upgrading of the skill level of the local labor shed.

Both the college (COLLEGE) and vocational education (VOED) variables proved to be significant in explaining the absolute change in manufacturing employment growth at the 5 percent level in Models A, B, and D. The VOED variable registered significance at the 10 percent level in Model C. Neither education variable showed significance in the models with percent change in manufacturing employment as the dependent variable.

It should be remembered that the significance of these variables may be disguised somewhat by their high correlation with POP70, which was also statistically

significant at the 5 percent level in Models A and B. The measured influence of VOED may be especially misleading, as the analysis of this variable was based on the existence of only three post-secondary vocational education facilities in the state in 1970.

Nevertheless, the existence of post-secondary educational facilities in a county seems to exert a positive influence on manufacturing employment growth. Manufacturing firms which require special labor skills may tend to locate in a county where a college or voed facility which teaches those skills is present. Oftentimes, firms requiring special labor needs also have a higher wage scale; thus, the general income level of the community may be enhanced by the attraction of such firms.

Another attraction which is associated with college communities is the increased cultural opportunities which are often available. This can be especially influential in attracting management personnel to rural areas, as these cultural amenities add to the overall quality of rural living.

Summary

Of the factors considered to be beyond community control, the presence of a large population base and post-secondary education facilities proved to be the most significant attractions to increasing the absolute level

of manufacturing employment. Most communities with college or vocational education facilities are associated with a sizable population base; therefore, firms can expect to fill most of their labor needs, in terms of quantity and quality, in such an environment.

In terms of explaining the percent change in manufacturing employment growth, low levels of female labor force participation, poverty, and prior industrialization in the base year of 1970 proved to be the most influential factors. Thus, those counties which can still incorporate a good deal of additional female labor into their work force can be expected to increase their manufacturing employment by the greatest percent.

Many locational considerations which have not been explicitly brought into the regression models need to be recognized. These considerations can be expected to be applicable to most counties in South Dakota. Thus, their impact on an entrepreneur's decision to locate in a particular community in South Dakota rather than another is quite limited. As noted, the labor force of South Dakota is generally considered to be more innovative and productive than the national average. This is due in part to the mechanical background which many laborers have been exposed to in previous farm employment. The turnover rate among South Dakota workers is also quite low, possibly due to the

lack of alternative employment opportunities elsewhere.

Although a community has little control over the labor pool in its area, the community can at least provide an indication to prospective manufacturers of the quantity and composition of this labor pool. Particular attention should be placed on identifying those persons who are not officially considered unemployed, but who are underemployed or "discouraged" workers. This includes workers who may not be able to find work due to a lack of employment opportunities in the area, lack of education or training, or age and handicap barriers. These workers may become discouraged at not finding work and drop out of the labor force. They are no longer considered to be a part of the labor force and thus are usually unrecognized in official statistics on the potential labor supply of an area.

The preponderance of manufacturing activity, in terms of absolute change in manufacturing employment, locating in the larger population centers of South Dakota appears to be contrary to the thesis of manufacturing activity locating in rural areas. However, consideration must be given to the fact that all areas of South Dakota except Sioux Falls are considered rural, according to the 1970 Census. Thus, there is much room for growth yet in the State's 'larger population centers' before significant deglomerating effects set in, which could cause

manufacturers to more strongly consider locating in smaller rural communities.

The heavy reliance on trucking for transporting goods and materials by the manufacturing firms in the State should also be noted. As fuel costs increase, the transportation costs of a firm become a greater percent of the firm's operating costs. Thus, firms must pay closer attention to the advantages, in terms of reducing these transport costs, of locating either near the source of raw materials or near the point of final delivery--depending on whether a weight gaining or weight losing production process is involved. For example, this may lead to the increased practice of processing food products near the agricultural production source. Transportation costs may become a more significant determinant of manufacturing location in the future in South Dakota.

Notes

[1] Bergman, pp. 46-47.

CHAPTER VI

COMMUNITY MODIFIABLE FACTORS

Although many location factors are beyond community control, there are certain variables which a community can influence which are believed to enhance the industrial potential of the community. These factors are primarily related to the financial assistance offered to firms, availability of industrial sites, facilities provided at these sites, and services offered within the community.

Actions of local development corporations (LDCs)--including tax considerations, financial incentives, and site related activities--are analyzed in this chapter for their effectiveness in attracting manufacturing activity. Facilities utilized by different types of manufacturing firms, as indicated by their two-digit SIC code classifications, are also examined. Differences among facilities utilized by firms and actions of LDCs are also analyzed according to the size of city which these firms and the LDCs are located in.

General Local Development Corporation Activities

"The LDC is an independent association of private businesses and citizens operating with privately subscribed funds as a legal authority or instrument of the state in which it does business. The privately subscribed funds are received through the sale of stock, if chartered as a profit corporation,

or from dues, assessments, or other contributions if chartered as a nonprofit corporation."[1]

The role which an LDC plays in a community may vary considerably. Generally, an LDC promotes the economic development of the community by assisting industry in locating within the community or by helping to expand existing industry. This may be accomplished by several means, including provision of financial assistance, provision of industrial sites and related facilities, and provision of other general liaison functions between the community and industry.

An indication of the influence of LDCs on the location of manufacturing firms within South Dakota versus some other state and within a particular community versus some other community is shown in Table VI-A. As can be seen, most manufacturing firms responding to the manufacturing firm survey reported that an LDC had little or no influence on their decision to locate within South Dakota or within a particular community. Only 17 percent of the firms indicated that an LDC had a major influence on their location decisions within South Dakota and within a particular community.

The same number of firms, 21, reported that an LDC exerted a major influence on the firm's decision to locate within a particular community and within South Dakota in

general. Thus, it would appear that LDCs are equally effective in attracting firms to particular communities as to the State in general.

Table VI-A. Influence of LDC on Firm Location.

Degree of Influence	LDC Influence on Firm Location			
	To Locate in South Dakota		To Locate in a Community	
	No.	%	No.	%
Little of None	81	65	77	61
Some	23	18	28	22
Major	21	17	21	17
Total	125	100	126	100

Source: Manufacturing Firm Survey

No discernible differences among the various city sizes or among the six Planning Districts were noted in firm's perceptions of the importance of LDCs. Not enough observations existed to make a meaningful statistical test of differences in LDC influences on the location decision of firms according to the various SIC code categories under consideration. However, it was observed that over 75 percent of the firms producing food and kindred products (SIC=20), concrete products (SIC=32), and fabricated metal

products and transportation equipment (SIC=34) rated LDCs as having little or no influence in their decision to locate in South Dakota or within a particular community.

A survey sent to all known LDCs in South Dakota revealed that 43 of 87 responding LDCs[2] had successfully located one or more manufacturing firms in their community. The reported success of the LDCs according to different city size intervals is shown in Table VI-B.

So many cells have such low expected frequencies in this cross-tabulation that conduct of a chi-square test would be statistically inappropriate. However, a general observation of data in Table VI-B reveals a much higher success rate for attraction of firms by LDCs in larger communities. However, this could be due primarily to the community attributes and amenities associated with larger cities, rather than to the specific actions of the LDCs in these cities. Also, because of size alone, the chances of attracting at least one firm during a given period of time would be greatest in the larger cities.

As mentioned earlier, an LDC may be chartered as either a profit corporation or a nonprofit corporation. The survey results revealed that 56 of the 84 LDCs which responded to the portion of the questionnaire pertaining to this point were designated as profit. No predominance of profit LDCs was noted in any particular city size; thus

Table VI-B. LDC Success in Attracting Manufacturing Firms since 1970 by City Size.

Successful in Attracting One or More Manufacturing Firms since 1970	City Size (Population)													
	<500		500-999		1000-2499		2500-4999		5000-9999		10,000 +		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	3	16	9	39	13	62	6	55	3	100	9	90	43	49
No	16	84	14	61	8	38	5	45	0	0	1	10	44	51
Total	19	100	23	100	21	100	11	100	3	100	10	100	87	100

Source: Local Development Corporation Survey

profit and non-profit types seem to be proportionally divided among the different city size intervals. Table VI-C shows that there is very little difference in success ratios for attraction of firms between those LDCs chartered as profit versus those chartered as nonprofit. Thus, the profit-nonprofit status of the LDCs does not appear to influence their success in attracting firms.

A difference between profit and nonprofit LDCs is apparent in terms of the financial assistance offered to firms. As indicated in Table VI-D, 92 percent of the profit LDCs which were successful in attracting a firm provided financial assistance in comparison to 66 percent of the comparable nonprofit LDCs.

Financial assistance for manufacturing firms is most frequently provided by LDCs in the larger cities. This is depicted in Table VI-E. Other than the 5000-9999 population interval, in which only three observations occurred, the percent of LDCs which have provided financial assistance increases as the city size increases. Thus, the LDCs in larger cities appear to be better able to offer financial assistance, possibly due to fewer capital constraints than occur among LDCs of smaller cities. However, it should be noted that the percentage differences do not appear great, given the small number of observations.

The questionnaire sent to the LDCs allowed each LDC

Table VI-C. LDC Success in Attracting Manufacturing Firms since 1970, by LDC Type.

Successful in Attracting One or More Manufacturing Firms since 1970	LDC Type					
	Profit		Nonprofit		Total	
	No.	%	No.	%	No.	%
Yes	13	46	29	52	42	50
No	15	54	27	48	42	50
Total	28	100	56	100	84	100

Source: Local Development Corporation Survey

Table VI-D. Financial Assistance Offered to Firm by LDC Type.

Financial Assistance by LDC	LDC Type					
	Profit		Nonprofit		Total	
	No.	%	No.	%	No.	%
Yes	12	92	19	66	31	74
No	1	8	10	34	11	26
Total	13	100	29	100	42	100

Source: Local Development Corporation Survey

Table VI-E. Financial Assistance Offered to Firms by LDCs of Various City Sizes.

Financial Assistance by LDC	City Size (Population)												Total	
	500		500-999		1000-2499		2500-4999		5000-9999		10,000 +			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Yes	2	67	6	67	10	77	5	83	1	33	8	88	32	74
No	1	33	3	33	3	23	1	17	2	67	1	12	11	26
Total	3	100	9	100	13	100	6	100	3	100	9	100	43	100

Source: Local Development Corporation Survey

Table VI-F. Type of Financial Assistance Offered by LDCs of Various City Sizes and Profit-Nonprofit Status.

	Type of Financial Assistance*																								Number
	IRB				LTI				LPO				ASSIST				LOAN				OTHER				
	Yes		No		Yes		No		Yes		No		Yes		No		Yes		No		Yes		No		of
LDC TYPE	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	Firms
Profit	7	26	20	74	16	59	11	41	11	41	16	59	13	48	14	52	8	30	19	70	3	11	24	89	27
Nonprofit	5	12	36	88	4	10	37	90	16	39	25	61	13	32	28	68	10	24	31	76	6	15	35	85	41
Total	12	18	56	82	20	29	48	71	27	40	41	60	26	38	42	62	18	26	50	74	9	13	59	87	68
CITY SIZE (POPULATION)																									
500	0	0	4	100	1	25	3	75	4	100	0	0	3	75	1	25	0	0	4	100	2	50	2	50	4
500-999	1	8	12	92	0	0	13	100	2	15	11	85	4	31	9	69	6	46	7	54	2	15	11	85	13
1000-2499	3	16	16	84	4	21	15	79	11	58	8	42	7	37	12	63	3	16	16	84	2	11	17	89	19
2500-4999	0	0	9	100	5	56	4	44	1	11	8	89	6	67	3	33	3	33	6	67	2	22	7	78	9
5000-9999	2	67	1	33	3	100	0	0	1	33	2	67	0	0	3	100	0	0	3	100	0	0	3	100	3
10,000+	6	27	16	73	7	32	15	68	9	41	13	59	6	27	16	73	6	27	16	73	1	5	21	95	22
Total	12	17	58	83	20	29	50	71	28	40	42	60	26	37	44	63	18	26	52	74	9	13	61	87	70

Source: Local Development Corporation Survey

* The variable names used in the above table for the type of financial assistance refer to:
IRB = Industrial Revenue Bond
LTI = Local Tax Incentive
LPO = Lease/Purchase Option
ASSIST = assist firm in obtaining financing from alternative sources
LOAN = funds loaned directly from LDC to firm
OTHER = other type of financial assistance

to list up to three firms which they were successful in helping influence to locate in their community. Of the 43 LDCs which were reportedly successful in attracting a firm, several were successful in locating two or three firms, thereby bringing the total number of "attracted" firms reported in the LDC survey to 86. The financial assistance and site facilities available for each firm have been recorded and will be presented in the following discussion.

Of the 43 LDCs which were successful in attracting one or more firms to their communities, 32 offered financial aid to the firms. Seventy firms reportedly received financial aid from these 32 LDCs. A cross-tabulation of the type of financial aid provided--by the profit-nonprofit status of the LDCs and the city size where the LDC was found--is presented in Table VI-F.

The lease-purchase option on the building and land was the most frequently used form of financial assistance, followed closely by the LDC assisting the firm in obtaining financing from some other source. Disregarding the 'OTHER' category for the moment, the least commonly used source of financing was industrial revenue bonds.

The local tax incentive was utilized by 59 percent of the firms attracted by an LDC designated as profit, whereas the nonprofit LDCs utilized that means of assistance for only 10 percent of the firms for which they provided

financial assistance. Nonprofit LDCs offered the lease-purchase option on the building and land more often than any other financial attraction device.

The LDCs in those towns with less than 2500 persons utilized the lease-purchase option on the building and land more frequently than any other single financing device. A local tax incentive to the firm was the device most commonly used by LDCs in cities of over 2500 persons. The use of industrial revenue bonds as a financial attraction device was most prevalent in the larger cities, notably in the cities of over 5000 persons.

Overall, it appears that those LDCs in large population centers are more willing and able than those in small centers to provide financial assistance of a more capital intensive nature--such as local tax incentives and industrial revenue bonds. Conversely, the LDCs in small communities tend to rely more heavily on conventional lease-purchase options on buildings and land and on assisting firms in obtaining financing from other sources. It should also be noted that those LDCs designated as profit generally provide more financial assistance of all types than do their nonprofit counterparts.

The perceived role which an LDC plays in attracting industry was ascertained by having each LDC rate eight factors often utilized by LDCs in attracting industry. The

average rank order of these eight factors by the 65 LDCs which responded to this portion of the questionnaire are as follows, with one being the most important:

1) play direct role in making industrial sites and buildings available to firms--by development corporation options, ownership, lease-purchase arrangements, etc.;
2) promote good business climate and serve as liaison between industry and various community groups;
3) assist firms in obtaining financing from other sources, such as commercial banks or the Small Business Administration;
4) make inventories of all available industrial land and buildings in the area;
5) conduct economic surveys of the area (e.g. labor surveys);
6) give tours of the area to prospective firms;
7) directly assist in financing; and
8) provide managerial and engineering counseling services of a technical nature.

As indicated by the ranking of these factors, LDCs in South Dakota feel that the provision of industrial sites and buildings is of primary importance in attracting industry. This is perhaps the most common function of LDCs,

as industrial sites are often held on option with the possibility of as yet unidentified firms locating in a community.

According to the rating given to the two factors dealing with financing, it appears that the LDCs do not feel that a direct role in financing is as cost-effective in attracting industry as is an indirect role, via assistance to firms in obtaining financing from alternative sources. This is supportive of the general observation that most LDCs in South Dakota do not appear to have a large amount of capital to work with and thus rely more on alternative financing, as well as non-financial inducements, to attract industry.

As expected, the provision of managerial and engineering counseling services of a technical nature was rated the least important of the factors in attracting industry. This may be due to the inability of most communities in South Dakota to provide such services. Provision of such services can be expected to be most prevalent in the large population centers and in communities where these services are part of a university or extension program.

The profit-nonprofit status of an LDC did not produce any marked variability in ratings of these eight inducement factors. However, a certain degree of

variability was noted among the LDCs of various city size intervals. Most notable was the difference in the provision of financing, with LDCs in cities of over 2500 persons rating both direct financing for firms and assistance in obtaining alternative financing as being of more importance than was indicated by LDCs in communities of less than 2500 persons. The LDCs in larger communities appear to have more capital resources from which to draw in their industrial inducement efforts.

Site Availability And Quality

As previously noted, the factor perceived to be of primary importance by the responding LDCs is the provision of industrial sites and buildings for firms. In a related question, the LDCs were asked whether they currently own or have an option to buy one or more development sites. Of the 85 LDCs which responded to this question, 56 (66 percent) LDCs did own or had an option on a development site. This was especially pronounced among the LDCs in those communities of over 5000 persons, where 12 of the 13(92 percent) responding LDCs indicated they owned or had an option on a development site. No difference was apparent between profit and nonprofit LDCs in terms of the percent which owned or had an option on a developed site.

When LDCs with development sites were asked to identify the type of ownership arrangement for the

development site, 30 of the 54(56 percent) LDCs which responded to this question reported that they currently have a site owned by the LDC, 10(18 percent) reported that they hold an option on a development site, and 14(26 percent) indicated that they control development sites by a combination of ownership and option agreements. No major differences existed among LDCs in various city size intervals for these three alternative ownership arrangements. However, it was observed that those LDCs designated as profit had a considerably higher incidence of ownership of development sites (70 percent) than did the nonprofit LDCs (47 percent ownership).

In terms of those firms which the LDCs reportedly helped influence to locate within their communities, 60 of 85 firms (71 percent) located on specially designated development sites. (See Table VI-G.) Of these development sites, 46 were owned by LDCs and the LDCs held options to buy 11 others. The LDCs reported that 58 of 84 firms (69 percent) located on development sites which were zoned industrial. With respect to whether or not the firm was located on a development site, ownership of the site, and zoning characteristics of the site, there were no statistically significant differences between the profit and nonprofit LDCs which attracted firms. Also, there were no notable differences in these site related activities

Table VI-G. Various Development Site Attributes by City Size.

City Size (Population)	Development Site Attributes																					
	Firm Located on Development Site						LDC Owned Development Site						LDC Had Option On Development Site						Site Was In Zoned Development Area					
	Yes		No		Total		Yes		No		Total		Yes		No		Total		Yes		No		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
500	4	80	1	20	5	100	4	80	1	20	5	100	0	0	5	100	5	100	5	100	0	0	5	100
500-999	10	56	8	44	18	100	3	19	13	81	16	100	2	17	10	83	12	100	8	50	8	50	16	100
1000-2499	16	76	5	24	21	100	10	59	7	41	17	100	5	33	10	67	15	100	10	45	12	55	22	100
2500-4999	6	55	5	45	11	100	8	73	3	27	11	100	1	10	9	90	10	100	9	82	2	18	11	100
5000-9999	5	83	1	17	6	100	5	83	1	17	6	100	0	0	5	100	5	100	6	100	0	0	6	100
10,000+	19	79	5	21	24	100	16	73	6	27	22	100	3	13	20	87	23	100	20	83	4	17	24	100
Total	60	71	25	29	85	100	46	60	31	40	77	100	11	16	59	84	70	100	58	69	26	31	84	100

Source: Local Development Corporation Survey

among LDC attracted firms in the various different sizes of city.

The existence of certain facilities--including treated water, sewer, rail, paved road, electricity, gas, and building--at development sites prior to firms decisions to locate on them was also reported for the 86 firms which the LDCs designated as having located in the community. The absolute number and the percent of these 86 sites which had these various facilities are reported by city size intervals in Table VI-H.

Electricity is shown to be the most frequently provided facility, being present at 87 percent of the development sites. Rail service and a building were the only two facilities which were not present at 50 percent or more of the sites. No statistically significant differences were noted in the provision of these services by sites in the various city size intervals. The only statistically significant difference in regard to site facilities was between the profit and nonprofit LDCs' provision of treated water. Profit LDCs provided treated water for 26 of 28 development sites (93 percent) versus 38 of 56 sites (68 percent) for nonprofit LDCs; this produced a chi-square value that is significant at the 5 percent level.

The survey of manufacturing firms mentioned earlier also included questions relating to site facilities

Table VI-H. Facilities at Development Site Prior to Firm Location by City Size.

City Size (Population)	Development Sites with Designated Facilities (number and percent of total)														Number of Firms
	Treated Water		Sewer		Rail		Paved Road		Electricity		Gas		Building		
	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	
500	5	100	5	100	2	40	4	80	5	100	0	0	2	40	5
500-999	13	72	14	78	6	33	12	67	15	83	10	56	16	89	18
1000-2499	17	77	13	59	2	9	15	68	22	100	10	45	8	36	22
2500-4999	10	91	7	64	3	27	6	55	11	100	7	64	3	27	11
5000-9999	6	100	6	100	0	0	6	100	6	100	5	83	4	67	6
10,000+	15	63	17	71	7	29	16	67	16	67	16	67	9	38	24
Total	66	77	62	72	20	23	59	69	75	87	48	56	42	49	86

Source: Local Development Corporation Survey

existing prior to a firm's location at the site. The responses of the 126 reporting firms are recorded in Table VI-I by city size intervals and two-digit SIC code categories.

So many cells had such low minimum expected frequencies that valid statistical tests could not be performed on the data. However, some general observations can be made concerning the facilities present at these sites. As in the sites reported on by the LDCs, over 50 percent of the sites reported in the manufacturing firm survey had electricity, sewer, and paved road. Electricity was again the most common available facility at the sites.

Due to the low number of firms in several of the SIC code categories, caution must be exercised in drawing any conclusions regarding the importance of the various facilities in attracting a particular type of manufacturing firm. However, one observation noted is that those firms producing transportation equipment (SIC=37) tended to locate at sites which did not have treated water, sewer, or rail. Rail service also seems to be of little consequence to those firms producing apparel and other fabric products (SIC=23) and firms producing electrical and electronic machinery, equipment and supplies (SIC=36).

Firms producing concrete products (SIC=32) generally located on sites with no building present. This can be expected, since the majority of the firms in this

Table VI-I. Facilities at Development Site Prior to Firm Location by City Size and 2-Digit SIC Code.

City Size (Population)	Facilities Present at Development Site (number and percent of total)														Number of Firms
	Treated Water		Sewer		Rail		Paved Road		Electricity		Gas		Building		
	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%	
500	5	24	8	38	8	38	7	33	17	81	3	14	9	43	21
500-999	9	53	8	47	6	35	10	59	13	76	3	18	9	53	17
1000-2499	11	44	13	52	4	16	13	52	20	80	11	44	8	32	25
2500-4999	6	60	4	40	5	50	5	50	7	70	4	40	4	40	10
5000-9999	6	75	5	62	1	13	7	87	7	87	4	50	3	38	8
10,000+	23	51	28	62	16	36	32	71	39	87	28	62	27	60	45
Total	60	48	66	52	40	32	74	59	103	82	53	42	60	48	126
2-Digit SIC Code															
20	8	31	13	50	10	38	12	46	18	69	8	31	11	42	26
23	8	61	6	46	1	8	9	69	12	92	7	54	4	31	13
23	6	50	8	67	5	42	7	58	10	83	5	42	4	33	12
26	0	0	0	0	1	100	1	100	1	100	0	0	0	0	1
28	3	43	4	57	3	43	4	57	6	86	3	43	4	57	7
30	4	57	5	71	2	29	4	57	7	100	3	43	4	57	7
32	6	54	3	27	6	54	5	46	7	64	2	18	2	18	11
34	2	40	3	60	1	20	3	60	3	60	3	60	3	60	5
35	15	65	14	61	8	35	16	70	22	96	14	61	15	65	23
36	5	71	4	57	0	0	4	57	6	86	1	14	6	86	7
37	2	17	4	33	2	17	8	67	9	75	5	42	6	50	12
38	1	50	2	100	1	50	1	50	2	100	2	100	1	50	2
Total	60	48	66	52	40	32	74	59	103	82	53	42	60	48	126

Source: Manufacturing Firm Survey

SIC category produce concrete and concrete products which require special plant characteristics peculiar to the industry. The sites which these plants located on were also the least likely to provide gas, paved road, electricity, and sewer facilities. Conversely, provision of rail service at the site was more likely in this SIC category than in most others, indicating a potential need for concrete producers to have rail access to move their bulky materials.

No statistically significant variation in the provision of facilities existed among the various city size intervals. However, it is noted that the smaller communities generally had a lower incidence of provision of various facilities at the industrial sites.

As noted in both Table VI-H and Table VI-I, a building was provided at the industrial site for nearly 50 percent of the firms. The firms included in the manufacturing firm survey responded to a question about what type of building was first used by the firm when it entered the community. Of the 127 reporting firms, 49 percent utilized a previously used building, while another 39 percent moved into a new building constructed especially for the firm. Very few firms utilized a previously unused speculative building.

Firms in cities of under 1000 persons tended to use previously used buildings much more frequently and new

buildings to a lesser degree than did firms in the larger cities. In terms of SIC categories, those firms producing rubber and miscellaneous plastic products (SIC=30) utilized previously used buildings for 86 percent of their initial locations. Those firms producing fabricated metal products, machinery, and transportation equipment (SICs=34, 35, and 37, respectively) also utilized previously used buildings for over 50 percent of their initial firm locations.

The most frequent users of new buildings included those firms producing cement products (SIC=32), food products (SIC=20), and lumber and wood products (SIC=24). These types of firms generally need special facilities (for their production operations) which must be built into the structure of the plant. Thus, it may be as cost-effective to construct a new building to meet these firms' exact specifications as to remodel an existing building.

The firms were also categorized according to whether they were new operations or take-overs of previous operations at the time of establishment in the community. Of the 102 firms reported as new operations, the percent utilizing new buildings was about the same as the percent utilizing previously used buildings. However, of the 23 firms designated as take-overs of previous operations, 19 (83 percent) utilized previously used buildings.

In regard to the type of purchase or rental

agreement used by firms for buildings and adjacent industrial land, 58 of 127 firms (46 percent) purchased the building and land outright. The other types of purchase-rental arrangements were fairly evenly split--with 19 percent of the firms using an ordinary lease, 10 percent using a lease-purchase agreement financed with municipal bonds, 18 percent using alternative types of lease-purchase options, and 9 percent using some "other" type of purchase or rental agreement.

Those firms reported in the survey which located in cities with a population of 5000 to 9999 persons utilized the lease-purchase agreement financed with municipal bonds 37 percent of the time, nearly three times more frequently than firms in any other city size interval. It should also be noted that firms in smaller cities utilized this form of purchase-rental agreement the least often, relying more on outright purchase of buildings and land or on some "other" alternative purchase or rental agreement.

Firms producing food products (SIC=20), chemical products (SIC=28), and cement products (SIC=32) were the most common users of the outright purchase arrangement for buildings and land. SIC categories 20 and 32 were also noted for often utilizing a new building as their initial structure. Thus, it appears that these firms often rely on the purchase or construction of a new building to begin

their operations.

The lease-purchase agreement financed with municipal bonds was used most often by those firms producing rubber and miscellaneous plastic products (SIC=30) and firms producing machinery, except electrical (SIC=35). These firms also tended to locate in the larger cities of the state where this type of agreement is most prevalent.

Community Service Quality

One of the variables used in the regression equations of Chapter IV dealt with the fire protection rating of the largest city in the county as a proxy for the service level of the county. A favorable fire protection rating is believed to be indicative of a higher level of support for public services, which may serve as an attraction for manufacturing firms.

The fire protection rating variable did not appear to be significant in the regression models tried. Due to its high simple correlation with the county population (-.76) this variable's impact may be disguised. The fire protection rating is also highly correlated with several of the other explanatory variables--such as the tax, poverty, and per capita income levels of the counties; these variables may also serve as proxies for the service level of the county. Generally, these variables associated with community services were found to be insignificant.

Local Tax Structure

Another community modifiable variable entered into the regression equations concerned the tax level of the county. It was hypothesized that the tax level of a county would be inversely associated with manufacturing employment growth, due to its perceived role as a cost to the firm. However, the regression results generally indicated the existence of a positive relationship between the tax level and manufacturing employment growth. Thus, tax considerations may be viewed as being generally insignificant in firm location decisions or they may be viewed as an indication of the service level of the area. In this respect, an increased tax level is generally associated with both an increased quantity and quality of public services. Hence, higher taxes, by making available improved services, could serve as an industrial attraction--up to a point.

Most industrial location studies have found taxes to be an insignificant factor in firm location decisions. Thus, local development officials should carefully consider whether a tax break for an incoming firm is a cost-effective location inducement. The tax revenue generated by a manufacturing firm may be quite considerable for a community. As cities compete for firms by offering location inducements such as tax incentives, much needed public revenue can be lost and with it one of the reasons for attracting

manufacturing firms in the first place.

Summary

Overall, actions taken at the community level appear to have little influence on a manufacturing firm's decision to locate within a particular community. This is evidenced in part by the responses of the manufacturing firms surveyed, indicating that an LDC had a major influence on the location decision of only 17 percent of the firms.

Of the LDCs surveyed, nearly half reported that they had influenced a manufacturing firm to locate in the community, with some reporting two or three firms located. While the profit-nonprofit status of the LDC did not seem to have any bearing on the attraction success of the LDC, the size of the city which the LDC is located in does seem to make a difference. Generally, LDCs from the medium to large cities in the state had more success in locating firms than did the LDCs from the smaller communities.

Although this success may be due to many factors outside the control of an LDC, such as a larger labor pool and other amenities of a larger population center, there are certain characteristics which the LDCs from these larger communities exhibit. The most notable difference between the LDCs of larger and smaller cities is in terms of the financial support provided for manufacturing activity.

The actions of the LDCs in the survey seem to

indicate that the LDCs from larger communities are more concerned with financing manufacturing activity and have greater financial capacity to directly assist firms. This is evidenced by the higher rating given to financing as a function of LDCs by those LDCs in cities of over 2500 persons.

This financing by the LDCs of larger cities is often of a fairly direct nature, such as through the use of industrial revenue bonds and local tax incentives. Local tax incentives may often be too costly for small cities to effectively utilize. Industrial revenue bonds, while incurring very little risk to the community, are not used very frequently by smaller cities. This may be due to the lack of familiarity on the part of the officials from these smaller cities with the procedure of issuing industrial revenue bonds. Also, the initial fixed costs of issuing bonds may be harder to bear for small towns. Whatever the case, it would seem that this source of financing might be utilized more extensively by LDCs of smaller communities to provide financial assistance to manufacturing firms.

Municipal bonds used to finance lease-purchase options on a firm's first building and adjacent industrial land were more commonly used by LDCs in large cities than by LDCs in small cities. The holding of development sites--either by ownership or on option--for future industrial activity was also most prevalent among the LDCs of cities

with over 5000 persons.

This greater financial capacity is also evident among the LDCs designated as profit, as 92 percent of these LDCs provided financial assistance to firms; this compares to 66 percent in the case of nonprofit LDCs. However, the success in attracting firms varied little according to the profit-nonprofit status of the LDCs.

Generally, the facilities provided at the industrial site were quite similar among the various city sizes and among the involved profit versus nonprofit LDCs. No particular combination of facilities appeared to be significant in attracting manufacturing activity. Electricity was the most commonly provided facility, with industrial site rail access being available the least often.

Those firms producing food (SIC=20) and concrete products (SIC=32) most often purchased new buildings outright for their initial operations. Previously used buildings were utilized most frequently by firms producing rubber and plastic products (SIC=30), metal products and transportation equipment (SIC=34), and machinery (SIC=35). No statistically significant conclusions can be drawn concerning financing or facilities utilized by the firms from the various SIC categories under consideration, due to the low expected frequencies of firms in several of the SIC categories.

In general, activities considered within the realm of community control seem to have little direct influence on attracting manufacturing activity. Providing sites and facilities, as well as maintaining an inventory of buildings and land, is a legitimate service of LDCs across the State. However, it appears that LDCs may have to become more involved with industrial financing in order to stimulate increased manufacturing employment growth in the future. This financing may be of an indirect nature, such as identifying potential sources of government financial aid and assisting firms in applying for this aid.

Notes

[1] Schaff, p. 4.

[2] The number of LDCs responding and the number of firms reported by each LDC is not consistent throughout this discussion, as not all portions of the questionnaire were filled out by each responding LDC.

CHAPTER VII

SUMMARY AND CONCLUSIONS

Summary

To insure future economic viability in South Dakota, the historical dependence on the agricultural sector needs to be deemphasized. Due to improved technology and cultivation practices, fewer farm workers are needed to maintain or improve agricultural productivity. The non-farm sectors of the South Dakota economy have not expanded rapidly enough to accomodate these displaced farm workers plus other young people entering the labor force. This has resulted in out-migration of many of the young people of the State. Thus, a diversification of the South Dakota economy is needed to provide alternative employment opportunities for the State's labor force.

An increased level of manufacturing activity in South Dakota is viewed as one means of effectively broadening the State's economic base and thus providing alternative employment opportunities. The State can benefit from the national trend of manufacturing activity expanding more into non-metropolitan locations. To take best advantage of this increased manufacturing activity, consideration must be given to the needs of various types of manufacturers and the particular characteristics of South Dakota communities in

order to promote a sound spatial organization for manufacturing activity. Objectives of this study were to explore how the extent and type of rural industrialization being experienced in South Dakota differs among types of communities and local labor sheds and to draw policy and planning conclusions that can be used by rural industrial development entities at the community, district, and state levels in South Dakota.

Primary data for the analysis were obtained through mail survey questionnaires. One questionnaire was sent to a sample of manufacturing firms in South Dakota; information was requested concerning factors influencing each firm's location decision, water use, and transportation access and utilization. Another questionnaire was sent to all local development corporations in South Dakota. This questionnaire requested information concerning site availability, facilities made available at such sites, financial aid to firms, and each local development corporation's perceived role in attracting industry. Data sources for other variables, primarily those included in the regression analysis, were collected from several secondary sources.

Multiple regression analysis was used to examine relationships between the change in manufacturing employment in individual South Dakota counties between the years 1971 and 1977 and various socio-economic characteristics of each

county. These socio-economic characteristics, generally considered to be beyond community control, represent the four broad locational inducement categories of labor force, economic structure and agglomeration, transportation, and education factors. An analysis of variance procedure was utilized to determine significant relationships among types of transportation facilities used by industrial firms and the frequency of such use by city size and type of industry.

Chi-square analysis was utilized to examine the various actions taken by local development corporations and other community modifiable actions relating to site availability and quality. In several instances, an insufficient number of observations rendered statistical tests invalid. General descriptive analysis was used in such cases to provide a general overview of manufacturing activity in South Dakota.

Both the absolute and percent change in manufacturing employment were utilized as dependent variables in the regression analysis. The presence of a large population base and a post-secondary education facility proved to be the most significant attractions to increasing the absolute level of manufacturing employment. Most communities with college or vocational education facilities are associated with a sizeable population base; therefore, firms can expect to fill most of their labor needs, in terms of quantity and

quality, in such an environment.

The percent change in manufacturing employment was found to have a significant inverse relationship with a county's female labor force participation rate, prior industrialization, and level of poverty. A strong positive association was noted with the degree of underemployment in a county.

Contrary to prior expectations, access to an interstate highway system did not significantly affect the absolute or percent change in manufacturing employment growth in any of the models tried. The tax variable also proved insignificant in all the models in which it was entered.

In terms of tonnage, 91 percent of all goods shipped and materials received by those firms responding to the manufacturing firm questionnaire were transported by truck. Firms producing chemicals and allied products (SIC=28) constituted the only SIC group using trucks for less than 80 percent of their material transport. The use of trucks for shipping goods and receiving materials is fairly equal among firms from different city size intervals.

Overall, actions taken at the community level appear to have little influence on a manufacturing firm's decision to locate within a particular community. This is evidenced in part by the responses of the manufacturing firms surveyed, indicating that an LDC had a major influence on the location

decision of only 17 percent of the firms.

Of the LDCs surveyed, nearly half reported that they had influenced at least one manufacturing firm to locate in the community. The profit-nonprofit status of the LDC did not seem to have any bearing on the attraction success of the LDC.

The most notable difference between the LDCs of larger and smaller cities is in terms of the financial support provided for manufacturing activity. The LDCs from larger communities are more concerned with financing manufacturing activity and have greater financial capacity to directly assist firms. This financing by the LDCs of larger cities is often of a fairly direct nature, such as through the use of industrial revenue bonds and local tax incentives.

Municipal bonds to finance lease-purchase options on a firm's first building and adjacent industrial land were more commonly used by LDCs in large cities than by LDCs in small cities. The holding of development sites--either by ownership or on option--for future industrial activity was also most prevalent among the LDCs of cities with over 5000 persons. This greater financial capacity exhibited by LDCs from larger cities is also evident among the LDCs designated as profit, as 92 percent of these LDCs provided financial assistance to firms, compared to 66 percent in the case of non-profit LDCs.

The facilities provided at the industrial site were quite similar among the various city sizes and among the involved profit versus non-profit LDCs. In general, no particular combination of facilities appeared to be significant in attracting manufacturing activity.

Conclusions

The tendency of manufacturing activity to locate in the larger population centers of South Dakota appears, at first glance, to be contrary to the national trend of manufacturing activity locating in rural areas. However, although manufacturing activity is moving more to the rural areas, consideration must be given to the fact that certain rural areas of South Dakota are so sparsely populated that an adequate population base may not exist to support manufacturing activity. Thus, there appears to be much room for growth in the State's "larger population centers" before significant deglomerating effects set in, which could then cause manufacturers to more strongly consider locating in smaller rural communities.

Although a community has little control over the labor pool in its area, the community should maintain an inventory of the quantity and composition of this labor pool. Particular attention should be placed on identifying potential female additions in the labor force, as many of

the light, footloose manufacturing enterprises which enter rural areas typically draw most heavily on the female labor force. The underemployed and discouraged workers also need to be identified, as these workers, if given adequate training and employment opportunities, can significantly contribute to economic activity in South Dakota.

Another factor considered to be largely beyond a community's control is the transportation attributes of firms. Access to an interstate highway did not prove to be significant in explaining manufacturing employment growth. This, in conjunction with the finding that 91 percent of the tonnage of goods and materials transported by those firms responding to the manufacturing firm questionnaire were transported by truck, seems to indicate that secondary roads and feeder roads leading to the interstate highway system frequently provide adequate access to the hinterlands of the State.

This heavy reliance on truck transport may take on added significance in the years ahead as increased fuel prices make transportation costs a greater percent of firms' operating costs. Thus, firms must pay closer attention to the advantages, in terms of reducing these transport costs, of locating near the source of raw materials or near the point of final delivery--depending on whether a weight gaining or weight losing production process is involved. This

may lead to the increased practice of processing food products near the source of agricultural production in South Dakota.

Generally, community modifiable factors were found to be insignificant in attracting manufacturing activity. Communities may best serve their interests by attempting to attract industries which can utilize the facilities and general characteristics which the community has available at the present time, rather than offering additional inducements to attract firms. Emphasis should be placed on building upon local market centers which already exist. Thus, it may be more important to assist the expansion efforts of an already existing firm, rather than seeking out new firms to bring into the community.

In light of the greater success of LDCs from larger cities in attracting manufacturing firms and the greater use of financial devices by these LDCs, it may be appropriate for LDCs of smaller cities to increase their use of certain financial devices to attract manufacturing firms. Certain financial incentives, such as local tax breaks for incoming firms, may be too costly for small cities; however, devices such as industrial revenue bonds, which are typically risk free to the community, should be more widely promoted.

Smaller communities may also be at somewhat of a disadvantage in terms of the technical expertise of their personnel in dealing with Federal development programs. LDC

officials from smaller communities are generally only involved with community development programs on a part-time basis, whereas larger cities may have full-time staffs working in this area. Thus, there is a need for State development agencies or the Planning Districts within South Dakota to conduct workshops instructing local officials on development options and finances which are available and how to utilize them. Assistance should especially be directed to officials of small cities which may lack technical expertise in applying for financial aid.

Before action is taken to enhance a community's industrialization potential, the impact of industry on the community and particular segments of the population within the community need to be taken into account. Consideration must be given to the equity in distribution of potential employment and income benefits expected to be derived from the effort, as well as to the possible pollution costs, congestion and crime which may result. The added demand for community services--such as water, sewer, fire, police, and streets--also needs to be assessed.

Limitations and Need for Further Study

This study examined various factors associated with the type and extent of manufacturing growth taking place in South Dakota between 1970 and 1977. Disclosure problems in several counties precluded a complete analysis of

manufacturing growth in South Dakota. The manufacturing employment data for the regression analysis was aggregated, thus preventing analysis by individual SIC categories.

Data gathered from the manufacturing firm survey, although broken into two-digit SIC categories, generally lacked a sufficient number of observations from each SIC category to allow valid statistical tests to be performed. It must also be remembered that only a sample of the manufacturing firms which entered South Dakota between 1970 and 1979 have been analyzed herein. Consideration needs to be given to the employment and income potential of firms which entered the State during these years but were not included in the sample, as well as the expansion of firms which existed in South Dakota prior to the beginning of the study period. The impact which the expansion of manufacturing firms already present has had on the State in recent years must also be remembered. Additional research concerning the employment multiplier effect of manufacturing employment on other sectors of the South Dakota economy would be desirable in order to derive a better assessment of the over-all contribution of manufacturing to the State's economic and social well-being. A study of the income generated within the State by manufacturing would also contribute to this assessment of the impact of manufacturing growth. In promoting future industrial expansion in the State,

consideration must be given to the fact that a limited amount of resources--physical, human, and financial--are at hand. Thus, careful evaluation of various industry types must be an essential part of any industrial development strategy.

It must be remembered that manufacturing is only one sector of the State's economy. Expansion in other sectors is also needed to achieve the goals of diversification of the State's economic base and of stemming out-migration and providing an increased standard of living for those who remain.

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APPENDIX A

SAMPLING TECHNIQUE FOR SELECTING MANUFACTURING FIRMS

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SAMPLING TECHNIQUE FOR SELECTING MANUFACTURING FIRMS

The selection of manufacturing firms to be included in the sample survey started with a comparison of the 1969-1971 South Dakota Manufacturers and Processors Directory and the 1979 South Dakota Manufacturers and Processors Directory. New firms were identified as those which appeared in the 1979 directory but were absent in the 1969-71 directory. Four hundred forty-seven such new firms were identified, with Rapid City and Sioux Falls accounting for 29 and 61 of the new firms, respectively. Since the emphasis of this study is on rural areas, the Rapid City and Sioux Falls firms were excluded from the sample. This brought the number of relevant new firms down to 357.

After sorting the new firms into their respective two-digit SIC code categories (see Appendix Table A-1 for two-digit SIC code listing) and examining the results, the following decisions were made concerning which SIC categories to include in the sample:

1) SIC categories 01, 02, 10, 14, 22, 25, 31, and 33 were excluded due to their consistently low percentages of the total. Also, agricultural production of crops and livestock (SICs 01 and 02) were excluded because they are not generally considered as manufacturing enterprises. SIC categories 10 and 14, dealing with mining, are not a

central concern of this study and thus were also excluded.

2) The printing, publishing, and allied products category (SIC 27) was excluded because this is not considered as manufacturing in the usual sense.

3) Miscellaneous manufacturing industries (SIC 39) was excluded as a category because it was felt that this represents too heterogeneous a group to be able to draw conclusions about it.

4) Paper and allied products (SIC 26) and measuring, analyzing, and controlling instruments, photographic, medical and optical goods, watches and clocks (SIC 38) were included, even though each was a small percentage of the total, because SIC category 26 firms may be significant users of water and SIC category 38 has a substantial employment roll.

After exclusion of the SIC categories mentioned, there remained 264 separate firms in the SIC categories still under consideration (SICs 20, 23, 24, 26, 28, 30, 34, 35, 36, 37, and 38). Firms in these categories were further stratified according to employment size, as follows:

Employment Categories

A= (0-24 employees)	B= (25-99 employees)	C=(100-249 employees)	D= (over 250 employees)	(unknown number of employees)
179 firms	59 firms	17 firms	2 firms	7 firms
		85 firms		
264 firms				

The 85 firms in employment categories B, C, D, and "unknown" were included in the sample. Of the firms in category A, a 60 percent sample from each included SIC category was drawn, subject to a minimum of 10 in each SIC category. A table of random numbers was used to draw firms to fill these sample quotas. If less than 10 firms existed in an SIC category, all of the firms in that category were used. This resulted in a sample of 124 separate firms from category A, which, combined with the 85 firms in the other employment categories, brought the total sample size to 209 firms.

Table A-1. Two Digit Standard Industrial Classification (SIC) Codes.

Two Digit Code Number	Description	No. of new firms (1970-1977) 1/	No. of firms with useable responses
01	Agricultural Production - Crops	1	
02	Agricultural Production - Livestock	1	
10	Metal Mining	2	
14	Mining & Quarrying of Nonmetallic Minerals, Except Fuels	10	
*20	Food and Kindred Products	57	26
22	Textile Mill Products	2	
*23	Apparel and Other Finished Products Made From Fabrics	23	13
*24	Lumber and Wood Products, Except Furniture	27	12
25	Furniture and Fixtures	2	
*26	Paper and Allied Products	2	1
27	Printing, Publishing and Allied Industries	50	
*28	Chemicals and Allied Products	15	7
*30	Rubber and Miscellaneous Plastic Products	18	7
31	Leather and Leather Products	5	
*32	Stone, Clay, Glass and Concrete Products	24	12
33	Primary Metal Industries	2	
*34	Fabricated Metal Products, Except Machinery, and Transportation Equipment	18	5
*35	Machinery, Except Electrical	51	23
*36	Electrical and Electronic Machinery, Equipment and Supplies	20	7
*37	Transportation Equipment	18	12
*38	Measuring, analyzing, and Controlling Instruments Photographic, Medical and Optical Goods, Watches and Clocks	2	2
39	Miscellaneous Manufacturing Industries	21	
	Total	371 2/	127

* SIC categories included in sample.

1/ Excluding Rapid City and Sioux Falls

2/ Includes double-counting due to some firms being in more than one SIC category. Eliminating this double-counting would result in about 357 new firms.

APPENDIX B

QUESTIONNAIRES AND RELATED INFORMATION

APPENDIX B

QUESTIONNAIRES AND RELATED INFORMATION

Manufacturing Firm Questionnaire

A questionnaire was mailed in May of 1979 to the sample of 209 manufacturing firms referred to in Appendix A. Before this mailing, several firms assisted in a pre-test of the questionnaire.

Approximately three weeks after the questionnaires were mailed, 65 questionnaires had been returned. This accounted for 31 percent of the firms in the sample. A follow-up letter was mailed to the non-respondents at this time. This was followed by a phone call to firms which had not responded within a month of the follow-up letter. By the middle of August, a total of 146 surveys had been received. Nineteen of the questionnaires received were not useable; thus, 127 firms were included in the final analysis. This was a response rate of 61 percent.

Local Development Corporation Questionnaire

A questionnaire was mailed in May of 1979 to all the local development corporations (LDCs) in South Dakota. Before this mailing, several LDCs assisted in a pre-test of the questionnaire.

Approximately three weeks after the questionnaires were mailed, 43 surveys had been returned. This accounted

for 31 percent of the 138 LDCs in South Dakota. A follow-up letter was mailed to the non-respondents at this time. This was followed by a phone call to LDCs which had not responded within a month of the follow-up letter. By the middle of August, a total of 96 surveys had been received. Nine of these responses were not useable; thus, 87 LDCs were included in the final analysis. This was a response rate of 63 percent.

SOUTH DAKOTA STATE UNIVERSITY
Brookings, South Dakota 57007

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Economics Department
Scobey Hall
605-688-4141

May 25, 1979

Dear Sir:

The last few years have witnessed a significant shift of manufacturing jobs from the Nation's larger cities to more rural areas. As an example, South Dakota's manufacturing employment has grown by 80 percent since the mid-1960's. This increase has been important in helping offset continued declines in the State's agricultural employment.

As a result of this trend, many South Dakota communities are now actively seeking new manufacturing activities or attempting to encourage expansion of existing firms. However, local development groups are frequently uncertain about the facilities and attributes their individual communities must possess in order to succeed in the promotion of various types of manufacturing.

In response to this planning uncertainty, the Economics Department at South Dakota State University has undertaken a study of manufacturing growth in South Dakota. The role of various community factors in influencing firm location and expansion decisions will be examined in this study. Among the factors to be examined are the availability of building sites and structures, availability of local water supplies, and access to transportation. One of the principal sources of data for this study is a sample survey of manufacturing firms in the State.

The enclosed questionnaire is being used to obtain data from firms included in the survey. We will greatly appreciate your taking the short time required to complete and return this questionnaire. Although you may have to refer briefly to your 1978 utility bills to answer part of the question on water use, most questions can be answered quite quickly.

You will note a code number in the upper left hand corner of the questionnaire. This number will be used for identification purposes in our analysis of the questionnaire data. Code numbers, firm names, and individual responses will be kept strictly confidential. Data from your firm will be combined with that for other firms in such a way that no individual responses or firm characteristics can be identified in publications resulting from the study.

We would like to have all questionnaires returned by June 15, to facilitate analysis of data over the summer months. You may use the enclosed, postage-paid, self-addressed envelope to return the completed questionnaire.

Your cooperation is needed and will be sincerely appreciated.

Yours sincerely,

Thomas L. Dobbs
Associate Professor of Economics

Enclosures: Questionnaire
Return envelope

SOUTH DAKOTA STATE UNIVERSITY
Brookings, South Dakota 57007

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Economics Department
Scobey Hall
605-688-4141

June 18, 1979

Dear Sir:

Three weeks ago, we sent a questionnaire to you, seeking information which would help us evaluate manufacturing location decisions in South Dakota. To insure that our research results are complete and accurate, we need responses from as many of the firms surveyed as possible. Since we have not yet received a completed questionnaire from you, we are enclosing another copy of the form. Also enclosed is a postage-paid, self-addressed envelope and a copy of the cover letter sent to you previously (on May 25th).

We will greatly appreciate your returning the completed questionnaire in the return envelope as soon as possible.

Thank you.

Yours sincerely,

Thomas L. Dobbs
Associate Professor of Economics

cc: Questionnaire
Return envelope
May 25th cover letter

Questionnaire Code No. _____

Economics Department
South Dakota State University
Brookings, SD 57007

CONFIDENTIAL SURVEY OF SOUTH DAKOTA MANUFACTURING FIRMS

Firm Name _____ Phone _____

Address _____

City _____ Zip Code _____

1. (a) What year did your firm begin production operations in the present community? _____
   (b) At that time, was this a take-over of a previous firm's operation in the community or was it a new operation in the community? Check one:
   ☐ Take-over of a previous operation ☐ New operation

2. Please list the major products your firm produces at this location: _____

3. (a) What is the current (1979) total employment of your firm in this community? ____ employees
   (b) Is there much seasonal variation to employment in your firm here? ☐ Yes ☐ No
   (c) What was the approximate average monthly employment of your firm in this community last year (1978)? _____ employees

4. Factors Influencing Firm's Location Decision
   (a) Did the activities of a local development corporation in the community where your firm is located have an influence on the firm's decision to locate in South Dakota rather than some other state? Check one:
   ☐ Little or no influence ☐ Some influence ☐ Major influence

   (b) Did the activities of a local development corporation in the community where your firm is located have an influence on the firm's decision to locate in this community rather than other communities in South Dakota? Check one:
   ☐ Little or no influence ☐ Some influence ☐ Major influence

   (c) What type of building did your firm occupy at the time it first located in this community? Check one:
   (1) A building previously used by another firm or occupant ____
   (2) An already constructed but as yet unused speculative building ____
   (3) A new building constructed specifically by or for your firm ____
   (4) Other (please specify) _____

   (d) What type of purchase or rental agreement did your firm use for the building and adjacent industrial land at the time of initial location in this community? Check one:
   (1) Outright purchase ____
   (2) Ordinary lease ____
   (3) Lease-purchase agreement to pay off building financed with municipal revenue bonds ____
   (4) Other type of lease-purchase ____
   (5) Other (please specify) _____

   (e) Prior to your firm's final decision to locate in this community, which, if any, of the following facilities already existed at the industrial site (as far as the industrial site property line, that is, and not necessarily all the way to the building)? Check each that existed:
   (1) Rail ____ (5) Sewer ____
   (2) Gas ____ (6) Building ____
   (3) Electricity ____ (7) Hard surface road ____
   (4) Treated water ____ (8) Other (specify) _____

   (f) Were there any special considerations related to water supply involved in the firm's decision on which South Dakota community to locate in? ☐ Yes ☐ No
   If Yes, please explain: _____

5. Details of Firm's Water Use

(a) What is the source(s) of water used by your firm? Please estimate the amounts drawn from each source in 1978 by the plant and indicate the major use of water from each source:

Source	Approximate amount drawn in 1978, in gallons or cu. ft. (indicate which)	Major use in the plant (production purposes? cooling? drinking & sanitation? fire protection? other?
Municipal system		
Private well(s)*		
Other (please specify; e.g., rural water system)		

*Exclude wells used essentially as storage for municipal or other water.

(b) If more than one source is used, briefly indicate why: _____

(c) If water is used for production or cooling purposes:
(1) Does water recycling take place in the plant? ☐ Yes ☐ No
(2) What kind of water quality is required for production or cooling?
(3) Does the firm have to treat to get this quality? ☐ Yes ☐ No
(4) If treatment required, of what nature? _____

(d) If municipal system is used at all for plant water supply and water line did not already reach edge of the industrial site at the time firm located here (see 4,e on previous page):
(1) How long was the needed line extension? _____ft.
(2) Who paid for the water line extension? Check one:
☐ Municipal water authority paid for.
☐ Cost was shared by firm and municipal water authority or other public body.
☐ Cost was paid for entirely by firm.
☐ Other arrangement (please specify): _____
(3) If costs were shared, what portion was born by the firm? Check one:
☐ Less than 30% of the costs of extension.
☐ 30% - 60% of the costs of extension.
☐ More than 60% of the costs of extension.

(e) For the purposes of firm protection:
(1) Does the plant have a sprinkler system? ☐ Yes ☐ No
(2) Does the plant have its own water tower? ☐ Yes ☐ No
(3) If there are problems with water supply for purposes of fire protection, please note them: _____

(f) Has the firm encountered water problems of any kind that might hinder plant expansion in this community? ☐ Yes ☐ No

If Yes, please specify nature of problem(s): _____

6. Details of Firm's Transportation

(a) Listed below are principal methods of transportation generally used in shipping manufactured products and in receiving materials from suppliers. Please indicate the approximate percentage (%) of your tonnage shipped by each method during 1978.

	Transportation Method					
	Truck*					
	Owned by Firm Itself	Not Owned by Firm Itself	Rail	Air	Other	Total
(1) Products shipped by your plant: % by each method						100%
(2) Materials received at your plant from suppliers: % by each method						100%

*Ignore truck deliveries of 10 miles or less to or from other means of transport.

(b) For each method of transportation used, indicate approximate frequency of delivery. Use the following codes:
D = Daily M = More often than weekly, but not daily W = Weekly
L = Less often than weekly, but on some regular basis

Note: Indicate NA (not applicable) for those methods accounting for less than 5% of volume in each row.

	Transportation Method				
	Truck*				
	Owned by Firm Itself	Not Owned by Firm Itself	Rail	Air	Other
(1) Products shipped by your plant: delivery frequency					
(2) Materials received at your plant from suppliers: delivery frequency					

*Ignore truck deliveries of 10 miles or less to other means of transport.

(c) Has the firm encountered transportation problems of any kind that hinder delivery of the firm's products or of materials it purchases, or are particular problems anticipated? ☐ Yes ☐ No

If Yes, please specify nature of problem(s): _____

_____

_____

Respondent's name and title: _____

Please return questionnaire in the enclosed stamped, self-addressed envelope to:

Rural Industrial Development Project
Economics Department
South Dakota State University
Brookings, SD 57007

SOUTH DAKOTA STATE UNIVERSITY
Brookings, South Dakota 57007

Department of Economics
Economics Extension
605-688-4141

May 31, 1979

Dear Sir:

The last few years have witnessed a significant shift of manufacturing jobs from the Nation's larger cities to more rural areas such as South Dakota. As an example, this State's manufacturing employment has grown by 80 percent since the mid-1960's. This increase has been important in helping offset continued declines in the State's agricultural employment.

The Economics Department at South Dakota State University has in recent years carried out various research and extension activities in support of sound industrial development in the State. The enclosed report on "Planning for Rural Industries-Local Employment" has recently been released by the Cooperative Extension Service as part of this work. We hope your development corporation finds it of use.

In order to further increase knowledge of the factors involved in successfully promoting various types of manufacturing development, a study is now underway which examines the activities of local development corporations. When analyzed, the information obtained on activities of development corporations across the State should be of real value to groups such as your own. We will share the published findings with all participants in the study, of course.

The enclosed questionnaire is being used to obtain a portion of the data needed for this study. (A different questionnaire is being mailed to some manufacturing firms.) We will greatly appreciate someone taking the few minutes required to complete and return this questionnaire. Please ask the person most knowledgeable of the corporation's activities to complete the questionnaire.

You will note a code number in the upper left hand corner of the questionnaire. This number will be used for identification purposes in our analysis of the questionnaire data. Code numbers, development corporation names, and individual responses will be kept strictly confidential. Data from your development corporation will be combined with that for others in such a way that no individual responses or development corporations can be identified in publications resulting from the study.

We would like to have all questionnaires returned by June 15, to facilitate analysis of data over the summer months. You may use the enclosed, postage-paid, self-addressed envelope to return the completed questionnaire.

Your cooperation is needed and will be sincerely appreciated.

Yours sincerely,

Thomas L. Dobbs
Extension Economist and
Associate Professor

Enclosures: Extension Circular
Questionnaire
Return Envelope

SOUTH DAKOTA STATE UNIVERSITY
Brookings, South Dakota 57007

176

Department of Economics
Economics Extension
605-688-4141

June 21, 1979

Dear Sir:

Three weeks ago, we sent a questionnaire to you, seeking information which would help us evaluate the roles of local development corporations in attracting manufacturing firms. To insure that our Research results are complete and accurate, we need responses from as many development corporations as possible. Since we have not yet received a completed questionnaire from you, we are enclosing another copy of the form. Also enclosed is a postage-paid, self-addressed envelope and a copy of the cover letter sent to you previously (on May 31st).

We will greatly appreciate your returning the completed questionnaire in the return envelope as soon as possible.

Thank you.

Yours sincerely,

Thomas L. Dobbs
Extension Economist and
Associate Professor

Enclosures: Questionnaire
Return envelope
May 31st cover letter

LDC Questionnaire Code No. _____

Economics Department 177
South Dakota State University
Brookings, SD 57007

CONFIDENTIAL SURVEY OF SOUTH DAKOTA LOCAL DEVELOPMENT CORPORATIONS

Local Development Corporation Name _____

Address _____ Phone _____

City _____ Zip Code _____

1. What year was your development corporation established in this community? _____
   Is the development corporation a profit or non-profit organization?
   ☐ Profit ☐ Non-Profit

2. Has your local development corporation been successful in influencing any manufacturing firms to locate in the community since 1970? ☐ Yes ☐ No
   If no, proceed to question number 5.
   If yes, please specify up to three firms which the development corporation has recently helped to locate in the community and complete the table:

Firm Name	Did the firm locate on a specially designated development site		Did your local development corporation own or have an option to buy the site				Was the site within a formally zoned industrial area	
			Owned		Option to buy			
	Yes	No	Yes	No	Yes	No	Yes	No
A. _____								
B. _____								
C. _____								

Note: For the remainder of the questionnaire, the firms and the sites which they located on will be referred to by the letters A, B or C associated with their names in question 2. (It is possible that two or all three firms are on the same development site. If so, note that here: _____
_____)

3. Which of the following facilities were provided at the development site(s) prior to the firm's decision to locate there (facilities already at the site or passing by the site and ready to be hooked on to)? Check appropriate category(s) for each site:

Firm	Treated Water	Sewer System	Rail Service	Paved Road	Electricity	Gas	Building
Firm A.							
Firm B.							
Firm C.							

4. Has your local development corporation aided in financing any of these firms?
☐ Yes ☐ No If yes, check the financial assistance alternatives used for each firm:

Firm A	Firm B	Firm C	Financial Assistance Alternatives
			industrial revenue bonds
			local tax incentives (e.g., tax moratorium)
			lease-purchase option on building and land
			assistance to firm in obtaining financing from other sources, such as commercial banks or the Small Business Administration
			funds loaned directly from development corporation to firm
			other (please specify: _____

5.(a). Does your development corporation currently own or have an option to buy a development site(s)? ☐ Yes ☐ No

(b). If yes, the site(s) is/are (check one):

☐ owned by the development corporation.

☐ held on option by the development corporation.

☐ controlled by a combination of ownership and option agreements.

(c). If yes, approximately how many additional firms could locate on the site(s) controlled by the development corporation? ____ firms

6. Which of the following functions of a local development corporation do you view as being the most important in attracting industry? Rate the following factors from 1 through 8, with 1 being the most important.

___ provide managerial and engineering counseling services of a technical nature

___ promote good business climate and serve as liason between industry and various community groups

___ conduct economic surveys of the area (e.g., labor surveys)

___ make inventories of all available industrial land and buildings in the area

___ play direct role in making industrial sites and buildings available to firms--by development corporation options, ownership, lease-purchase arrangements, etc.

___ directly assist in financing

___ assist firms in obtaining financing from other sources, such as commercial banks or the Small Business Administration

___ give tours of area to prospective firms

Respondent's name and position: _____

Please return questionnaire in the enclosed stamped, self-addressed envelope to:

Rural Industrial Development Project
Economics Department
South Dakota State University
Brookings, SD 57007

APPENDIX C

DATA SOURCES

Variable	Source
D_1, D_2	map received from the Mapping Center, South Dakota Department of Transportation, Pierre, South Dakota, 1979
D_3	personal knowledge of author
D_4	personal correspondence from William H. Bergman, University of South Dakota, Business Research Bureau, Vermillion, South Dakota, November 27, 1978
X_1, X_2, X_4, X_5, X_6, X_7, X_9, X_{11}, X_{12}	William H. Bergman, Handbook of Manpower Statistics for South Dakota, Bulletin No. 108, (Vermillion, South Dakota: The University of South Dakota, Business Research Bureau, July 1973)
X_3	Gene Rowe and John M. Zimmer, Manpower Economic Utilization Indexes by Counties, 1970, Standard Federal Region VIII (Springfield, Virginia: National Technical Information Service, U.S. Department of Commerce, n.d.)
X_8, Y_1, Y_2	Bureau of Economic Analysis, U.S. Department of Commerce
X_{10}	Official 1977-1978 South Dakota State Highway Map and 1970 Rand-McNally Road Atlas
X_{13}	personal correspondence received from William J. Mooers, Insurance Services Office of South Dakota, Minneapolis, March 7, 1979
X_{14}	Annual Statistical Report of the Department of Revenue (Pierre, South Dakota: Department of Revenue, 1971) pp. 44-45. South Dakota Thirteenth Annual Report Sales Ratio (Pierre, South Dakota: Department of Revenue, 1970) p. 6.