

New Manufacturing Plants and Job Locations in Oklahoma 1963-71

**Technical Bulletin T-137
December 1973**



Table of Content

Introduction	5
The Study	6
Objective	6
Data Source and Classification	6
Economic Activity and Change in Activity in Oklahoma From 1963 through 1971	7
Manufacturing Plants and Jobs Created by Industry and Community Size	9
Number of Jobs Created by New Plants	9
Number of Jobs Created by Plant Expansions	10
Number of New Plants and Jobs Created by Community Size and Industry Type	12
Number of Plant Expansions and Jobs Created by Community Size and Industry Type	15
Types of Industries and Number of Jobs Created by Community Size	18
Community Size Interval 0-2,499	18
Community Size Interval 2,500-4,999	19
Community Size Interval 5,000-9,999	19
Community Size Interval 10,000-14,999	19
Community Size Interval 15,000-29,999	19
Community Size Interval 30,000-99,999	20
Community Size Interval 100,000 +	20
Plant Location by Districts	20
New Plant Location in District I	21
Types of New Plants Locating in District I	22
New Plant Location in District II	22
Types of New Plants Locating in District II	25
New Plant Location in District III	25
Types of New Plants Locating in District III	27
Summary and Highlights	27
Highlights	27
Bibliography	29

**Oklahoma State University
Agricultural Experiment Station
Department of Agricultural Economics
Stillwater
In Cooperation With
Research Division, Rural Development Service
U. S. Department of Agriculture**

New Manufacturing Plants And Job Locations In Oklahoma 1963-71

Dan Childs and Gerald A. Doeksen*

In Oklahoma, as in other parts of the United States, rural residents continued to move to urban centers. In 1960, 37 percent of Oklahoma's population resided in rural areas (rural meaning open country and towns of 2,500 or less). In 1970, rural areas accounted for 32 percent of the state's population.¹ Many that move to urban areas may prefer to live in rural communities. But new industrially based employment opportunities in rural communities have not expanded sufficiently to offset (a) the reduced labor requirements of agriculture and other basic industries, and (b) the natural increase in the rural workforce.

Attracting new industries to locate in rural areas is seen by many rural leaders as a means of reducing the trek of rural people to the cities. The increased congestion in urban centers and associated problems of pollution, transportation, crime, etc. have stimulated the interest in the development of rural communities by national and state leaders as well as rural leaders.²

Knowledge of the locational patterns of manufacturing establishments is essential if regional growth is to be understood or planned. It is hoped that this study will provide information that will be helpful in uncovering these locational patterns. The study investigates the locational trends of manufacturing plants which began operations or expanded operations in Oklahoma during the period 1963 to 1971.³

Research reported herein was conducted under Oklahoma station Project No. 1492, in cooperation with the Research Division, Rural Development Service, U.S. Department of Agriculture

*Graduate Research Assistant, Department of Agricultural Economics and Economist, Rural Development Service, Economic Development Division, U. S. Department of Agriculture, respectively, Oklahoma State University, Stillwater, Oklahoma.

¹Tweeten, Luther. "Elements of Economic Growth in Rural Areas," *Research Application in Rural Economic Development and Planning*, Research Report P-665, Oklahoma State University, Agriculture Experiment Station, July, 1972.

²*Toward Balanced Growth: Quantity with Quality, National Goals Research Staff*, U. S. Government Printing Office, Superintendent of Documents, Washington, D. C. 1970.

³For this study, firms expanding operation included only those which reported a capital expenditure, and created additional jobs at their present location.

This study is intended to provide useful data for local development planners in their efforts to persuade new industries to locate in their areas. For them and others who are interested in the development of rural areas, it is useful to understand how the market economy has been operating in the past. What types of plants have been locating in the various size communities is an important aspect that needs to be comprehended by local policymakers. This analysis of past industry location should provide assistance to local development planners in evaluating the prospects for their areas to acquire additional employment in specific manufacturing industries.

The Study

Objectives

A large number of new plants located or expanded operation from 1963 through 1971. The general objective of this study was to analyze the number of plants and jobs created by new plant locations and expansions in Oklahoma from 1963 through 1971. More specifically, the objectives of the study were:

1. To determine the number of jobs created by new manufacturing plants and plant expansions by community size;
2. To ascertain the number of manufacturing plants and jobs created by industry type; and
3. To ascertain the number of manufacturing jobs created by districts in Oklahoma and which community sizes and industrial types were most important within each district.

Data Source and Classification

Data used were obtained from the Bureau of Business Research, College of Business Administration, University of Oklahoma, Norman, Oklahoma. Data were collected by the Bureau from information provided to them by major utility companies on the basis of new gas and electricity connections and by the Chamber of Commerce in each community as to new plants and plant expansions. Data were originally listed by new manufacturing plants and manufacturing plant expansions by communities in Oklahoma. In each instance information was carefully checked by the Bureau with a responsible officer of the firm so that every listing was a bona fide manufacturing plant which was actually in production.⁴ If needed, the Bureau would follow up with a request for more pertinent information from the firm itself.

⁴Dikeman, Heil J., Jr., and Paula D. Mueller, *Oklahoma Industrialization*, Bureau of Business Research, College of Business Administration, University of Oklahoma, Norman, Oklahoma, January, 1964 through 1971.

Information available concerning each listing included the Standard Industrial Classification Code (SIC), when operations or expansions began, market served, total employment, and total capital investment. Each plant was assigned an industrial code (SIC) on the basis of its major activity, which was determined by the product or group of products produced or handled, or service rendered.

Data for the 1960's indicate that manufacturing employment grew at greater rates in non-metropolitan than metropolitan areas in all regions of the nation except the Western United States.⁵ This indicates that at least some segments of manufacturing are undergoing relative shifts from metropolitan to non-metropolitan areas. Therefore, the emphasis of this study was toward communities that conformed more to smaller size population intervals.

For study purposes all communities in Oklahoma were partitioned into seven intervals according to population. These intervals are 0-2,499; 2,500-4,999; 5,000-9,999; 10,000-14,999; 15,000-29,999; 30,000-99,999; and 100,000+. Each community's population was based on population counts taken in 1970. Smaller intervals were formed for lower populated areas because of the wider range of characteristics shared by communities in these intervals. Generally, as the community size increased, the disparity in characteristics decreased, therefore, the magnitude of those intervals were increased.

Another reason for forming smaller intervals for lower populated areas was because the study was mainly interested in rural areas and more detailed analysis could be completed on these smaller intervals. Even though these smaller communities were divided into smaller intervals, the total population of each interval was fairly uniform. The interval, 10,000-14,999, represented the fewest number of people. It contained 105,562. Other intervals contained roughly 240,000 each, except the interval containing Oklahoma City and Tulsa which contained 698,119.

Economic Activity and Change In Activity In Oklahoma From 1963 Through 1971

Economic activity can be classified into three broad categories. First, are the basic industries which are tied to the natural resources of the area. These include the activities such as farming and mining. Second, are primary industries which depend upon the primary activities for raw materials. Included in this category are the manufacturing industries. Third, are the secondary industries which arise to serve the basic industries, primary industries and the general public. Industries in this group

⁵Beale, Calvin L., Claude C. Haren, and Helen Johnson. Rural America: "New Face for Old Image." *Farm Index*, August, 1970, USDA.

include such service businesses as wholesale and retail trade, construction, service, and public utilities.

Growth in the number of jobs in Oklahoma from 1963 through 1971 has not occurred in the basic industries but has occurred in the primary and secondary industries. The increased activity by primary industries and increased service demands by the general public have generated a number of jobs in the secondary industries. Data in Table 1 exemplified the growth occurring in the primary and secondary industries in Oklahoma from 1963 through 1971. Employment in agriculture decreased by 16 percent and mining by 3, whereas employment in the manufacturing industries increased 50 percent. Employment change in the secondary industries increased 33 percent to serve the primary industries and the increased demands of general public. The largest increases in the secondary industries were in the government, service, and trade industries. Manufacturing is an important segment of the Oklahoma economy and an analysis of plant location and job creation by industrial type and community location will assist local planners.

Table 1. Oklahoma Labor Force In January 1963 and December 1971 and Change In Employment Data 1963 and 1971

	January 1963	December 1971	Change Jan. 1963 Dec. 1971	Percent Change
	000			
Total Labor Force	873.7	1,042.1	+168.4	+19
Unemployed	48.5	46.4	- 2.1	- 4
Employed	825.2	995.7	+170.5	+21
Agriculture	116.0	97.0	- 19.0	-16
Nonagriculture	709.2	898.7	+189.5	+27
Domestic Service, Self-Employed and Unpaid Family Workers	115.4	111.9	- 3.5	- 3
Wage and Salary	593.8	786.8	+193.0	+33
Manufacturing	87.8	131.6	+ 43.8	+50
Durable Goods	49.6	76.7	+ 27.1	+55
Nondurable Goods	38.2	54.9	+ 16.7	+44
Contract Construction	31.6	37.4	+ 5.8	+12
Mining	42.6	37.1	- 5.5	- 3
Public Utilities	45.5	51.2	+ 5.7	+13
Trade	138.1	178.5	+ 40.4	+29
Finance Insurance and Real Estate	28.5	37.1	+ 8.6	+30
Service	79.4	120.6	+ 41.2	+52
Government	140.3	193.3	+ 53.0	+38

Source: Oklahoma Employment Security Commission, Research and Planning Division, *Oklahoma Labor Market*, February, 1964 and January, 1972.

Manufacturing Plants and Jobs Created By Industry Type and Community Size

A perspective on manufacturing trends in Oklahoma can be secured by determining the number of plant jobs generated by new plants and expansions of existing plants in the state. From 1963 through 1971 there were 951 new plants or expansions and 58,693 new manufacturing jobs created in Oklahoma (see Table 2).⁶ Of the 951 new plants or expansions 468 were new plants and 483 were expansions of existing plants. The number of jobs created by new plants was 29,172 or 49.7 percent and from expansions of existing plants equalled 29,521 or 50.3 percent. Job creation from new plants and expansions of existing plants are almost equal in importance to Oklahoma in terms of providing new manufacturing employment. The number of jobs per plant or plant expansion was also very similar as new plants created on the average 62.3 jobs per plant and expansions created 61.1 jobs.

Number of Jobs Created by New Plants

The number of jobs created by new manufacturing plants which located in Oklahoma from 1963 through 1971 was 29,172 (Table 3). This total was spread sporadically throughout all community size intervals. The interval containing communities with a population of over 100,000 was most conducive to new plant location. In fact, 27 percent of the jobs created by new plants during the period were in this interval.

The 5,000-9,999 interval received 7,306 jobs, which represented 25 percent of the jobs created by new plants in Oklahoma from 1963 through 1971 (Table 3). During 1970 and 1971, there were more jobs created in this interval than any other community size interval. These data indicate that in recent years smaller communities were more attractive to plant location than large metropolitan centers. Intervals, 0-2,499

⁶The difference between the 58,693 reported by the Bureau of Business Research (Table 2) and the 43,800 reported by the Oklahoma Employment Security Commission (Table 1) is justified by the number of plants closing down operations or reducing their work force. The 14,893 difference appears to be a reasonable figure given the time period under consideration.

Table 2. Number of Plants and Jobs Created By New and Expanding Manufacturing Plants In Oklahoma from 1963 Through 1971

	Number	Jobs Created	Jobs Per Plant
New Plants	468	29,172	62.3
Plant Expansions	483	29,521	61.1
Total	951	58,693	

and 15,000-29,999 supported another 15 and 12 percent, respectively, of the jobs created by new manufacturing plants. Jobs created in these intervals indicate that manufacturing employment in small centers is a significant part of the state's total amount of new employment.

Data from Table 3 show that 47 percent of those jobs created by new manufacturing plants existed in communities with a population of less than 10,000 people. If all communities with a population of less than 30,000 are included, then 66 percent of all jobs created is encompassed.

The number of jobs created in the state by new manufacturing plants varies substantially from year to year. By grouping the years into three-year intervals, the number of jobs created was largest in recent years. During years 1963 through 1965, 19 percent of the jobs were created; from 1966 through 1968, 33 percent of the jobs were created; whereas during the last three years (1969 through 1971) almost half, or 48 percent, of the jobs were created.

Number of Jobs Created by Plant Expansions

Expansions of existing manufacturing plants occurred where the manufacturing base was located. Thus, smaller communities did not experience much growth in manufacturing employment from plant expansions. From 1963 through 1971 (Table 4), 29,521 jobs were created by expansions of existing manufacturing plants in Oklahoma. Of those 29,521 jobs, 59 percent were created in communities with a population of over 100,000. Combining the number of jobs created by plant expansions with jobs created by new plants in the 100,000+ interval, 43 percent of all jobs created from 1963 through 1971 are included.

Other communities that prospered substantially from expansions of existing plants were those in intervals 5,000-9,999; 10,000-14,999 and 15,000-29,999. The group of communities which constituted the 5,000-9,999 interval provided a base for 3,899 jobs or 13 percent of all jobs created by expansion (Table 4). The interval consisting of the group of communities with a population between 10,000-14,999 provided for 8 percent of those jobs created by expansions while the interval 15,000-29,999 provided for another 9 percent.

The years with greatest plant expansion were somewhat different than the years with greatest new plant location. The year most favorable for expansions of existing plants was 1964 (Table 4). A total of 5,342 jobs were created by expansions in 1964. There were 4,911 additional jobs created in the year 1966.

Table 3. Number of Jobs Created By New Manufacturing Plants Locating In Oklahoma from 1963 Through 1971 Classified By Community Size

Community Size	No. of Communities	1963	1964	1965	1966	1967	1968	1969	1970	1971	Total	Percent
0-2,499	73	282	291	8	323	655	760	910	821	462	4,512	15
2,500-4,999	26	80	12	109	86	34	476	609	385	105	1,896	7
5,000-9,999	25	248	35	287	1,299	817	677	1,239	1,118	1,586	7,306	25
10,000-14,999	7	77	8	158	119	273	256	413	150	655	2,109	7
15,000-29,999	12	125	31	209	414	310	802	1,490	50	47	3,478	12
30,000-99,999	6	0	155	73	153	375	397	403	500	51	2,107	7
100,000+	2	2,809	460	307	463	703	238	1,237	482	1,065	7,764	27
Total		3,621	992	1,151	2,857	3,167	3,606	6,301	3,506	3,963	29,172	100
Percent		12	3	4	10	11	12	22	12	14	100	

Table 4. Number of Jobs Created by Expansions of Existing Plants In Oklahoma from 1963 Through 1971 Classified By Community Size

Community Sizes	1963	1964	1965	1966	1967	1968	1969	1970	1971	Total	Percent
0-2,499	103	3	20	186	224	200	124	401	294	1,555	5
2,500-4,999	0	35	88	92	67	80	120	95	76	653	2
5,000-9,999	315	529	190	515	556	525	184	524	561	3,899	13
10,000-14,999	333	123	580	203	67	70	125	550	120	2,171	8
15,000-29,999	390	113	388	876	73	136	262	0	310	2,548	9
30,000-99,999	0	80	45	76	523	25	300	144	67	1,260	4
100,000+	188	4,459	232	2,963	1,399	2,444	2,807	2,502	441	17,435	59
Total	1,329	5,342	1,543	4,911	2,909	3,480	3,922	4,216	1,869	29,521	100
Percent	5	18	5	17	10	12	13	14	6	100	

Number of New Plants and Jobs Created by Community Size and Industry Type

Wide variation existed in the types of manufacturing plants that chose to locate in Oklahoma from 1963 through 1971. The number of manufacturing plants in each industry locating in each community is presented in Table 5. The number of jobs these plants created is presented in Table 6.

Manufacturers of apparel and related products (SIC Code 23) created more jobs than any other industry type. The 27 new apparel and related product plants created 4,670 jobs or 16 percent of all jobs created in Oklahoma by new manufacturing plants. The average number of jobs created per plant was 173 and was the largest for any industry type. Of the 4,670 jobs created by manufacturers of apparel and related products, roughly 69 percent were created in non-metropolitan centers with a population of less than 30,000. Thus, the apparel and related products industry not only created more jobs than any other industry, but it was also attracted to non-metropolitan areas.

The state was also relatively popular with other types of industry. These included rubber and plastic products (SIC Code 30), electrical machinery (SIC Code 36), and transportation equipment (SIC Code 37). Jobs in each of these sectors represented approximately 11 percent of the total number of jobs created by new plants. The 23 new plants in the rubber and plastic products industry created 3,278 jobs. The average employment per plant in the industry type equalled 142.5.

The electrical machinery sector created 3,233 new jobs in 31 new plants. Most of the new jobs were in metropolitan centers with a population over 30,000. In fact, only 18 percent of the jobs created by this type of industry were created in communities with a population of less than 30,000. This suggests that manufacturers in this category preferred the large sized communities for the location of their new plants.

The transportation equipment industry started 58 new plants and created 3,179 jobs. This industry type had the largest number of new plants beginning operation from 1963 through 1971 of any industry type (Table 5). Each plant created an average of 55 jobs. Of the jobs created in the transportation equipment industry, 79 percent were created in communities with a population of less than 30,000.

Other types of industries which located new plants in the state and also created a substantial number of jobs were: manufacturers of furniture and fixtures (SIC Code 25), manufacturers of textile mill products (SIC Code 22), and manufacturers of machinery except electrical (SIC Code 35). The furniture and fixtures industry started 24 new plants and created 2,355 jobs. Almost 98 percent of these jobs were created in cen-

Table 5. Number of New Manufacturing Plants Started In Oklahoma from 1963 Through 1971 Classified By Community Size and Industrial Type

SIC Code	Industry Group	0-2,499	2,500-4,999	5,000-9,999	10,000-14,999	15,000-29,999	30,000-99,999	100,000+	Total	Average No of Jobs per Plant
19	Ordnance and Accessories	0	0	0	0	0	1	0	1	6
20	Food and Kindred Products	7	3	9	2	1	4	7	33	36
21	Tobacco Manufacturers	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	3	3	5	4	2	0	0	17	104
23	Apparel and Related Products	1	7	9	1	3	2	4	27	173
24	Lumber and Wood Products	2	4	5	0	1	1	2	15	54
25	Furniture and Fixtures	8	2	5	4	0	1	4	24	97
26	Paper and Allied Products	5	0	1	0	1	0	3	10	82
27	Printing, Publishing, and Allied Products	0	0	0	0	1	1	7	9	33
28	Chemicals and Allied Products	6	6	9	4	0	0	9	34	21
29	Petroleum and Coal Products	8	1	3	0	1	0	3	16	24
30	Rubber and Plastic Products	0	2	1	1	5	1	13	23	143
31	Leather and Leather Products	1	0	0	1	0	0	1	3	23
32	Stone, Clay, and Glass Products	8	9	7	1	2	3	7	37	30
33	Primary Metals	3	5	4	1	0	1	9	23	67
34	Fabricated Metals	7	4	3	7	5	2	20	48	29
35	Machinery Except Electrical	7	3	13	1	2	1	11	38	47
36	Electrical Machinery	5	5	4	1	3	0	13	31	104
37	Transportation Equipment	14	5	6	7	13	5	8	58	55
38	Instruments and Related Products	0	1	1	0	2	0	2	6	26
39	Miscellaneous Manufacturing	6	2	3	1	1	0	2	15	27
Total		91	62	88	36	43	23	125	468	62

Table 6. Number of Jobs Created By New Manufacturing Plants Locating In Oklahoma from 1963 Through 1971 Classified By Industry Type and Community Size

SIC Code	Industry Group	0-2,499	2,500-4,999	5,000-9,999	10,000-14,999	15,000-29,999	30,000-99,999	100,000+	Total	Percent
19	Ordnance and Accessories	0	0	0	0	0	6	0	6	0
20	Food and Kindred Products	49	42	584	14	26	189	295	1,199	4
21	Tobacco Manufacturers	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	691	257	311	430	82	0	0	1,771	6
23	Apparel and Related Products	250	455	1,797	125	608	362	1,073	4,670	16
24	Lumber and Wood Products	103	143	485	0	40	25	13	814	3
25	Furniture and Fixtures	510	31	1,424	320	0	5	45	2,335	8
26	Paper and Allied Products	706	0	35	0	7	0	73	821	3
27	Printing, Publishing and Allied Products	0	0	0	0	10	3	281	294	1
28	Chemicals and Allied Products	187	109	186	25	0	0	216	723	3
29	Petroleum and Coal Products	96	10	128	0	20	0	127	381	1
30	Rubber and Plastic Products	0	65	10	4	1,443	350	1,406	3,278	11
31	Leather and Leather Products	40	0	0	3	0	0	27	70	0
32	Stone, Clay, and Glass Products	387	95	229	7	135	21	220	1,094	4
33	Primary Metals	339	78	770	28	0	125	243	1,583	5
34	Fabricated Metals	128	122	65	146	432	90	413	1,396	5
35	Machinery Except Electrical	75	230	377	100	138	500	349	1,769	6
36	Electrical Machinery	264	31	186	12	86	0	2,654	3,233	11
37	Transportation Equipment	621	185	511	778	401	431	252	3,179	11
38	Instruments and Related Products	0	9	100	0	43	0	4	156	1
39	Miscellaneous Manufacturing	61	34	108	117	7	0	73	400	1
Total		4,512	1,896	7,306	2,109	3,478	2,107	7,764	29,172	100
Percent		16	7	25	7	12	7	27	100	

ters with a population of less than 30,000. Manufacturers of textile mill products created 1,771 jobs in 17 new plants. Every one of these plants was located in centers with a population of less than 30,000. This implies that small centers were highly conducive to these industrial types. Manufacturers of fabricated metals (SIC Code 34) and manufacturers of machinery except electrical added another 48 plants (1,396 jobs) and 38 plants (1,769 jobs), respectively. These industries also created most of their jobs in non-metropolitan centers.

Industries which created very few jobs in Oklahoma from 1963 through 1971 should be mentioned. Industries that created 1 percent or less of those jobs created by new manufacturing plants were those manufacturing: ordnance and accessories (SIC Code 19); printing and publishing (SIC Code 27); leather and leather products (SIC Code 31); and instruments and related products (SIC Code 38). These types of industry combined created 526 jobs or about 2 percent of all jobs created by new plants. This reveals that Oklahoma did have a wide variation in types of industry which located new plants from 1963 through 1971 and that certain types of industries were more important than others to the state in terms of providing employment opportunities.

Number of Plant Expansions and Jobs Created by Community Size and Industry Type

Like new manufacturing plants, expansions of existing plants occurred among a large number of industry types. Unlike new plant locations, expansions occurred mainly in the larger communities. The number of plants expanding operation classified by industry type and community size is presented in Table 7, while the number of jobs created by these plants is presented in Table 8.

Expansions of existing plants were mainly centered around five types of industries. These included: transportation equipment (SIC Code 37), ordnance and accessories (SIC Code 19), machinery except electrical (SIC Code 35), apparel and related products (SIC Code 23), electrical machinery (SIC Code 36), and fabricated metals (SIC Code 34).

Manufacturers of transportation equipment expanded operations in 48 plants and created 5,649 jobs. This represents 10 percent of plant expansions and 19 percent of all jobs created by expansions. The ordnance and accessories industry created 5,110 jobs, the next largest amount of jobs from plant expansions, but only 6 plants were expanded. The average number of jobs created per expansion was 852 which is larger than any other industry type. Centers with populations over 30,000 received 92 percent of the jobs created by the ordnance and accessories industry and 74 percent of the jobs created by the transportation industry.

Table 7. Number of Plants Expanding In Oklahoma from 1963 Through 1971 Classified By Community Size and Industrial Type

SIC Code	Industry Group	0-2,499	2,500-4,999	5,000-9,999	10,000-14,999	15,000-29,999	30,000-99,999	100,000+	Total	Jobs per Expansion
19	Ordinance and Accessories	0	0	0	1	1	0	4	6	852
20	Food and Kindred Products	5	0	6	4	7	2	25	49	16
21	Tobacco Manufacturers	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	1	0	3	1	0	0	0	5	190
23	Apparel and Related Products	2	5	19	3	6	2	6	43	85
24	Lumber and Wood Products	1	4	3	1	0	0	3	12	40
25	Furniture and Fixtures	1	0	2	0	0	1	3	7	20
26	Paper and Allied Products	1	0	0	1	0	0	4	6	12
27	Printing, Publishing and Allied Products	0	1	0	0	0	0	12	13	7
28	Chemicals and Allied Products	1	0	2	0	1	0	11	15	22
29	Petroleum and Coal Products	2	1	1	0	3	0	4	11	36
30	Rubber and Plastic Products	0	1	4	1	2	0	10	18	39
31	Leather and Leather Products	0	0	3	0	0	0	1	4	38
32	Stone, Clay, and Glass Products	2	1	2	1	2	0	13	21	15
33	Primary Metals	0	2	1	2	3	0	9	17	43
34	Fabricated Metals	2	3	4	2	3	1	56	71	27
35	Machinery Except Electrical	4	2	10	8	3	9	49	85	49
36	Electrical Machinery	4	1	1	1	5	3	18	33	102
37	Transportation Equipment	6	3	3	8	5	2	21	48	118
38	Instruments and Related Products	0	0	1	0	0	1	5	7	34
39	Miscellaneous Manufacturing	0	0	2	1	0	1	8	12	21
Total		32	24	67	35	41	22	262	483	61

Table 8. Number of Jobs Created By Expansions of Existing Plants In Oklahoma from 1963 Through 1971 Classified By Industry Type and Community Size

SIC CODE	Industry Group	0-2,499	2,500- 4,999	5,000- 9,999	10,000- 14,999	15,000- 29,999	30,000- 99,999	100,000+	Total
19	Ordnance and Accessories	0	0	0	20	436	0	4,654	5,110
20	Food and Kindred Products	39	0	151	79	66	32	403	770
21	Tobacco Manufacturers	0	0	0	0	0	0	0	0
22	Textile Mill Products	200	0	500	250	0	0	0	950
23	Apparel and Related Products	175	217	1,901	570	388	285	131	3,667
24	Lumber and Wood Products	100	143	91	100	0	0	50	484
25	Furniture and Fixtures	15	0	30	0	0	7	90	142
26	Paper and Allied Products	11	0	0	17	0	0	41	69
27	Printing, Publishing and Allied Products	0	2	0	0	0	0	87	89
28	Chemicals and Allied Products	2	0	22	0	6	0	308	338
29	Petroleum and Coal Products	18	30	25	0	248	0	70	391
30	Rubber and Plastic Products	0	2	73	45	160	0	424	704
31	Leather and Leather Products	0	0	145	0	0	0	5	150
32	Stone, Clay, and Glass Products	36	26	12	75	13	0	144	306
33	Primary Metals	0	122	60	190	81	0	279	732
34	Fabricated Metals	62	26	160	60	41	50	1,526	1,925
35	Machinery Except Electrical	188	36	363	199	212	419	2,758	4,175
36	Electrical Machinery	286	35	80	50	457	177	2,291	3,376
37	Transportation Equipment	423	14	138	456	440	275	3,903	5,649
38	Instruments and Related Products	0	0	100	0	0	2	139	241
39	Miscellaneous Manufacturing	0	0	48	60	0	13	132	253
Total		1,555	653	3,899	2,171	2,548	1,260	17,435	29,521
Percent		5	2	13	8	9	4	59	100

Eighty-five plants expanded in the machinery except electrical industry and created 4,175 jobs. This industry had the largest number of plant expansions. The apparel and related products sector expanded 43 plants and created 3,667 jobs. Unlike most of the other industries, the majority of these plants were located in communities under 30,000. The electrical machinery industry expanded 33 plants (3,376 jobs created) and the fabricated metals industry expanded 71 plants (1,925 jobs created). Most of these plants and jobs from these two industries were created in centers with over 30,000 population.

An important aspect of the way industry expanded, centers around whether gains occurred mainly because of the creation of new plants, or due to growth of existing plants. It was found that throughout Oklahoma the creation of new plants provided 49.7 percent and plant expansions provided 50.3 percent of the total amount of manufacturing jobs created. This reveals that location of new plants and growth of existing plants were of approximately equal importance to the state. However, there was a difference in the size of communities in which each was active. Most jobs created by new plants were in centers with a population of less than 30,000 whereas expansions created most of their jobs in metropolitan areas with a population of over 100,000.

Types of Industries and Number of Jobs Created by Community Size

The type of manufacturing industries locating in various size communities in Oklahoma is another important aspect of employment characteristics of new plants. Overall, each community size attracted a wide variety of industrial types. Some were more prominent among certain community sizes than others.

Community Size Interval 0-2,499

The manufacturing industries which created the largest number of jobs from new plants included paper and allied products (SIC Code 26), textile mill products (SIC Code 22), transportation equipment (SIC Code 37) and furniture and fixtures (SIC Code 25). These industry types accounted for 2,528 jobs or 56 percent of all new manufacturing jobs created from 1963 through 1971 (Table 6). The 2,528 jobs were created by 30 new plants or 33 percent of the new plants (Table 5). Other important industry types were stone, clay and glass products (SIC Code 32) and primary metals (SIC Code 33). These industry types created 387 jobs (8 plants) and 339 jobs (3 plants) respectively.

Community Size Interval 2,500-4,999

Data in Table 6 show that manufacturers of apparel and related products (SIC Code 23) created a larger number of jobs than any other industry in communities with a population between 2,500-4,999. Manufacturers of apparel and related products generated 24 percent of the total number of new jobs created and 11 percent of the new plants started in this community size group. Two other industrial types created a considerable number of jobs, those manufacturing textile mill products (SIC Code 22), and those manufacturing machinery except electrical (SIC Code 35). Together they were responsible for 26 percent of the jobs created in the 2,500-4,999 group from 1963 through 1971.

Community Size Interval 5,000-9,999

Manufacturers of apparel and related products (SIC Code 23) and furniture and fixtures (SIC Code 25) dominated the communities with a population in the interval 5,000-9,999. Nine new apparel and related products plants started which created 1,797 jobs. In the furniture and fixture industry, 1,424 jobs were created in 5 plants. The largest number of plants started was in the machinery, except electrical industry, where 13 new plants were opened. However, these plants created on the average 29 jobs per plant for a total of 377 jobs.

Community Size Interval 10,000-14,999

The interval consisting of communities with a population in the range of 10,000-14,999 had most of their new jobs created by manufacturers of transportation equipment (SIC Code 37). Seven new plants were opened and created 778 jobs. Of the 2,109 jobs created in the 10,000-14,999 group, 37 percent were created by this industrial type. The industry creating the next greatest number of jobs for these size communities was manufacturers of textile mill products (SIC Code 22), which created 20 percent of all jobs created in this community size interval. Manufacturers of furniture and fixtures (SIC Code 25) accounted for another 320 jobs or 15 percent of the total. The fabricated metals industry (SIC Code 34) opened 7 plants, but created only 146 jobs.

Community Size Interval 15,000-29,999

Manufacturers of rubber and plastic products (SIC Code 30) created the most jobs (42 percent) in communities with a population between 15,000-29,999. The largest number of new plants started was in the transportation equipment industry (SIC Code 37) where 13 new plants were

opened. Other types of industries important to this population interval included apparel and related products (SIC Code 23) and fabricated metals (SIC Code 34). These four industry types accounted for 60 percent of the new plants started and 83 percent of the jobs created.

Community Size Interval 30,000-99,999

Manufacturers of apparel and related products (SIC Code 23), rubber and plastic products (SIC Code 30), machinery except electrical (SIC Code 35), and transportation equipment (SIC Code 37) generated 78 percent of the jobs created from 1963 through 1971 by new plants in communities with population between 30,000-99,999.

Community Size Interval 100,000+

Metropolitan areas with a population of over 100,000 were attractive to almost every type of industry which located new plants from 1963 through 1971. The most important type of manufacturing industry for creating jobs was the industrial group which manufactured electrical machinery (SIC Code 36). A total of 2,654 jobs or 34 percent was created by 13 plants or 10 percent of the new plants. Other types creating a substantial number were manufacturers of lumber and wood products (SIC Code 24) and manufacturers of rubber and plastic products (SIC Code 30). The largest number of new plants opened was in the fabricated metal industry (SIC Code 34) where 20 new plants opened from 1963 through 1971.

Plant Location by Districts

Oklahoma was partitioned into three districts for comparison purposes (Figure 1). Boundaries for these districts were taken from a previous study by C. H. Little.⁷ The districts were formulated according to median family income by counties.⁸ This state breakdown should indicate if economic conditions and geographic location of different size centers affects changes in their manufacturing employment.

District I consists mainly of counties with median family income below \$5,000. There are 21 counties in District I. The average median family income in 1970 was \$5,023. District I is characterized by economic activity related mainly to agriculture with farms usually small and very diversified. The largest city in District I is Muskogee with a population of 37,331 in 1970. Usually, larger cities provide the momentum for economic growth and development and affect smaller communities within a

⁷Charles H. Little, *Economic Changes in Oklahoma*. Stillwater, Oklahoma. Technical Bulletin No. B-652 (January, 1967).

⁸District IA delineated in footnote 1 is included in District III for this study.

wide radius around them. This being the case, the southeast corner of the state may be disadvantaged since there are no large communities in the immediate area.

District II includes 41 counties and covers the entire center of the state on a northeast to southwest diagonal. This district is not as homogeneous as the other districts because of the wide range in community sizes. The average median family income for District II was \$6,966 in 1970. The large number of trade centers of 5,000 or more population in this district is the major reason the district is considered as a unit. Most industrial activity in the state is located in District II, particularly around Oklahoma City and Tulsa. The presence of the large number of trade centers should provide the impetus for sufficient economic expansion.

In District III there are no large metropolitan areas. Average median family income for this district was \$6,981 in 1970. The district is agriculturally oriented and most farms and ranches are large and usually a little diversification. All communities in this District have population of less than 10,000.

New Plant Location in District I

The number of new jobs created from 1963 through 1971 amounted to 8,342 in District I (Table 9). This represented 14 percent of all jobs created. Of the 8,342 jobs, 4,567 or 55 percent were created by new plants (Table 9). The population interval in District I receiving more jobs than any other was the interval 0-2,499. Over one-half of the jobs

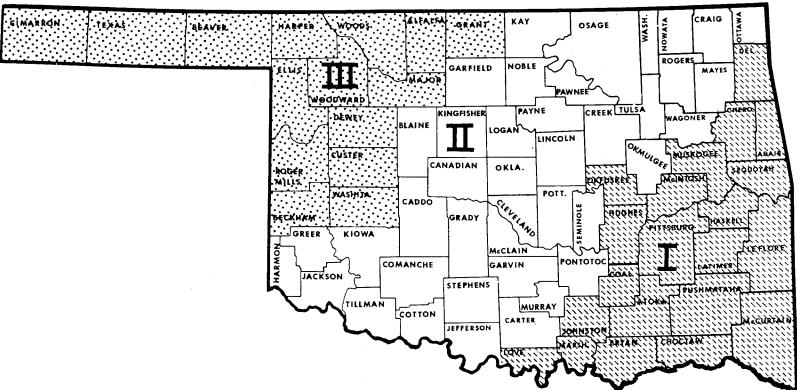


Figure 1. General Economic Districts in Oklahoma

Source: Charles H. Little, *Economic Changes in Oklahoma*. Stillwater, Oklahoma, Technical Bulletin, No. B-652 (January 1967).

Table 9. Number of Jobs Created By New Plants and Expansions In Districts I, II, and III In Oklahoma from 1963 Through 1971

	I	(Percent)	II	(Percent)	III	(Percent)
New Plants	4,567	(55)	21,521	(46)	3,084	(85)
Expansions	3,775	(45)	25,198	(54)	548	(15)
Total	8,342	(100)	46,719	(100)	3,632	(100)

created in District I by new manufacturing plants were created in this community size group (Table 10). When these two intervals are combined with the interval containing the small size communities, 79 percent of all jobs created by new plants in District I are accounted for. The other 19 percent of those jobs created by new plants were created in communities with a population between 10,000-99,999.

Types of New Plants Locating in District I

There were many different types of manufacturing industries which chose to locate in District I from 1963 through 1971. Manufacturers of apparel and related products (SIC Code 23) were the most active in creating jobs. This type of manufacturer created 17 percent of all jobs created in District I by new plants (Table 10). Other types of manufacturing industries that created 9 percent or more each were those industries manufacturing: food and kindred products (SIC Code 20), textile mill products (SIC Code 22), paper and allied products (SIC Code 26), and primary metals (SIC Code 33).

Together, these industrial types created 40 percent of all jobs started by new plants. Because manufacturers of paper and allied products use wood for their raw materials, they would be expected to locate in southeastern Oklahoma since most of that area is characterized by timber including many evergreens.

New Plant Location in District II

District II received more new jobs than any other district in Oklahoma from 1963 through 1971. A total of 46,719 new jobs were created in this district which represented almost 80 percent of the state total (Table 10). New plants were responsible for creating 46 percent of those jobs created in District II from 1963 through 1971 (Table 10). Oklahoma City and Tulsa accounted for 36 percent of all new jobs created by new manufacturing plants (Table 11).

Table 10. Number of Jobs Created By Types of New Manufacturing Plants In Different Size Population Intervals Within District I of Oklahoma from 1963 through 1971

SIC Code	Industry Group	0-2,499	2,500-4,999	5,000-9,999	10,000-14,999	15,000-29,999	30,000-99,999	100,000+ ¹	Total	Percent
19	Ordinance and Accessories	0	0	0	0	0	0	0	0	0
20	Food and Kindred Products	17	20	250	0	0	175	0	462	10
21	Tobacco Manufacturres	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	450	0	0	0	0	0	0	450	10
23	Apparel and Related Products	250	100	300	125	0	0	0	775	17
24	Lumber and Wood Products	0	20	170	0	0	0	0	190	4
25	Furniture and Fixtures	250	25	18	10	0	5	0	308	7
26	Paper and Allied Products	488	0	0	0	0	0	0	488	11
27	Printing, Publishing and Allied Products	0	0	0	0	0	0	0	0	0
28	Chemicals and Allied Products	129	0	4	5	0	0	0	138	3
29	Petroleum and Coal Products	0	0	0	0	0	0	0	0	0
30	Rubber and Plastic Products	0	15	0	4	100	0	0	119	3
31	Leather and Leather Products	0	0	0	0	0	0	0	0	0
32	Stone, Clay, and Glass Products	5	77	6	0	0	3	0	91	2
33	Primary Metals	300	0	0	0	0	125	0	425	9
34	Fabricated Metals	5	30	5	0	0	0	0	40	0
35	Machinery Except Electrical	5	225	7	100	0	0	0	337	7
36	Electrical Machinery	200	0	0	0	86	0	0	286	6
37	Transportation Equipment	235	0	8	73	18	0	0	334	7
38	Instruments and Related Products	0	0	0	0	0	0	0	0	0
39	Miscellaneous Manufacturing	7	0	0	117	0	0	0	124	3
Total		2,341	512	768	434	204	308	0	4,567	100
Percent		51	11	17	10	4	7	0	100	

¹This population interval contains all zeros because no cities with over 100,000 population are located in District

Table 11. Number of Jobs Created By Types of New Manufacturing Plants In Different Size Population Intervals Within District II of Oklahoma from 1963 Through 1971

SIC Code	Industry Group	0-2,499	2,500-4,999	5,000-9,999	10,000-14,999	15,000-29,999	30,000-99,999	100,000+	Total	Percent
19	Ordnance and Accessories	0	0	0	0	0	6	0	6	0
20	Food and Kindred Products	23	12	15	14	26	14	295	399	1
21	Tobacco Manufacturers	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	241	257	295	430	82	0	0	1,305	6
23	Apparel and Related Products	0	355	537	0	608	362	1,073	2,935	14
24	Lumber and Wood Products	8	123	315	0	40	25	13	524	2
25	Furniture and Fixtures	160	6	206	310	0	0	45	727	3
26	Paper and Allied Products	218	0	35	0	7	0	73	333	2
27	Printing, Publishing and Allied Products	0	0	0	0	10	3	281	294	1
28	Chemicals and Allied Products	58	109	167	20	0	0	216	570	3
29	Petroleum and Coal Products	76	10	128	0	20	0	127	361	2
30	Rubber and Plastic Products	0	50	10	0	1,343	350	1,406	3,159	15
31	Leather and Leather Products	0	0	0	3	0	0	27	30	0
32	Stone, Clay, and Glass Products	382	18	213	7	135	18	220	993	5
33	Primary Metals	39	78	770	28	0	0	243	1,158	5
34	Fabricated Metals	123	92	60	146	432	90	413	1,356	6
35	Machinery Except Electrical	49	5	344	0	138	500	349	1,385	7
36	Electrical Machinery	52	15	186	12	0	0	2,654	2,919	14
37	Transportation Equipment	335	155	500	705	383	431	252	2,761	12
38	Instruments and Related Products	0	0	0	0	43	0	4	47	0
39	Miscellaneous Manufacturing	40	34	105	0	7	0	73	259	1
Total		1,804	1,319	3,886	1,675	3,274	1,799	7,764	21,521	100
Percent		9	6	18	8	15	8	36	100	

Communities with a population between 15,000-29,999 were also conducive to new plant location in District II. These size communities accrued another 15 percent of the jobs created by new plants. A contrast between District I and District II can be seen. It was previously cited that 80 percent of all jobs created in District I by new plants were created in communities with a population of less than 10,000. In District II, 67 percent of those jobs created by new plants were created in communities with a population greater than 10,000.

Types of New Plants Locating in District II

Most types of manufacturing industries located new plants in District II from 1963 through 1971. Among these types were four industries that were found to be attracted to District II more than other industries. These types of manufacturers included: apparel and related products (SIC Code 23), rubber and plastic products (SIC Code 30), electrical machinery (SIC Code 36), and transportation equipment (SIC Code 37). Manufacturers of rubber and plastic products were the most prevalent in District II creating 15 percent of all jobs created by new plants (Table 11). The total amount of jobs created by these industrial types were 11,774 which represented 55 percent of all jobs created in District II by new plants.

New Plant Location in District III

District III is a very distinct district and much different than District I and II. No communities in this district exist with a population of over 10,000 which is quite different than was found to be the case in District II. Also, District I had only a few centers with a population above 30,000 which delineates it from District III.

Industrial activity in District III created only 3,632 jobs from 1963 through 1971 (Table 12). This was only 6 percent of all jobs created in the state. This can be compared to the 80 percent of the state total number of jobs created in District II and 14 percent created in District I. Another contrasting characteristic of District III is the number of jobs created by new plants. In District III, 85 percent of all jobs were created by new plants. This is a much larger proportion than we created by new plants in District I and antonymous to the amount in District II. The majority of jobs created in District II was a result of expansions.

The amount of industrial activity generated by new plants in District III was concentrated mainly in the 5,000-9,999 population interval. A total of 86 percent of those jobs created by new plants was created in these size communities (Table 12). In District I, most of the industrial activity was in communities with a population of less than 10,000 but

Table 12. Number of Jobs Created By Types of New Manufacturing Plants In Different Size Population Intervals Within District III of Oklahoma from 1963 Through 1971

SIC Code	Industry Group	0-2,499	2,500-4,999	5,000-9,999	10,000-14,999 ¹	15,000-29,999 ¹	30,000-99,999 ¹	100,000+ ¹	Total	Percent
19	Ordnance and Accessories	0	0	0	0	0	0	0	0	0
20	Food and Kindred Products	9	10	319	0	0	0	0	338	11
21	Tobacco Manufacturers	0	0	0	0	0	0	0	0	0
22	Textile Mill Products	0	0	16	0	0	0	0	16	1
23	Apparel and Related Products	0	0	960	0	0	0	0	960	31
24	Lumber and Wood Products	100	0	0	0	0	0	0	100	3
25	Furniture and Fixtures	100	0	1,200	0	0	0	0	1,300	42
26	Paper and Allied Products	0	0	0	0	0	0	0	0	0
27	Printing, Publishing and Allied Products	0	0	0	0	0	0	0	0	0
28	Chemicals and Allied Products	0	0	15	0	0	0	0	15	0
29	Petroleum and Coal Products	20	0	0	0	0	0	0	20	1
30	Rubber and Plastic Products	0	0	0	0	0	0	0	0	0
31	Leather and Leather Products	40	0	0	0	0	0	0	40	1
32	Stone, Clay, and Glass Products	0	0	10	0	0	0	0	10	0
33	Primary Metals	0	0	0	0	0	0	0	0	0
34	Fabricated Metals	0	0	0	0	0	0	0	0	0
35	Machinery Except Electrical	21	0	26	0	0	0	0	47	2
36	Electrical Machinery	12	16	0	0	0	0	0	28	1
37	Transportation Equipment	51	30	3	0	0	0	0	84	3
38	Instruments and Related Products	0	9	100	0	0	0	0	109	3
39	Miscellaneous Manufacturing	14	0	3	0	0	0	0	17	1
Total		367	65	2,652	0	0	0	0	3,084	100
Percent		12	2	86	0	0	0	0	100	

¹These population intervals contain all zeros because no cities with a population over 10,000 are located in District 3

mainly concentrated in the 0-2,499 population interval. This is somewhat of a contrast with District III where only 12 percent of those jobs created by new plants in District III were created in communities with a population of less than 2,500 people.

Types of New Plants Locating in District III

The types of manufacturing industries that located new plants in District III were mainly of two types. Manufacturers of apparel and related products (SIC Code 23) created 31 percent while manufacturers of furniture and fixtures (SIC Code 25) created another 42 percent of the jobs created by new plants from 1963 through 1971 (Table 11). Together these industrial types accounted for almost 73 percent of the industrial activity generated by new plants in District III. Manufacturers of apparel and related products were also very active throughout District I and II, but those industries manufacturing furniture and fixtures were quite sparse.

The variety of types of manufacturers in District III is limited somewhat because of the predominance of agricultural activity. The northeast and north central areas of the district specialize more in wheat production, whereas cotton production is concentrated in the southern portion. With agriculture providing employment for most people in District III, little labor is available for manufacturing industries.

Summary and Highlights

The general objective of the study was to analyze plant location in Oklahoma from 1963 through 1971. All the industries that located or expanded in Oklahoma during this period were grouped according to the Standard Industrial Classification Code (SIC). All the incorporated cities in the state were then partitioned on the basis of their population in 1970. For further analysis, the state was divided into three districts based on median family incomes by county in 1970. Secondary data from the Bureau of Business Research at the University of Oklahoma were tabulated according to the number of plants started or expanded and the jobs created.

Highlights

The number of new manufacturing plants and plant expansions in Oklahoma between 1963 through 1971 amounted to 951. Of this total, 468 new manufacturing plants created 29,172 jobs; and 463 expanding plants created 29,521 jobs. Thus, during this period, expansions of existing plants and new plants were equally important to Oklahoma.

Communities with over 100,000 residents created more of these new

jobs than any other size group of communities. These large communities were responsible for 27 percent of the jobs created by new plants during the period and 59 percent of the jobs created by expansions of existing plants. Communities in the 2,500 to 4,999 size interval received the least number of jobs — 6 percent of those new plants and only 2 percent of those due to plant expansions.

The types of manufacturing plants locating in Oklahoma from 1963 through 1971 varied widely. Manufacturers of apparel and related products created most jobs (16 percent). Of the new plants, those industry groups which produced rubber and plastic goods, electrical machinery, and transportation equipment each created about 11 percent of the total jobs.

Plants manufacturing transportation equipment and those manufacturing ordnance and accessories were the industry groups that created the most new jobs through plant expansions — 19 percent for the first and 17 percent for the second. Most of these jobs were in Oklahoma City and Tulsa.

The types of manufacturers which located within communities in each population size class varied widely. In communities with less than 2,500, plants making textile mill product, paper and allied products, transportation equipment, and furniture and fixtures were observed most frequently. Within the 2,500-4,999 size interval, the manufacturers of apparel and related products created more jobs than any other industry. This same industry, along with manufacturers of furniture and fixtures were the most common new industries in communities in the 5,000-9,999 size interval. Communities of 10,000-14,999 people got most of their new jobs through manufacturers of transportation equipment, textile mill products and furniture and fixtures. For communities of 15,000-29,999 the most common new plants were for rubber and plastic products, apparel and related products, fabricated metals and transportation equipment.

Four types of industry dominated the 30,000-99,999 size interval — manufacturing apparel and related product, rubber and plastic products, machinery except electrical, and transportation equipment.

Jobs created in metropolitan areas with a population of over 100,000 were in almost every type of industry except those manufacturing ordnance and accessories, tobacco and textile mill products. Electrical machinery makers created most jobs.

Oklahoma was partitioned into three districts — numbered I to III east to west — for comparison purposes. The number of new jobs in District I was 8,342 or 14 percent of all the new jobs in Oklahoma. The population interval in District I where more of these new jobs were in communities under 2,500 than any other size class and these new jobs

were most commonly in plants making apparel and related products.

More jobs were created in District II, which contains Oklahoma City and Tulsa than in the other districts combined — almost 80 percent of all new jobs. Roughly 54 percent of the new jobs were in Oklahoma City and Tulsa. Among the 21 types of manufacturers which located plants in District II, the four most common industry classes were: manufacturing apparel and related products, rubber and plastic products, electrical machinery and transportation equipment. These four industries provided 55 percent of the new jobs in District II.

District III had no communities larger than 10,000 and only 6 percent of the new jobs. Of the new plants, those making apparel and related products created 31 percent of the new jobs and manufacturers of furniture and fixtures created another 42 percent.

Bibliography

- Beale, Calvin L., Claude C. Haren, and Helen Johnson. Rural America: "New Face for Old Image." *Farm Index*, August, 1970. USDA Bureau of Business Research, *Oklahoma Industrialization*, University of Oklahoma, Norman, Oklahoma, 1963-71.
- Dikeman, Neil J., Jr. and Paula B. Mueller, *Oklahoma Industrialization*, Bureau of Business Research, College of Business Administration, University of Oklahoma, Norman, Oklahoma, January, 1964.
- Doeksen, Gerald A. and Charles H. Little, *An Analysis of the Structure of Oklahoma's Economy by Districts*, Bulletin No. B-666, Department of Agricultural Economics, Oklahoma State University, Stillwater, Oklahoma, May, 1969.
- Doeksen, Gerald A. and Dean F. Schreiner, *An Analysis of the Capital Structure by Private Sectors in Oklahoma*, Bulletin No. B-694, Department of Agricultural Economics, Oklahoma State University, Stillwater, Oklahoma, July 1971.
- Fuller, Theodore E., *Trends in Manufacturing Among Small Centers of Pennsylvania*, State University Bulletin 788, December, 1971.
- Little, Charles H., *Economic Changes in Oklahoma*, Bulletin No. B-652, Department of Agricultural Economics, Oklahoma State University, Stillwater, Oklahoma, January 1967.

- Oklahoma Labor Market*, Revised Labor Force Estimates, Oklahoma Employment Security Commission, Oklahoma State Employment Service, Research and Planning Division, Oklahoma City, Oklahoma, February, 1964 and February, 1972.
- Spiegelman, Robert G., *A Study of Industry Location Using Multiple Regression Techniques*, Agricultural Economic Report No. 140, Economic Research Service, U. S. Department of Agriculture, August, 1968.
- Toward Balanced Growth: Quantity with Quality*, National Goals Research Staff. U. S. Government Printing Office, Supt. of Documents, Washington, D. C., 1970.
- Tweeten, Luther, "Elements of Economic Growth in Rural Areas," *Research Application in Rural Economic Development and Planning*, Research Report P-665, Oklahoma State University, Agriculture Experiment Station, July, 1972.
- U. S. Department of Commerce, *Industrial Location as a Factor in Regional Economic Development*, Economic Development Administration, 1967.
- U. S. Department of Commerce, Bureau of the Census. *1970 Census of Population - Number of Inhabitants, Oklahoma*, Washington, D. C. July, 1971.
- U. S. Department of Commerce, Social and Economic Statistics Administration, Bureau of the Census. *General Social and Economic Characteristics, Oklahoma, 1970 Census of Population*, PC(1) - C38 Oklahoma, March, 1972.





AGRICULTURAL
EXPERIMENT STATION