

# Characteristics of North Dakota's Manufacturing Sector Work Force

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North Dakota is not viewed as a highly industrialized state but rather one rich in natural resources. Agriculture and energy have dominated the state's economy and emphasized the need for diversification in the state's economic base and have comprised over 60 percent of the total for the 1981 to 1985 period (Coon 1987). Recent downturns in the agriculture and energy sectors have resulted in corresponding declines in the state's economic base. The manufacturing sector provides one of the few opportunities for a more diversified economy; most other sectors of the state's economy essentially arise to serve and support the basic economic sectors and their associated population.

The manufacturing sector comprised 8 percent of the state's economic base for the 1981 to 1985 period and is one of the few sectors that increased its share of the state's economic base during the 1958 to 1985 period (Coon, 1987). Growth in the manufacturing sector has been a result of an increased number of firms engaged in that type of activity. A 28.7 percent increase in the number of establishments occurred between 1967 and 1982, and the number of larger firms (those with 20 or more employees) increased by over 54 percent during that same period (U.S. Department of Commerce, 1980; U.S. Department of Commerce, 1985). Total payrolls in manufacturing increased by 490 percent and the value of products shipped increased by 575 percent during that period.

Total North Dakota employment in the manufacturing sector was 14,800 in 1982, and the total value added by manufacturers was over \$650 million. Earnings by the manufacturing industry in the state amounted to \$333 million in 1985, a significant increase from the \$89 million earned in 1972 (Bureau of Economic Analysis, 1972-1985). These figures provide an indication of the growth that has occurred in the manufacturing sector of the state's economy, although much of this sector's expansion has been overshadowed by the agriculture and energy sectors.

In response to a lack of adequate information about the characteristics of the manufacturing sector's labor force, a worker profile questionnaire was developed and administered in early 1986 to all workers at a sample of manufacturing firms. A total of 740 usable questionnaires was returned. Worker profiles provide insight into the characteristics of employees attracted to specific industries and provide an indication of whether existing labor supplies would be adequate to staff new developments in North

Dakota. In addition, the study results will help to identify the types of training programs that could be most helpful in preparing North Dakota workers for industrial jobs.

Results of the survey will be presented for numerous socioeconomic variables. Demographic and employment characteristics are presented to provide an overview of the industry's work force. Also, selected characteristics pertaining to the worker's previous employment will be presented.

## Demographic Characteristics

Selected demographic characteristics of the manufacturing work force are presented in Table 1. Survey results in-

**Table 1. Selected Demographic Characteristics for North Dakota Manufacturing Sector Work Force.**

Item	Units	Value	N
Sex:			
Male	percent	71.3	740
Female	percent	28.7	
Marital status:			
Married	percent	71.2	729
Unmarried	percent	28.8	
Number of dependents: (including spouse)			
Average number	number	1.9	727
Distribution			
1 or less	percent	41.8	
2	percent	20.8	
3	percent	23.4	
4 or more	percent	14.0	
Does spouse work:			
Yes	percent	68.4	513
No	percent	31.6	
Residence:			
Own	percent	64.2	712
Rent	percent	35.8	
Years lived at current residence:			
Average years	years	11.2	732
Distribution			
1 year or less	percent	10.5	
2-5 years	percent	31.6	
6-10 years	percent	21.9	
11-25 years	percent	23.6	
26 or more years	percent	12.4	

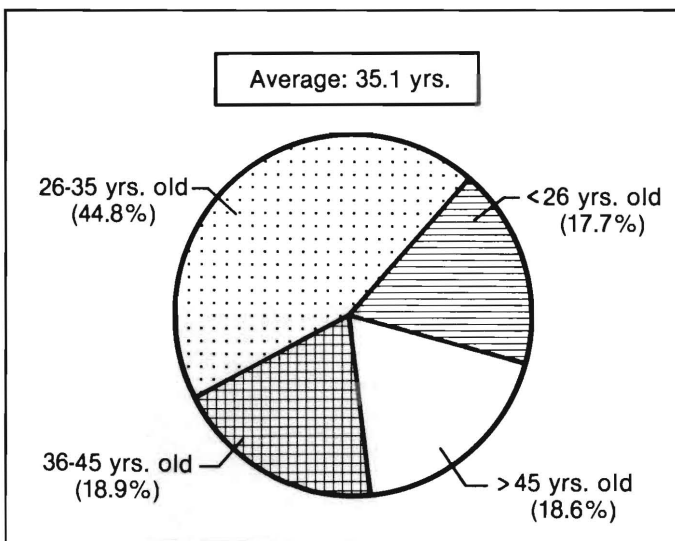
Note: N denotes the number of respondents to each question.

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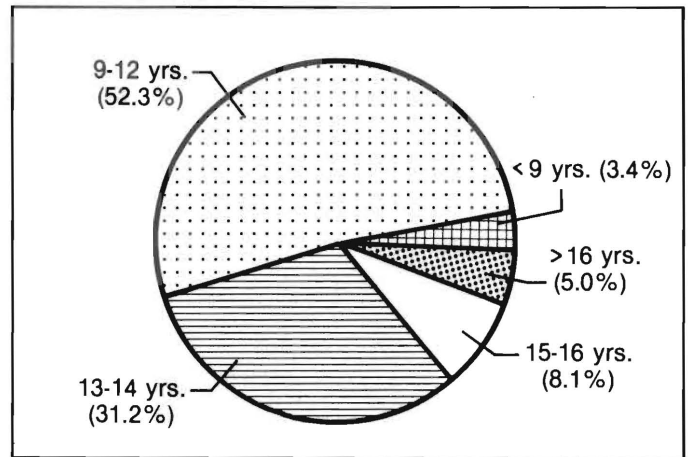
indicated that males dominated the manufacturing sector work force with over 71 percent of the total, which compares very closely to the 74 percent from Census data (U.S. Department of Commerce, 1983). These workers were relatively young; the mean age was 35.1 years, and over 62 percent of the labor force was 35 years of age or less (Figure 1). A large portion of the workers (71.2 percent) were married, and the mean number of dependents (including the worker's spouse) was 1.9 persons (Table 1). A large portion of the children were less than 4 years old (35 percent) and between 5 and 12 years old (37 percent); only 28 percent were 13 years of age or older. This large percentage of children in the preteen age groups corresponds closely with the large number of workers that were in their mid-30s or younger. Over two-thirds (68.4 percent) of the manufacturing workers were from two-income families.

A large share of the workers owned their own home (64.2 percent) compared to 35.8 percent who rented their living quarters (Table 1). Average length of time respondents have lived at their current residence was 11.2 years. Almost 58 percent of this group had resided in their current home more than six years compared to only 10.5 percent who had occupied their home for less than one year. This would imply that the manufacturing industry in North Dakota has attracted workers who were longtime residents of the local area and had remained employed in that area for a rather long period.

Over 50 percent of the respondents had completed 9-12 years of education (Figure 2), and 44.3 percent had some post-high school training. Only 3.4 percent of the workers had completed only eight years or less of formal schooling. This high proportion of personnel with post-high school education provides a good indication that many of the workers would be employed (or qualified to be employed) in skilled, technical, or managerial positions. These data indicate the need for post-high school training by persons competing in the job market for employment in North Dakota's manufacturing sector.



**Figure 1. Age Distribution for North Dakota Manufacturing Sector Work Force.**



**Figure 2. Years of Formal Education for North Dakota Manufacturing Sector Work Force.**

Because of recent downturns in the agricultural sectors of the economy, manufacturing workers were questioned as to their involvement in farming during the past five years. Only 13.7 percent of the respondents had been involved in farming during the past few years, and 7.9 percent of the group were currently active in farming.

### Employment Characteristics

Selected employment characteristics for the manufacturing work force are presented in Table 2. The largest portion of the respondents (over 46 percent) categorized their occupation as laborer, and only 5.6 percent of the workers indicated they were in a management position. Average length of time on the job for manufacturing workers was 6.4 years (Figure 3). The amount of time these workers have remained at their present job would tend to indicate a stable work force with a high degree of job loyalty.

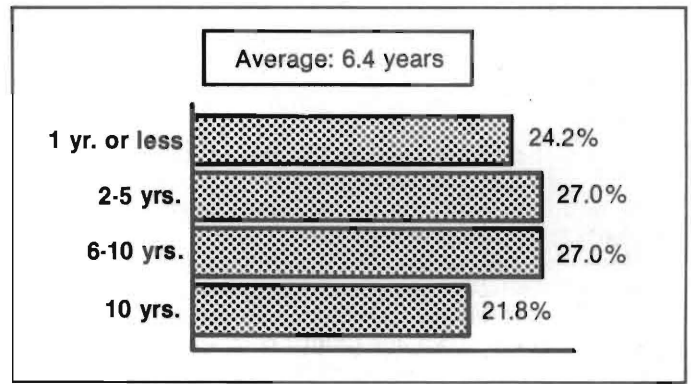
A high proportion (80.8 percent) of the workers were paid on an hourly basis, and the remaining 19.2 percent were paid an annual salary (Table 2). A large share of the salaried workers (73.2 percent) were earning over \$20,000 per year; the high percentage of salaried workers earning larger incomes would tend to indicate that salaried employees are primarily technical and management workers. Workers earning an hourly wage rate earned an average of \$7.71 per hour with an almost equal portion of the workers receiving wages between \$5.01 and \$7.00 per hour and between \$7.01 and \$10.00 per hour (Figure 4). Type of employment for the manufacturing worker's spouse was primarily in the laborer, clerical, services, and sales categories.

Distance traveled (one way) to work was cross-tabulated by length of time at the present job. Most employees who traveled more than 25 miles to work had been on the job one year or less (Table 3). New workers also had the highest percentage (29.3 percent) that commuted a distance of one mile or less; this could indicate that many newer employees are driving to their work rather than relocating immediately upon changing jobs, but those who do move are living very close to their work. This appears to be a temporary situation because the percentage of workers living one mile or less

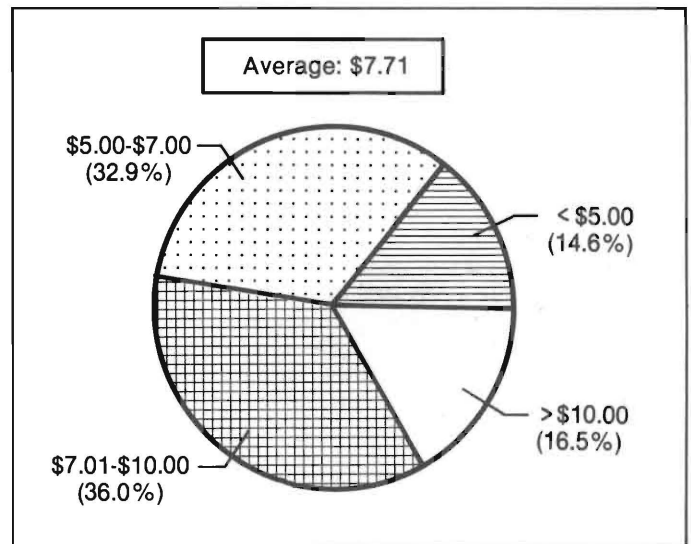
**Table 2. Selected Employment Characteristics for North Dakota Manufacturing Sector Work Force.**

Item	Units	Value	N
<b>Occupation:</b>			
Laborer	percent	46.3	736
Clerical worker	percent	11.3	
Technical worker	percent	9.8	
Management	percent	5.6	
Skilled worker	percent	12.2	
Other	percent	14.8	
<b>Payment method:</b>			
Annual salary	percent	19.2	740
Hourly wage rate	percent	80.8	
<b>Annual salary:</b>			
\$15,000 or less	percent	13.4	142
\$15,001-\$20,000	percent	13.4	
\$20,001-\$30,000	percent	40.1	
\$30,001 or more	percent	33.1	
<b>Distance traveled to work (one way):</b>			
Average distance	miles	11.0	734
<b>Distribution</b>			
Up to 1 mile	percent	14.2	
1.1-5.9 miles	percent	42.8	
6.0-15.9 miles	percent	18.9	
16.0-25.9 miles	percent	11.7	
26.0 or more miles	percent	12.4	
<b>Type of employment for spouse:</b>			
Clerical	percent	18.6	350
Services	percent	17.7	
Labor	percent	19.7	
Sales	percent	12.9	
Teaching	percent	6.3	
Manager	percent	5.1	
Engineer	percent	3.7	
Other	percent	16.0	

Note: N denotes the number of respondents to each question.



**Figure 3. Time in Current Job for North Dakota Manufacturing Sector Work Force.**



**Figure 4. Hourly Wage Rates for North Dakota Manufacturing Sector Work Force.**

**Table 3. Distance Traveled One Way to Work by Length of Time at Present Job for Manufacturing Sector Workers.**

Miles (one way) To Work	Length of Time at Present Job								Row Total and Percent	
	1 Year or Less		2 to 5 Years		6 to 10 Years		11 or More Years			
	N	%	N	%	N	%	N	%	N	%
1 mile or less	52	29.3	32	16.4	10	5.1	8	5.0	102	14.0
2 to 5 miles	36	20.4	79	40.5	104	53.1	94	58.8	313	43.0
6 to 15 miles	28	15.8	39	20.0	39	19.9	32	20.0	138	19.0
16 to 25 miles	24	13.6	28	14.4	21	10.7	13	8.1	86	11.8
26 or more miles	37	20.9	17	8.7	22	11.2	13	8.1	89	12.2
<b>Total</b>	<b>177</b>	<b>100.0</b>	<b>195</b>	<b>100.0</b>	<b>196</b>	<b>100.0</b>	<b>160</b>	<b>100.0</b>	<b>728</b>	<b>100.0</b>
Column percent of total (N = 728)		24.3		26.8		26.9		22.0		

from their jobs declines as length of time at their job increases. Most persons who have worked two or more years at their job lived two to five miles from work. Interestingly, the portion of the total workers in the two-to-five-mile category increased with length of time on the job. This indicates that the longer workers are at the same job, the more likely they are to move closer to their employment location. This could also be aided by the fact that many manufacturing plants are located in or near urban areas where commuting distance can be quite small.

A higher share of the males (15.6 percent) than females (6.9 percent) had completed college or post-graduate levels of education (Table 4). The largest share of the workers had completed only high school; nearly equal percentages of males and females fell into this category (51.0 and 55.1 percent, respectively).

**Table 4. Education by Sex for North Dakota Manufacturing Sector Workers.**

Education	Male		Female		Row Total and Percent	
	N	%	N	%	N	%
8 years or less	19	3.7	6	2.9	25	3.4
9 to 12 years	264	51.0	113	55.1	377	52.1
13 to 14 years	154	29.7	72	35.1	226	31.3
15 to 16 years	47	9.1	12	5.9	59	8.2
More than 16 years	34	6.5	2	1.0	36	5.0
Total	518	100.0	205	100.0	723	100.0
Column percent of total (N = 723)		71.6		28.4		

## Previous Employment

Selected characteristics pertaining to the worker's prior job are presented in Table 5. The largest portion of the workers (20.3 percent) listed their previous occupation as laborer, closely followed by skilled worker (19 percent). The third largest group (11.2 percent) was unemployed prior to their present job. Manufacturing firms had employed the largest portion (20.4 percent) of workers prior to their current job. Service sector jobs, retail, farm, and construction firms also had employed a relatively large share of workers. A total of 13.2 percent of the workers responding to this question indicated they had no former employer (i.e., they were unemployed or self-employed). The previous residence most often listed by the manufacturing workers was a small North Dakota town (36.6 percent) followed by larger North Dakota towns (26.6 percent) and a Minnesota location (23.3 percent).

## Summary

The need for diversification in the North Dakota economy has become evident in recent years with the impact that downturns in the agriculture and energy sectors have had on the state's economy. Manufacturing is one potential source for diversification and economic growth in the state. The manufacturing industry provides jobs for many North Dakota residents who are predominantly male, young, and fairly well educated. These workers tend to commute short distances to work and stay at their job for a rather long period of time. Characteristics of the North Dakota

**Table 5. Selected Characteristics Relating to Previous Employment for North Dakota Manufacturing Sector Workers.**

Item	Units	Value	N
<b>Previous Occupation:</b>			
Laborer	percent	20.3	735
Farmer/farm laborer	percent	10.0	
Military service	percent	3.2	
Construction worker	percent	5.9	
Clerical worker	percent	8.7	
Salesperson	percent	5.7	
Truck driver	percent	5.7	
Skilled worker	percent	19.0	
Other	percent	10.3	
Unemployed	percent	11.2	
<b>Type of firm previously employed by:</b>			
Manufacturing	percent	20.4	740
Construction	percent	8.5	
Retail	percent	10.3	
Farm	percent	10.0	
Military	percent	4.1	
Service	percent	13.0	
Engineering	percent	3.9	
Other	percent	16.6	
No former employer	percent	13.2	
<b>Previous residence:</b>			
Small North Dakota towns	percent	36.6	692
Larger North Dakota towns	percent	26.6	
Minnesota	percent	23.3	
South Dakota	percent	1.7	
Iowa	percent	1.3	
Montana	percent	1.3	
California	percent	1.2	
Other states	percent	8.0	

Note: N denotes the number of respondents to each question.

manufacturing sector work force provide an indication of the type of worker hired by that industry and the type of person attracted to employment in that sector.

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