Most firms are able to secure needed capital investment; some have experienced severe problems.

Minnesota companies appear to be undertaking quality improvement strategies—both through human and capital investments.

Businesses will demand an increasingly skilled labor pool, and there is some concern about shortages of required skills.

THE CHALLENGE TO CHANGE:

Minnesota businesses appraise current conditions, future plans and government roles in the 1990s.

Minnesota's manufacturers view product and technology innovation as increasingly important, and they plan to invest significantly in research and development.

Business groups have intense concerns about the quality and efficiency of primary and secondary schools.

Businesses recommend decreased public spending in most areas but are willing to spend more on programs and services that are important to their business.

The Challenge to Change:

Minnesota businesses appraise current conditions, future plans and government roles in the 1990s.

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The Challenge to Change:

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Executive Summary

Table 1 Group Sample Size

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Number of Surveys Mailed	512	523	507	456	314
Number of Surveys Returned	293	240	240	223	155
Rate of Return	57%	46%	47%	49%	49%

Overview and Findings

Minnesota's businesses look ahead to the 1990s as a time of growth and change. The change will challenge the way they do business and the services they require of employees, suppliers and government. Their chief concerns center on human resources — the skill and availability of skilled labor and the cost or effectiveness of employee benefit programs. They will demand an increasingly skilled laborforce. Reflecting their concern over the future of the workforce, they see a critical need for improving education — especially in primary and secondary schools. Workers' compensation and unemployment insurance levies, together with liability insurance requirements, are perceived as the most burdensome taxes or regulatory impositions. While wishing to hold down the costs of public services, they are willing to pay more for those that benefit them in tangible ways. Quality and productivity improvement strategies are apparent in both human and capital investment. They are actively involved in developing products and seeking technological solutions through research and development (R&D). They are satisfied with the state's physical and capital infrastructure.

These findings are among the results of *The 1990 Minnesota Enterprise Business Survey*. The study was conducted throughout 1990 by the Minnesota Department of Trade and Economic Development. Surveys were distributed to businesses in March and April of 1990. The survey, undertaken to assess business concerns and projected needs for the 1990s, is the most comprehensive business attitudes study undertaken in Minnesota in the past decade. (See Appendix for complete survey.)

Reflecting the major business constituents of the Department, survey samples were drawn from large firms, small to medium-sized fast-growing firms, Greater Minnesota manufacturers, high technology firms, and small-to-medium-sized exporters. More than 2,300 companies in the five groupings returned nearly 1,200 questionnaires, a response rate of almost 50 percent. Table 1 presents the sample size and return rate for the five groups. Samples were selected based on an expected rate of return of 50 percent. Thus, the rate of return allows a 95 percent confidence level that the margin of error of the results is within 5-7 percentage points.

Focus group sessions with company executives from the five groups were used to design the survey questionnaire. The same groups were also brought together after the survey was completed to assist in the interpretation of results.

In the body of this report, findings for each group are presented in considerable detail. The objective in this chapter is to summarize the findings of the survey and to highlight and discuss the major themes that emerged from this effort. Findings and themes are organized into three categories: 1) Current business conditions and issues; 2) Plans for the 1990s; and 3) Impact and role of government. Selected comments gained from business executives during the second set of focus group sessions helped the interpretation of the survey results and are included to illustrate and explain some results.

Table 2 Satisfaction with Energy Service *(percent "somewhat satisfied" — rating 3 or 4)*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Cost	61%	57%	53%	58%	68%
Reliability	91	89	88	84	89
Availability	92	89	93	90	92

Table 3 Importance Ratings of Energy Service Characteristics *(percent distribution)*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Cost	68%	71%	68%	57%	72%
Reliability	80	81	83	74	84
Availability	74	78	77	66	80

Major Themes: Current Issues and Concerns

The 1990 Minnesota Enterprise Business survey included questions about current business operating conditions, including adequacy of infrastructure, capital access, and laborforce.

MINNESOTA'S BUSINESSES ARE VERY SATISFIED WITH THE STATE'S INFRASTRUCTURE.

Companies in the five groups rated their satisfaction with their energy service systems and with their primary modes of transportation.

Energy

Natural gas is used as the predominant source of heating energy by Minnesota's manufacturers; more than 50 percent of firms in each group reported using it. Among manufacturing firms, electricity is the most-used process energy, followed by natural gas. Satisfaction levels with cost, reliability, and availability of energy systems were very high for all five groups (Table 2). The groups were most satisfied with the energy service characteristics that were also rated as most important — reliability and availability (Table 3). However, a majority of all five groups were also satisfied with the cost of their energy service.

Table 4 Primary Transportation Mode *(percent distribution)*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Truck	60%	52%	55%	53%	60%
Air	15	4	20	17	16
Rail	3	8	4	6	12
Barge/Ship	1	5	2	3	2
Freight Services	21	31	19	20	10

Table 5 Satisfaction with Transportation Mode *(percent rating "satisfied" 3 or 4)*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Truck	89%	93%	91%	92%	96%
Air	87	60	90	91	85
Rail	40	44	44	30	65
Barge/Ship	57	57	56	50	57
Freight Services	80	82	81	83	91

"Upkeep of rural roads is of special importance to firms in rural areas because, often, they supply rural markets and need good roads for access." (Focus group member)

Transportation

Businesses identified and evaluated their primary mode of transportation. Transportation modes included in the survey were truck, air, rail, barge/ship, and commercial freight services. As presented in Table 4, truck transport was the most important mode, with from 52 percent to 60 percent of firms in the five groups identifying it as their primary mode. Freight services were identified as the primary transportation mode used second most often, followed by air transport, rail, and barge/ship.

Levels of satisfaction with transportation service were also quite high. All groups expressed the highest satisfaction with truck service, with 90 percent of each group indicating that they were satisfied or very satisfied. More than 80 percent also reported that they were satisfied with the second most important mode — freight services. In four of the five groups a majority reported that they were dissatisfied with rail, with from 70 percent to 56 percent reporting that they were dissatisfied with the mode (Table 5).

MOST FIRMS ARE ABLE TO SECURE NEEDED CAPITAL INVESTMENT; SOME HAVE EXPERIENCED SEVERE PROBLEMS.

With the exception of Greater Minnesota firms, roughly two-thirds of the companies in each group sought to obtain capital during the past five years. Small-to-medium-sized growing companies were more likely to have sought capital than the others, but generally the pattern is the same across the groups (Table 6).

Table 6 Percent Seeking Capital in Past Five Years

Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
78%	58%	63%	64%	64%

Table 7 Level of Difficulty in Securing Capital

Levels	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
1-Low	34%	36%	30%	30%	49%
2	33	28	26	29	30
3	21	19	24	22	14
4-High	12	17	20	19	7

More significantly, the respondents were generally successful in finding capital. Not surprisingly, 79 percent of large firms reported little or no problem getting capital. A majority of each group had a low or moderate level of difficulty securing capital. However, a small but significant proportion of each group reported severe problems finding adequate capital. Of these, the highest share of small-to-medium-sized exporters (20 percent) and high tech firms (19 percent) reported severe problems (Table 7).

These low levels of difficulty may in part be due to the sound financial profile of the sample. Very few are highly leveraged. Nearly half of each group reported a debt-to-equity ratio of 1:1 or less; and almost three-fourths had ratios of less than 2:1. Only 10 percent reported debt-to-equity exceeding 4:1. This profile suggests that those respondents experiencing difficulties may already carry a heavy burden of debt.

Barriers to Funding

Businesses were asked to rate the severity of 12 barriers to obtaining capital. Based on the responses to this question, most barriers were not rated as problematic and the chief roadblocks were high collateral or offsetting deposit requirements; prohibitive costs in the form of interest rates and loan origination fees; and cash flow requirements. Exporters, high technology companies, and small-to-medium growing companies cited the collateral/deposit problem as the most severe; large companies and Greater Minnesota firms cited capital costs as the leading barrier.

Since these areas of friction are, largely, functions of the competition in credit markets, it is instructive to look at other barriers. As presented in Table 8, these include lending limits imposed by banks and local availability of funds. Exporters and high technology firms cite the amount of business control required by equity investors and cash flow requirements as problematic. Lack of knowledge about funding sources and local availability are barriers for some Greater Minnesota companies.

Table 8 Barriers to Capital *(percent rating "high")*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Cost	21%	28%	29%	22%	7%
Collateral Requirements	25	29	34	37	14
Lending Limits	20	22	24	20	15
Cash Flow Requirements	18	14	27	23	8
Know Where to Go	10	16	17	14	10
Local Availability	17	20	22	20	11
Risk of Project	10	9	17	17	3
Discrimination	2	1	4	2	-
Return Requirements by Equity Investors	12	6	12	10	7
Control Requirements by Equity Investors	13	6	28	14	8
Lack of Market for Public Offering	10	8	19	7	11

Table 9 Satisfaction with Sources of Capital *(percent "somewhat satisfied" — score of 3 or 4)*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Stock Off	33%	19%	26%	34%	76%
Venture Capital	22	23	26	31	44
Personal Equity	62	46	63	69	50
Retained Earning	57	53	46	55	82
Bond Sale	29	22	40	40	32
Commercial Paper	42	16	35	28	77
Commercial Loan	73	67	62	66	90
Government Loan	41	22	45	25	43
Grant	21	27	15	18	30

Again, it should be noted that the severity of these barriers was reported to be relatively low. No more than one-third of the respondents in each group ranked any single barrier as severe.

Sources and Uses of Capital

Businesses were also asked to rate their satisfaction with various sources of capital. As presented in Table 9, the most commonly used sources — personal equity and commercial loans — were also rated as the most satisfactory source of capital. The proportion of firms reporting that they were satisfied with commercial loans ranged from a high of 90 percent of the large firm group to 62 percent of the exporters group.

Table 10 Uses of Capital *(percent by type)*

Uses	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Working Capital	64%	54%	65%	65%	54%
Inventory	44	56	55	51	24
New Equipment	63	61	60	59	65
R&D Expenses	12	15	29	32	17
Land	20	12	16	13	32
Building	49	36	39	35	47
Extinguish Debt	4	6	20	13	13
Refinance Debt	19	16	24	19	23

"Venture capital is quite difficult to secure in Minnesota, especially if the venture is risky. In such cases, seeking money from outside the state is imperative." (Focus group member)

"Exporters have special problems because lenders are reluctant to include international sales as part of the borrowing base." (Focus group member)

Among private sector sources, venture capital received the lowest satisfaction rating. Only 22 percent to 44 percent of the firms in the five groups rated it as even somewhat satisfactory. Government financing, especially grants, also received low satisfaction scores.

Funds were used primarily for purchasing new equipment, working capital, financing inventories, and purchasing buildings (Table 10). Surprisingly, nearly one-third of exporting and high-technology firms reported using capital for R&D expenses.

Table 11 Importance of Labor Groups *(percent rating "very important")*

Groups	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Management	73%	70%	69%	63%	79%
Professional/Scientists/Engineers	25	15	45	43	50
Technical/Skilled	46	34	36	42	48
Clerical/Sales	44	28	24	29	42
Unskilled	14	18	12	12	19

Table 12 Difficulty Recruiting *(percent rating "somewhat difficult" — score 3 or 4)*

Groups	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Management	63%	61%	68%	64%	59%
Professional/Scientists/Engineers	60	67	66	68	69
Technical/Skilled	61	71	60	53	51
Clerical/Sales	39	35	33	35	29
Unskilled	22	23	15	13	15

Difficulty Retaining

Groups	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Management	30%	39%	38%	33%	23%
Professional/Scientists/Engineers	29	50	33	40	33
Technical/Skilled	36	44	31	38	33
Clerical/Sales	29	24	24	23	26
Unskilled	38	32	29	23	28

MINNESOTA BUSINESSES REPORT DIFFICULTY RECRUITING THE MOST IMPORTANT AND HIGHLY SKILLED LABOR GROUPS, BUT LITTLE PROBLEM RETAINING WORKERS.

Businesses in each of the groups rated the importance of, and difficulty in, recruiting and retaining five occupational groups. At least 59 percent of each group reported some difficulty recruiting management — the occupational group rated as most important by all five groups (see Tables 11 and 12).

Table 13 Current Personnel Issues *(percent rating "very important")*

Issues	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Rising Labor Costs	56%	55%	48%	47%	39%
Lack of Skills	31	26	21	23	29
Declining Labor Supply	28	18	14	12	30
Drug/AIDS Testing	11	12	7	4	14
Health Benefits	56	47	51	50	53
Parking/Commuting	4	1	2	0	4
Day Care	3	3	3	3	7
Organized Labor	14	12	11	5	19
Work Force Diversity	8	5	3	5	7
Retirement/Pensions	15	14	11	12	13
Alternative Work Schedules	6	6	5	6	4

"Lack of skilled labor prevents selectivity in hiring — with negative consequences for productivity." (Focus group member)

"Relocation of dual worker families is becoming a problem: the spouse of the relocated worker cannot always find appropriate work." (Focus group member)

A vast majority also reported difficulty recruiting the two next most important groups as well. From 60 percent to 69 percent of the firms in the groups reported some difficulty recruiting employees in the professional/scientists group. From 53 percent to 71 percent of the firms in the five groups reported difficulty recruiting skilled and technical workers.

In comparison, a far smaller proportion of firms reported difficulties retaining staff. Nearly two-thirds of firms in all groups reported little difficulty retaining the occupational groups rated most important, and less than 10 percent reported severe difficulty. The one exception is firms in Greater Minnesota, with 50 percent reporting some difficulty retaining professionals and scientists.

COST ISSUES RANK AS THE MOST IMPORTANT PERSONNEL ISSUES IN COMPANY OPERATIONS. LACK OF SKILLS ARE ALSO A CONCERN.

Minnesota's manufacturers viewed the costs of employee health benefits and the rising costs of labor generally as their top-ranking personnel issues at the time of the survey, and they see no relief in the next five years (Table 13). Reflecting this general concern with personnel costs, workers' compensation and unemployment insurance are the government costs cited as having the greatest impact on companies (see further discussion in Role of Government Section).

Table 14 Formal Training

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Percent Providing Formal Training	81%	61%	73%	74%	96%
(percent rating very important)					
Reasons					
Meet Increased Complexity of Jobs	42%	34%	30%	35%	42%
Teach Company Procedures	40	31	25	28	31
Correct Basic Skills Deficit	19	17	15	15	15
Encourage Career Advancement	20	13	18	17	20
Improve Quality/Productivity	67	62	67	53	66
Manage Employee Turnover	24	21	14	13	15
Reduce Absenteeism	13	17	11	9	8
Increase Workplace Safety	40	52	43	30	34

"Health benefits are a major concern, but it is not clear how the state government can address the issue." (Focus group member)

Aside from costs, skill and availability of labor also emerge as significant concerns for firms in all five groups. Other issues, such as drug testing and day care, are not rated as very important.

MINNESOTA COMPANIES APPEAR TO BE UNDERTAKING QUALITY IMPROVEMENT STRATEGIES — BOTH THROUGH HUMAN AND CAPITAL INVESTMENTS.

Survey participants identified frequently offered training topics and reasons for offering training. As presented in Table 14, the vast majority of the firms in all of the groups provided formal training and the most common reason given was to improve the quality of goods and services and worker productivity. It is not surprising, then, that the two most frequently offered topics were quality control for manufacturing processes and customer service (see Table 15).

Business participants were also asked to rate the importance of four groups of technologies. The majority of firms rated systems to improve quality/productivity as currently important and three-fourths projected that they will be important to their business in the next five years (see Table 16).

Table 15 Training Topics Covered *(percent indicating "often")*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Manufacturing					
Processes/Equipment	38%	36%	41%	41%	39%
Engineering/Scientific Technology	14	9	19	24	20
Quality Control	47	47	47	47	48
Marketing/Sales					
Customer Service	54	38	40	40	50
International Sales	5	2	5	6	2
Foreign Language	0	0	0	2	0
Marketing/Sales	37	20	22	31	30
Administrative					
Clerical/Office	15	10	12	16	15
Computer Skills	17	19	25	26	27
Managerial					
Strategic Planning	21	21	22	26	25
Supervisory	36	27	32	38	43
General					
Basic Skills	12	11	7	8	7
Communication	23	13	14	17	16
Career Development	6	9	7	10	8
Interpersonal	18	9	16	15	20

Table 16 Importance of Quality Improvement Systems

Percent Reporting Important:	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Currently	65%	56%	70%	69%	82%
In 5 years	78	68	84	80	92

"Whether or not firms are fully committed to the quality movement, the important thing is that they are at least saying that quality is important." (Focus group member)

Table 17 Changes in Staffing *(percent reporting "no change")*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
	25%	51%	25%	33%	24%

(percent increasing — score of 3 and 4)

Groups	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Management	70%	57%	61%	68%	65%
Professional/Scientists/Engineers	67	57	74	80	69
Technical/Skilled	82	75	85	86	74
Clerical/Sales	67	43	54	58	47
Unskilled	59	41	58	46	39

"The unskilled worker will become extinct." (Focus group member)

"Lack of skilled workers is becoming a crisis in the state." (Focus group members)

Major Themes: Issues and Plans for the 1990s

Participants in the survey were asked a series of questions regarding their plans for the 1990s and were asked to identify issues of importance to them in the years ahead. Minnesota's businesses are poised for change and growth in the 1990s. Two-thirds of the companies surveyed will introduce new products and three-fourths will change the basic profiles of their staffing within the next five years. One-half will change transportation modes. Firms in Greater Minnesota appear to be the exception to this pattern, with fewer companies reporting plans for change of any type.

BUSINESSES WILL DEMAND AN INCREASINGLY SKILLED LABOR POOL, AND THERE IS SOME CONCERN ABOUT SHORTAGES OF REQUIRED SKILLS.

Two-thirds to three-fourths of the firms surveyed reported plans to change staffing in the next five years. Greater Minnesota firms were the exception to this, with 51 percent reporting no plans for staffing changes. As presented in Table 17, within the next five years, companies planning changes in staffing are most likely to increase their employment of technically skilled staff (between 74 percent and 86 percent plan to do so); professionals, scientists, and engineers (from 59 percent to 80 percent anticipate increases); and managerial-level people (57 percent to 70 percent will expand this group). In contrast,

Table 18 Percent Introducing New Product/Service

Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
64%	53%	83%	82%	78%

Table 19 Importance of Research and Development in Five Years

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Percent Rating "Very Important"	34%	29%	57%	55%	53%

fewer than one-half of the firms in the Greater Minnesota, high technology and large firms groups report plans to add unskilled labor to the payroll.

Clearly the laborforce will become much more technical in the 1990s. Not surprisingly, the highest share of high technology companies expect to add technically trained staff. However, all groups without exception see the trend and expect to respond to it. Management employees rank third on the list of occupations to be increased. With some exceptions clerical/sales and unskilled labor will decline in relative proportion. Although a majority of small-to-medium-sized high growth and exporting companies plan to increase unskilled workers, higher shares plan to increase skilled and professional staff.

This shift up the skill hierarchy is likely to cause skill shortages and strain training institutions. Companies foresee lack of skill to be the most important non-cost personnel issue of the future. Nearly one-third of firms from each business group rate skill shortages as a very important problem to their business in the next five years.

MINNESOTA'S MANUFACTURERS VIEW PRODUCT AND TECHNOLOGICAL INNOVATION AS INCREASINGLY IMPORTANT AND PLAN TO INVEST SIGNIFICANTLY IN RESEARCH AND DEVELOPMENT.

The vast majority of firms from all of the business groups, except Greater Minnesota manufacturers, plan to introduce a new product or service in the 1990s. As displayed in Table 18, from 64 percent of small, fast-growing firms, to more than 80 percent of high technology and exporting firms reported plans to develop a new product or service in the next five years. Only 53 percent of Greater Minnesota firms reported such plans.

Similarly, more than one-half of the companies in the exporters, high technology and large firm groups consider R&D investments as very important to their businesses in five years (Table 19). Small-to-medium growing companies and Greater Minnesota companies see technology as somewhat less central to their enterprises — now and in the future. Only 29 percent of Greater Minnesota firms reported that R&D

Table 20 Importance of Technologies in Five Years *(percent rating "very important")*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Automation Equipment	47%	40%	49%	40%	57%
Communication Equipment/Systems	44	29	30	31	53
Quality/Productivity Equipment/Systems	46	34	45	40	48
Advanced Materials (Composites)	30	31	34	35	32

"Research and development investment forecasts in the survey may seem high but are likely to turn out to be too low. High tech companies must continuously innovate to stay up with technology." (Focus group member)

"Low reliance on the university as an R&D supplier is surprising. One reason, perhaps, is academic reluctance to engage in the development aspect of research and development." (Focus group member)

"Low levels of research and development and introduction of new products in Greater Minnesota reflects the nature of the typical firm. It is a small shop mass-producing components for other firms." (Focus group member)

will be very important to their business operations in the next five years.

According to survey respondents, the bulk of research, generally more than 80 percent, is performed in-house. Less than 10 percent is conducted by or with academic or government institutions. As R&D investments increase in importance in the next five years, it will continue to be conducted in-house.

Very large majorities in each group plan to increase R&D expenditures over current levels in the next five years. A majority of the companies in the large, high technology and exporters groups reported that R&D will be very important to them in the next five years. Small, fast-growing companies and Greater Minnesota companies also suggest that innovation will play a much greater role in their operations in the future. Firms in these groups increased their ratings of R&D by 20 percentage points, from "current" importance to importance "in five years."

Surveyed firms not only plan to develop and introduce new products, they also plan to use new technologies in the production and

Table 21 Changes in Transportation

Percent Planning Change	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Truck	50%	41%	46%	45%	46%
Air	67	28	59	66	61
Rail	67	23	59	63	63
Barge	69	19	64	64	66
Freight	67	37	63	63	60

Table 22 Severity of Future Transportation Problems *(percent rating "very severe")*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Reduction of Air Service Availability	17%	10%	21%	23%	25%
Reduction of Air Service Quality	15	13	19	16	16
Airport Congestion	9	7	16	15	16
Lack of Rail Service	7	16	6	7	9
Deterioration of Roads/Bridges	25	33	29	24	27
Inadequate Shipping Services	25	24	39	27	13
Poor Road Access	25	30	20	16	10
Road Congestion	26	27	17	16	20
Lack of Mass Transit	10	9	2	5	4
Transportation of Hazard Waste	11	11	11	12	10
Increasing Cost	49	44	50	47	35
Reduction in Trucking Service Availability	29	39	47	32	22

delivery of goods and services. When asked to rank the importance of four categories of technologies to their business operations in the next five years, at least one-third of businesses in all groups rated them as very important and more than two-thirds rated them as somewhat important. As displayed in Table 20, this pattern held true even for Greater Minnesota manufacturers.

INCREASED DEMAND FOR TRANSPORTATION SERVICES RESULTS IN BUSINESS CONCERNS FOR ROAD AND SERVICE ADEQUACY.

The majority of firms in each business group surveyed, except the Greater Minnesota group, expect changes in transportation in the next five years. As displayed in Table 21, 60 percent of firms plan changes in air, freight, barge and rail use. The majority of firms planning changes intend to increase use of truck, air and freight services while decreasing use of barge and rail transportation.

Firms also rated the severity of future transportation problems. After cost issues, which always rank high, deteriorating roads and inadequate trucking services were ranked as most severely affecting their business in the next five years as displayed in Table 22. Exporters, high technology firms and large firms also rated reduction of air service availability as problematic. Evidently, Minnesota businesses fear that increasing demands for transportation services in the years ahead may strain current transportation systems.

Table 23 Overall Impact of Taxes and Regulations

Impact	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
4 (*Very Significant*)	61%	60%	55%	53%	59%
3	29	26	32	35	35
2	6	6	7	7	5
1 (*No Impact*)	4	8	6	5	1

Table 24 Rank of Taxes *(rating 1 - 8, 1 equals "highest")*

Taxes	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Workers' Compensation	1	1	1	1	1
Unemployment Insurance	3	2	2	2	3
Corporate Income Taxes	2	4	3	3	2
Commercial/Industrial Property Taxes	4	3	4	4	4
Personal Income	5	5	5	5	5
Residential Property	7	7	6	7	7
Sales Taxes	6	6	7	6	6
R&D Tax Credit	8	8	8	8	8

"Government should recognize that Minnesota businesses are increasingly playing in an international marketplace; they need a level playing field." (Focus group member)

Major Themes: Impact and Role of Government

Many business climate studies, including the 1990 Minnesota Enterprise Business Survey, ask businesses to report on the impact of tax costs and regulations on their business operations. The Enterprise Survey is unique, however, because it also attempts to evaluate the quality of government technical assistance and to understand businesses' priorities for government services and recommendations for government spending.

MINNESOTA COMPANIES VIEW TAXES AND OTHER IMPOSED COSTS AS HAVING A MAJOR IMPACT ON OPERATING COSTS. WORKERS' COMPENSATION LEADS THE LIST.

The majority of Minnesota businesses surveyed in each of the groups rated taxes and other governmentally-imposed costs as having a very significant impact on the costs of doing business (Table 23).

In order to differentiate among various taxes and government costs, businesses ranked the impact of eight separate taxes for their impact

Table 25 Impact of Regulations *(percent rating "very significant")*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Pollution Control Regulations					
Air Pollution	15%	22%	12%	22%	21%
Water Pollution	14	25	15	27	23
Toxic Waste	14	18	18	29	19
Solid Waste	25	27	20	28	27
Employment Regulations					
Hiring and Selection	21	19	12	16	33
Hours and Wage	27	24	15	13	20
Civil Rights	10	8	6	6	22
Health and Safety	20	38	21	37	26
Liability Insurance	48	48	45	46	28

on their operations. Workers' compensation ranked highest by far — with every group ranking this category as having the most impact. Unemployment insurance levies were ranked second by three groups: Greater Minnesota firms, high technology firms and exporting companies. The corporate income tax ranked second for the small, high-growth firms and large firms groups (Table 24).

Somewhat surprisingly, personal income taxes, which have received sharp criticism from business groups, ranked fifth. This was especially surprising given the difficulty reported in attracting management and skilled employees. One reason reported by the survey respondents for recruiting difficulties is high personal income taxes in Minnesota.

POLLUTION CONTROL AND EMPLOYMENT REGULATIONS ARE NOT PERCEIVED AS HIGHLY BURDENSOME.

The surveyed companies rated the impact of regulations — specifically, pollution control, employment and liability insurance regulations — on the successful operation of their businesses. Only a minority of businesses rated regulatory programs as having a significant or very significant impact. With the exception of liability insurance, far smaller proportions of firms rated these regulations as having a very significant impact than taxes and regulations as a whole, as displayed in Table 25. Employment regulations and product liability insurance were perceived as more burdensome than environmental compliance.

Pollution Control Regulation

The most significant impact from pollution control regulations reported by the companies in all groups was solid waste management. As presented in Table 25, roughly one-quarter of the firms from each group rated it as very significant, most likely because it touches the majority of operations and is a frequently encountered, recurring cost. Other pollution control regulations were rated similarly, with from 14 percent to 25 percent of firms rating their impact as very significant and less than 50 percent typically rating their impact as even somewhat significant (score of 3 and 4).

As presented in Table 26, technical assistance support from government for help in complying with pollution regulation was generally rated fair to poor by the majority of firms. No significant differences between programs (air, water, etc.) appeared, suggesting general difficulties in dealing with regulatory agencies. Large firms gave technical assistance far better ratings than the other groups, with a majority rating all programs good or excellent.

Table 26 Quality of Technical Assistance *(percent rating "good" or "excellent" — score of 3 or 4)*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Pollution Control Regulations					
Air Pollution	32%	39%	40%	40%	63%
Water Pollution	36	49	50	42	61
Toxic Waste	40	42	51	41	55
Solid Waste	35	45	45	39	57
Employment Regulations					
Hiring and Selection	37	39	41	37	59
Hours and Wage	42	45	47	35	65
Civil Rights	35	43	40	33	57
Health and Safety	45	61	48	42	69
Liability Insurance	43	51	40	34	62

"The computer industry has serious disposal problems. Survey results do not adequately reflect this fact." (Focus group member)

"OSHA is a reformed operation and very helpful — service and client oriented." (Focus group member)

Employment Regulation

The survey also investigated the impact of four programs that regulate employment standards. Of these, the program with the most significant impact was occupational health and safety standards (OSHA) with from 20 to 38 percent rating the impact as very high. Large firms reported hiring and selection regulations to be the most burdensome of all regulations.

On the whole, employment regulations were viewed as having somewhat more impact than rules associated with pollution control. In light of the companies' strongly-expressed concerns over the employment issue — availability, cost, skills, etc. — this result is not surprising.

Companies rated technical assistance available in each of the areas in roughly the same way as they rated compliance assistance received in the pollution area (Table 26). The OSHA program stands out, with 69 percent of large firms and 61 percent of Greater Minnesota firms rating technical assistance as good or excellent. This finding is especially notable given the high impact these particular regulations are reported to have on business operations.

Liability Insurance

Liability insurance requirements were rated as the most burdensome regulatory issues by far by four of the five groups. More than 40 percent of firms rated the impact of these requirements as "very significant" in the small, fast-growing, Greater Minnesota, high technology and exporters groups.

Table 27 Satisfaction with Training Providers *(percent satisfied, score of 3 or 4)*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
In-House	82%	77%	70%	68%	82%
Vo-Tech Education	58	51	67	44	55
University/College	59	53	67	46	56
Primary/Secondary (Basic Skills)	41	67	45	27	42

"The education system is not teaching the appropriate skills. Emphasis on soft subjects or irrelevant vocational specialties does not prepare students well for the workplace." (Focus group member)

Surprisingly, only 28 percent of large firms rated this area as having significant impact on their operations. Technical assistance for this area is not highly rated, with as few as one-third of the high technology group rating it as good or excellent (see Table 26).

BUSINESS GROUPS HAVE INTENSE CONCERNS ABOUT THE QUALITY AND EFFICIENCY OF PRIMARY AND SECONDARY SCHOOLS.

Aside from in-house training programs, Minnesota companies consider primary and secondary schools as the **most important** source of formal training — and are also **least satisfied** with the performance of this segment of the educational establishment. Other public institutions — vocational schools, community colleges and universities — were all rated as more satisfactory than the primary/secondary education system. For example, only 27 percent of high technology firms rated primary/secondary institutions as even somewhat satisfactory. Greater Minnesota companies were more satisfied with their elementary and high schools than the other groups (Table 27).

The reasons for corporate dissatisfaction with the primary and secondary education system are not clear. For example, when asked why they provided training, the response **"Correction of Basic Skills Deficits"** was rated relatively low, ranking sixth of the eight reasons listed. Furthermore, among the training topics they offer most frequently, the topic **"Improvement of Basic Skills"** ranked among the lowest now, and also for the future.

As will be discussed below in detail, the firms in the survey consider primary and secondary education to be the most important service of government and are willing to spend more money on these services. Low satisfaction with a government function considered to be so important by the business respondents suggests serious deficits in the current system.

BUSINESSES RECOMMEND DECREASED PUBLIC SPENDING IN MOST AREAS BUT ARE WILLING TO SPEND MORE ON PROGRAMS AND SERVICES THAT ARE IMPORTANT TO THEIR BUSINESS.

Drawing from categories listed in the United States Department of Commerce publication *Government Finances*, exporters were asked to rate the importance of, and recommend spending changes for,

Table 28 Importance of Government *(percent rating "very important")*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Education					
Elementary/Secondary	69%	59%	63%	57%	67%
Higher Education	49	39	47	52	58
Libraries	26	14	20	22	15
Social Services					
Public Welfare	10	8	7	8	7
Hospitals	18	16	14	24	22
Health	21	25	21	28	28
Employment Security	13	12	10	9	7
Transportation					
Highway	34	44	34	35	37
Air	16	6	23	27	26
Water	3	4	3	4	5
Public Safety					
Police Protection	26	24	29	25	31
Fire Protection	28	35	37	32	40
Corrections	11	9	14	15	10
Protective Regulations	8	8	7	9	9
Environment and Housing					
Natural Resources	22	27	19	22	21
Parks & Recreation	16	15	11	16	19
Housing and CommunityDevelopment	13	14	9	11	16
Sewerage	14	19	14	17	17
Other Sanitation	10	17	11	16	10

"Willingness to spend more is a function of the objective and the benefit it may bring. Reluctance to spend more reflects doubt about effectiveness — either of the policy or its execution." (Focus group member)

19 government service categories. The survey provided both United States and Minnesota expenditures per capita for all 19 categories to allow comparisons of current spending levels.

As shown in Table 28, a majority of Minnesota companies in all five groups rated elementary and secondary education as the most important public sector activity, with roughly 60 percent rating it very important. Next in importance came higher education with between 40 percent and 50 percent of firms in each group rating it very important, followed by highway construction/maintenance and fire and police protection. Roughly one-quarter of firms rated public health services and natural resource development as very important as well.

Government services rated least important were water transportation, employment security and public welfare programs, each with 5 percent or less of firms rating them as very important to their operations.

Table 29 Government Spending *(percent rating "increase spending" — score of 3 or 4)*

	Small/High Growth	Greater Minnesota	Exporters	High Technology	Large
Education					
Elementary/Secondary	66%	56%	63%	58%	65%
Higher Education	60	51	55	57	59
Libraries	41	32	40	43	35
Social Services					
Public Welfare	7	9	7	11	11
Hospitals	32	32	25	30	30
Health	44	39	41	45	45
Employment Security	13	19	16	13	13
Transportation					
Highway	58	63	58	56	56
Air	32	21	39	40	40
Water	8	14	10	9	9
Public Safety					
Police Protection	53	51	56	54	57
Fire Protection	51	52	53	56	59
Corrections	33	31	34	36	32
Protective Regulations	18	20	18	20	20
Environment and Housing					
Natural Resources	49	42	51	40	47
Parks and Recreation	42	33	40	36	33
Housing and Community Development	29	31	24	6	24
Sewerage	36	46	36	8	39
Other Sanitation	38	54	37	8	37

As displayed in Table 29, the majority of companies recommended less public spending on most of the programs listed in the survey. However, a majority was willing to spend at least slightly more on those programs they rated as the most important to their business operations: elementary and secondary education, higher education, highways, and police and fire protection. Together, these programs accounted for 40 percent of all state spending in 1988. Forty percent or more of the firms in each group also recommended somewhat increased spending on natural resource development and health care. Very small proportions of firms, generally less than 20 percent, recommended significantly increased spending, with a rating of 4, on any government service, even education.

Conclusion

Minnesota firms in key groups appear to find the state a good place to conduct business in terms of the physical and capital infrastructure. They report some difficulty recruiting key, specialized personnel but little problem retaining them. They are attempting to improve the quality of their goods and services.

They look to the future as a time of growth and appear to be planning for, and even embracing, change — in staffing, in product development and in technological innovation. Firms in Greater Minnesota do not report plans to change to the same extent planned by firms in the other groups.

Firms are planning increased employment in skilled and professional occupations, relative to unskilled groups. This shift up the skill hierarchy may strain existing training institutions and firms are concerned about skill shortages.

The overall cost of government is considered burdensome and firms do not support increased government activity in general. Their responses suggest a view of government as laying the foundation that enables business to operate, rather than an activist to influence business decisions.

However, they perceive government playing an important role in providing basic public services, maintaining the infrastructure and educating the workforce, and they are willing to pay for those services.

The Challenge to Change:

Minnesota businesses appraise current conditions, future plans and government roles in the 1990s.

Introduction

Purpose of the Study

The mission statement of the Department of Trade and Economic Development (DTED) states that "Based upon an understanding of regional and structural economic strengths, DTED develops and implements policies and programs that create a favorable environment for economic development."

In order to meet that mission, the Office of Information, Analysis and Evaluation undertook the Minnesota Enterprise 1990 Survey of Business to improve the Department's understanding of businesses' views of current conditions and their plans for the 1990s. The Department had not conducted a business attitudes survey since 1984 and had never conducted one that assessed the distinct views of the department's various business constituents.

As the 1980s have drawn to an end, the fundamental structure and operation of the economy is changing. Markets are becoming increasingly internationalized. Minnesota's exports to international markets increased by nearly 40 percent in just two years, between 1987 and 1989. Whether or not firms export to international markets, they increasingly compete with international goods available in domestic markets. Technology is also changing at an increasing pace. For example, the 1980s saw the maturation and decline of the mainframe computer industry and its resulting impact on the Minnesota economy.

If Minnesota public policy is to support continued economic growth in the decade ahead, it is critical to understand how business leaders plan to respond to these changing economic conditions and whether or not the state's business environment is adequate to support that response. The Minnesota Enterprise 1990 Survey of Business represents DTED's most extensive effort in the past decade to identify factors which businesses consider likely to affect their success.

Timing and Process

The Office of Information, Analysis and Evaluation initiated the study in late 1989. First, a survey instrument was drafted with questions designed to address the adequacy of basic factors of production — labor, capital and material and service inputs, especially government services and costs. Focus group sessions with leaders representing five of DTED's chief business constituent groups — small high-growth firms, exporting firms, Greater Minnesota manufacturers, high technology firms and large firms — were conducted to review the survey. Based on their feedback, the survey was revised, with increased emphasis on plans for the future among the resulting changes.

Survey samples were drawn independently for each of the five business groups from commercially available business lists. A precise definition of each group is included in the introduction to each chapter. Samples were designed, with an expected rate of return of 50 percent and based on a 95 percent confidence level that the margin of error would be plus or minus 5 percentage points.

Surveys were distributed and completed in March and April of 1990. The timing turned out to be advantageous, avoiding both the political campaigns and economic downturn that occurred in the late summer and fall of 1990. As a result, the survey responses are more likely to reflect broader views and opinions, rather than cyclical problems or desired political outcomes.

In order to achieve the targeted 50 percent return rate, two sets of surveys were mailed. All businesses that had not completed their survey after two mailings were given a reminder telephone call. The resulting response rates, reported in the individual chapters and in the Executive Summary, range from 46 percent of Greater Minnesota firms to 57 percent of small high-growth firms. This rate of return allows a 95 percent confidence level that the margin of error of the results is within 5 to 7 percentage points for all groups.

Data entry and initial tabulations were completed over the period of June through August, with analysis and chapter drafts prepared from September through November, 1990. After initial analysis, focus group members were reconvened in early October to help interpret the results and give focus to the final analysis. Selected comments from these focus group sessions are included in the Executive Summary.

Survey Structure

The final survey instrument, in Appendix A, includes questions in the following categories: background information, labor availability and costs, employee training, impact of taxes and regulations, finance issues, energy and transportation, and technology and research and development investments. The small-to-medium-sized exporters survey also contained a section on international trade.

Most of the questions in the survey asked businesses to rate an issue or factor of production on a four point scale: a score of "4" means very important or very satisfied and a score of "1" means not important or not satisfactory. The scale allowed firms to discriminate among levels of satisfaction or severity of problem, but did not provide a neutral point. Thus, it required survey participants to determine whether they viewed an issue as marginally problematic or not; or rate a factor as marginally satisfactory or not.

As with most business attitudes surveys, businesses were asked to rate the impact of taxes and regulations on their businesses. The Minnesota Enterprise 1990 Survey of Business is unique, however, because it also seeks business views on the importance of government services and recommendations for spending on those services. Based on the U.S. Department of Commerce, Bureau of Census publication Government Finances, firms were asked to rate the importance of 19 categories of government programs on a four point scale from "4"- very important to "1"- not important. They were also provided 1988 per capita spending levels for Minnesota and the United States and were asked to recommend changes in government spending. Again, the four point scale was used, with"4"- spend more and "1" - spend less. No "spend the same" option was provided.

Analysis

Analysis and results are presented for those responses that could be described as having a low probability that random variation alone could have caused the observed differences. Thus, when confidence intervals for results overlap, differences are generally not reported.

At the 95 percent confidence level, intervals range from plus or minus 5 percent for groups with a 50 percent response rate to plus or minus 7 percent for the group with the lowest response rate of 46 percent. The survey result that 63 percent of exporters plan to introduce a new product or service in the next five years can be interpreted that 95 percent of the time the response to the same question would be between 56 percent and 69 percent (63 percent, plus or minus 7 percent).

Nonrespondents are excluded in calculating proportions. Thus, reported percentages are of those firms actually completing the question. However, to avoid nonrespondent bias, we omitted all questions where more than 25 percent of the firms did not complete the question. Overall nonresponse for the vast majority of questions was low, generally less than 10 percent.

Structure of the Report

Detailed results from the five business groups are presented in the five following chapters. In each chapter, results are organized into the following sections: introduction/review of the literature; current conditions and issues; future plans and issues; priorities for government and summary/conclusions. Intergroup comparisons are provided in the Executive Summary.

Small and Medium-Sized High Growth Companies

by Kevin L. Olsen, Economic Analyst

Introduction

In the 1980s state and local development strategies focused on "growing their own" local businesses and encouraging the start-up of small businesses that would grow up to be the major corporations of tomorrow. However, the small business sector proved to be very turbulent. Many jobs were generated by small businesses but many jobs were also lost. Challenging though it may be, small business assistance remains the focal point of Minnesota's economic development approach.

Description of Small and Medium-Sized Firms in Minnesota

According to the U.S. Small Business Administration, small and medium-sized businesses, those with 20 to 499 workers, employed more than half a million Minnesota workers, or 32 percent of the workforce, in 1986.

While small and medium-sized firm (SMF) employment grew at a slower rate than total national employment, the lag was even greater in Minnesota. At the national level, total employment grew by 13 percent and SMF employment increased 10 percent between 1984 and 1986. Employment growth for Minnesota SMFs grew only 4 percent compared to a state growth rate of 10 percent for the same time period.

SMFs constitute a significant share of employment in all of Minnesota's industries. SMFs employ 37 percent of service industry workers and 36 percent of wholesale and retail trade workers. SMFs are least important in agricultural services where their share of employment is only 18 percent. The rest of the industries have shares that fall between 20 and 30 percent.

The picture changes when looking at the distribution of firms. Here manufacturing has the largest share of SMFs comprising more than one-quarter of all manufacturing firms. Next is transportation (21 percent), followed by trade (19 percent), services (18 percent), and finance, insurance and real estate (FIRE) (18 percent). The agricultural services and mining/construction industries are dominated by large-sized firms. Minnesota's distribution is similar to the nation's.

Shares of employment held by very small, small and medium, and large firms shifted somewhat between 1976 and 1984, with very small firms and small and medium firms declining moderately and large firms increasing slightly. However, after 1984 this trend accelerated with very small firms actually losing more than 5,800 jobs, causing their share of total employment to drop 12 percent. SMFs declined moderately losing 5 percent of their share. Large firms showed an increase in share of 9 percent. This may have been caused in part by the fact that large businesses tend to rebound more quickly after a recession than smaller businesses.

Employment shares for the United States remained relatively stable, showing the same trends, but to a much lesser extent.

Despite this lagging employment growth Minnesota has been consistently recognized as a "good place" for fast-growing small and medium businesses.

For example, Minnesota consistently ranks high in Business Week magazine's annual ranking of high-growth small firms. Only California and Florida have had more high-growth companies on this list in the past three years. Minnesota ranks highest on a per capita basis. Minnesota also does well in INC.'s annual list of 100 fastest growing small firms. In a 1988 INC. article, Minneapolis ranked number nine in the country as a "hot manufacturing center" with its high concentration of fast growing small firms. (Kotkin, Tomlinson)

The Importance of Small and Medium-Sized Firms

Birch states that most cities in the U.S. lose about 7 or 8 percent of their job base every year, regardless of their economic condition. The difference is how successful cities are in replacing the jobs that are lost. (Birch 1987)

While the importance of small and medium-sized businesses in job growth has probably been overblown, they still provide more than half of net new jobs in Minnesota. (Venegas)

Innovation

According to some studies, smaller firms may be more innovative because they are more adaptable and flexible. Unlike large firms which are sometimes burdened with layers of creativity-stifling bureaucracy, smaller firms can be more entrepreneurial. (Brock and Evans, OTA)

While the evidence is mixed, some research shows that firms with less than 500 employees generate more innovation per employee than larger firms, especially in manufacturing. (Brock and Evans, SBA)

Innovation can also differ by industry mix. Smaller firms are more innovative in industries with high proportions of skilled labor. Other industries where smaller firms have high innovation rates are characterized by low capital intensity, low concentrations, low unionization and standardized products. (Acs and Audretsch, Brock and Evans)

Competitiveness

The economy is becoming more competitive and subject to changes from abroad. These new economic conditions demand that firms be more flexible. Larger establishments' advantage in terms of scale efficiencies, where larger size leads to lower costs, is giving way to the need for flexibility which is more characteristic of smaller firms. (Brock and Evans)

Entrepreneurship booms in time of decline. Some studies show that small businesses generally do better in a recession because they do not decline as fast as large industries. This helps to even out the effects of an economic downturn.

"Stable or declining industries (such as steel, textiles, or paper) tend to engender large concentrations of rapidly growing companies," according to David Birch, an economist with Cognetics, Inc. in Cambridge, Massachusetts. Conversely, successful industries are dominated by large companies. (Birch 1988b)

Labor

Smaller businesses tend to hire types of people that are less likely to be hired by larger firms. This helps reduce dependence on large businesses for employment. Smaller businesses hire more part-time, women, blacks, teenagers, older, low-skill, entry level, previously unemployed workers. "The differences are greatest for women. Women who have left their previous job for 'personal or family reasons' . . . are far more likely to be hired by small companies."(Brock and Evans, SBA)

Beyond purely economic reasons, SMFs are important because they represent an important value in American society: working for oneself. This value is reflected in the political process where all levels of government have acted to assist small businesses.

States' efforts to influence small business formation and growth gained prominence in the early 1980s when large corporations were laying off thousands of workers and wreaking havoc on local economies. Also at this time Birch came out with his landmark study on the importance of small businesses in job growth.

State programs to assist small businesses through loan funds, technology parks, incubator programs and tax incentives have proliferated. According to Brock and Evans, however, "development and implementation of small-business policies have quickly outpaced economic research that might help guide these policies."

The growth in programs is evidenced by the U.S. Small Business Administration's directory of state small business programs which contains more than 400 pages of program listings. The Corporation for Enterprise Development (CfED) reports that all but four states offer small business financing, and all but four have small business development centers. (Mangelsdorf, CfED)

In Minnesota, too, programs have been implemented to help small and medium businesses with planning, financing, managing, procuring government contracts, product researching and exporting. These services are provided by state departments, public agencies and public-private partnerships.

The Department of Trade and Economic Development (DTED) has programs specifically targeted at certain geographic areas and industries, and offers broader sources of assistance through the Minnesota Small Business Assistance Office and a statewide system of Small Business Development Centers. Aside from the efforts of state government there is widespread activity on the local and private, non-profit levels.

Problems Facing Minnesota Small and Medium-Sized Businesses: Location

Location has always been important but cost alone is not the only consideration when choosing a site for business creation or expansion. Some cities are expanding rapidly despite high costs for businesses. The important question is whether the costs are justified. (Birch 1987)

Smaller firms are more sensitive to location because they do not have the resources to provide all the services they need themselves. Smaller firms are more dependent on government services to provide snow removal, security, garbage disposal and airports. (Birch 1987)

There is a cost savings for small firms that locate near other smaller firms in similar industries. This lowers the cost of information and recruiting, and increases access to suppliers, distributors and business services. Also important, especially for high-growth high technology firms, are access to major research universities and independent research institutes and good telecommunications facilities. (Satterhwaite, OTA, Birch 1987)

Labor and Wages

Smaller firms are generally labor-intensive. If labor becomes scarce small businesses will be hurt because they cannot compete with the higher wages and benefits paid by larger firms. Already in some areas the declining number of young workers is hurting small business growth. (Brock and Evans)

Small businesses are more dependent on the local labor supply and are less able to bring in the workers they need from outside the region.

Finance

Much of the literature reveals that smaller firms have a harder time getting capital to finance their operations, especially in rural areas. The reasons given include: the high costs/low return of small loans, skeptical or conservative bankers and the frailty of small businesses. Research suggests that not only is it harder for smaller businesses to get credit, but credit is likely to dry up more quickly when money is tight. (Brock and Evans, Evans and Jovanovic, Fazzari, Hubbard and Petersen)

Government Policies

Government provides a mixture of constraints and benefits for small and medium businesses. Studies show that taxes and regulations may be more burdensome for smaller businesses due to their small capacity and the overhead required by some taxes and regulations. These requirements impose a fixed cost that appears to bear more heavily on smaller firms. (Brock and Evans)

Susan Suran, Oregon's first small business advocate, in her survey of Oregon's small businesses found that what most small businesses wanted from government was less hassles. However, she states that "politicians have built-in incentives to add new programs." (Mangelsdorf)

Description of Sample

In selecting the sample of small and medium high-growth firms, the DTED Economic Analysis Unit used the U.S. Small Business Administration's definition of 20 to 499 employees. Very small firms (less than 20 employees) were not included because their growth rates would be disproportionate to the actual number of jobs created. The other criterion for size was annual sales of at least $1 million. This was used to overcome the bias towards labor-intensive industries that an employment-only size criteria would entail.

High growth is defined as above average growth for the period from 1984 to 1987, the years covered by Dun's Market Identifiers (DMI). Average employment growth in Minnesota was 8 percent while average sales growth was 14 percent for the same period.

The sample was taken from DMI because this business data base reports both sales and employment over time. The list includes private and public U.S. companies that have five or more employees and companies with $1 million or more in sales. Firms are more likely to be listed in DMI if they have applied for credit, which may bias the sample toward successful and older companies.

DMI lists 48,841 firms in Minnesota and 10,339 firms in the 20-499 employee size category.[1] Of these, 1,232 Minnesota companies met the criteria for a small or medium-sized high-growth firm. Surveys were sent out to 512 firms and 293 were returned for a response rate of 57 percent.

Aside from the previously mentioned limitations, the number of firms selected from DMI were further reduced by the fact that companies were eliminated if no sales or employment figures were given in either of the years to calculate growth. The sample was also biased against recent start-ups because only firms in business since 1984 were included.

The sample was stratified by type of industry based on two-digit Standard Industrial Code (SIC) definitions. The largest industry in the sample was manufacturing with 35 percent of all small and medium-sized firms. Trade had the next largest share with 30 percent, followed by services with 15 percent. The rest of the industries all had shares of less than 10 percent. They were: mining/construction (9 percent), transportation (7 percent), FIRE (3 percent) and agricultural services (1 percent).

Description of the Respondents

The median age of the firms in the sample was 14 years. Eighty-seven percent of the firms were independent. Nearly three-quarters of the firms in this sample employed between 20 and 99 workers in Minnesota. Almost one-half of the high-growth firms reported annual revenues between $1 million and $4.9 million and another 31.5 percent of the firms had revenues of $5 million to $24.9 million.

Markets for these firms tended to be local. A surprising 22.5 percent of the firms reported that all their sales were in Minnesota. At the other end of the scale, 74.4 percent reported that they had no foreign sales and 43.6 said they had no national sales. Of the non-exporting firms only 11.3 percent were planning to export in the next five years.

In its continuing efforts to assist business development in Minnesota, the Department of Trade and Economic Development formulated a survey to assess the attitudes of Minnesota businesses toward current operating conditions, the future and the role of government.

[1]County Business Patterns shows 14,124 Minnesota establishments in 1987 and data from the U.S. Small Business Administration lists 16,259 establishments in Minnesota for 1986.

Table A-1 Importance of Occupational Groups

Occupational Groups	Number of Respondents	Very Important
Management	284	73%
Professional/Scientists/Engineers	252	25
Technical/Skilled	270	46
Clerical/Sales	274	44
Unskilled	262	14
n=289		

Importance of and Satisfaction with Operating Factors

As part of this survey, businesses were asked to evaluate their current business conditions. These conditions included labor, training, government, finance, energy, transportation, technology, and research and development.

Labor

As capital and technology become increasingly footloose, labor becomes the deciding criteria in growth and development. Constraints in the labor force constrain overall growth for business and the general economy.

One of the first questions examined was which occupational groups small and medium high growth firms considered the most important, and of these important occupational groups were these firms experiencing difficulty recruiting or retaining workers. This question is especially important for expanding firms since it is likely that they may continue to expand in the future.

According to the firms surveyed, the most important labor group is management. This occupational group was cited as "very important," rating a 4 on a four point scale, by 73 percent of firms (Table A-1). This group was followed by technical/skilled workers which were rated by 46 percent of firms as very important and clerical/sales with a 44 percent very important rating. Only a quarter of firms considered professionals/scientists/engineers very important and just 14 percent said unskilled labor was important.

Recruiting

Small and medium firms provide a special niche in the overall employment picture. These firms tend to hire workers with a more temporary attachment to the labor force. New or re-entrants to the labor force, part-time, working parents, and minorities are more likely to be hired by smaller firms. (Brock and Evans, SBA)

Recruiting is of special interest to small and medium firms, because they are more sensitive to labor costs and suffer more as labor becomes scarce. Already smaller firms that have traditionally recruited from certain labor groups (high school students, for example), have had their growth constrained by this factor. Generally, smaller firms are less able to compete with larger firms in terms of wages and fringe benefits. (Brock and Evans)

Although the top three and bottom two occupational groups were close together in terms of difficulty in recruiting, there seems to be a relationship between the skill level of an occupation and the difficulty in recruiting (Table A-2). The lower skilled occupational groups of clerical/sales and unskilled appear to be much easier to recruit.

Of the groups considered important to small and medium high-growth firms (SMHGF), management and technical/skilled were seen as the most difficult to recruit with 25 percent and 21 percent, respectively, of firms answering that these occupational groups were difficult (score of 4) to recruit. The third most important occupational group, clerical/sales, was reported to be difficult to recruit by only 8 percent of firms in the sample. Of the

Table A-2 Difficulty in Recruiting and Retraining Staff

Occupational Groups	Number of Respondents	Recruiting Difficult	Number of Respondents	Retaining Difficult
Management	271	25%	267	6%
Professional/Scientists/Engineers	147	22	150	6
Technical/Skilled	237	21	231	7
Clerical/Sales	265	8	264	6
Unskilled	233	6	231	16
n=289				

remaining occupational groups, 22 percent of the firms said that professional/scientific/ engineers were difficult to recruit while only 6 percent said that unskilled workers were difficult to recruit. In fact, nearly one-half of the firms said that unskilled workers were easy to recruit.

These patterns of importance of occupation and difficulty in recruiting were consistent across all size groups, industries and firm types.

Retaining

More and more companies are beginning to follow workers rather than vice versa. Areas that already have a highly skilled workforce that is reluctant to move will have the advantage in recruiting firms.(Birch 1987)

Retaining workers was much easier than recruiting them for Minnesota's small and medium high-growth firms. Except for unskilled workers, less than 8 percent of the firms thought that retaining was difficult (4). It appears that once small and medium firms acquire the workers they consider important, these firms have little difficulty in keeping them. The only exception is unskilled workers, which are not considered an important occupational group by most SMHGFs. It could be that the characteristics of this occupational group lead to high turnover or that since unskilled workers are easy to recruit, this makes them easy to replace.

Another reason for the high level of difficulty in retaining unskilled workers is that according to the firms in our focus group, some smaller firms prefer to hire people with basic skills and then bring them up to the skilled level by providing training in their own production methods and promoting from within.

However, of the 80 firms that do consider unskilled workers important (rating them either a 3 or 4 on a four point scale), 26 percent said they have difficulty in recruiting this occupational group. There was no difference from the average for the other occupational groups

Reasons for Difficulty in Recruiting and Retaining

Small and medium high-growth firms were asked to cite reasons for their difficulty in recruiting and retaining staff. Firms were given a list of five possible reasons and asked to rate their importance on a four point scale (Table A-3).

Cost of labor (76 percent) and lack of skills (71 percent) were cited by about three-quarters of firms as being important reasons for difficulty in recruiting. Shortage of labor was given as an important reason by 55 percent of firms having difficulty, and personal taxes was cited as important by 45 percent of firms having difficulty recruiting.

Further analysis did not reveal many significant differences by importance of occupational group. However, 81 percent of the firms having difficulty in recruiting technical/skilled workers consider lack of skills an important reason, as compared to 71 percent for the overall group.

Table A-3 Reasons for Difficulty in Recruiting by Importance of Occupational Group

Reasons for Difficulty	Number of Respondents	All	* Management	Professional/ Scientists/ Engineers	* Technical/ Skilled	* Clerical/ Sales	Unskilled
Cost of Labor	198	76%	76%	69%	76%	75%	85%
Lack of Skills	196	71	71	74	81	75	62
Labor Shortage	194	55	52	55	55	60	76
Personal Tax	187	45	49	56	49	44	52

* = important occupational groups
n=236

Table A-4 Reasons for Difficulty in Retaining by Importance of Occupational Group

Reasons for Difficulty	Number of Respondents	All	* Management	Professional/ Scientists/ Engineers	* Technical/ Skilled	* Clerical/ Sales	Unskilled
Cost of Labor	151	87%	87%	79%	86%	81%	85%
Lack of Skills	141	71	69	70	64	56	70
Labor Shortage	141	56	57	46	55	48	64
Personal Tax	138	44	64	39	46	44	52

* = important occupational groups
n=189

For the unskilled labor group, the least important labor group, firms said that cost of labor and labor shortage were important reasons for difficulty in recruiting this labor group. SMHGFs also rate lack of skills as somewhat more important for difficulty in recruiting unskilled workers than the group as a whole. It is interesting to note that small and medium high-growth firms may be concerned about unskilled workers' lack of skills. Also SMHGFs that said technical/ scientific/engineers were an important occupational group reported that personal taxes were more of a problem than did the group overall.

Firms were also asked to rate four possible reasons for difficulty retaining employees (Table A-4). Firms rated the importance of reasons for difficulty in retaining much the same as they rated the reasons for difficulty in recruiting, except for cost of labor which jumped to 87 percent.

The only difference from the overall group was in management and clerical/sales. Sixty-four percent of firms having difficulty in retaining management said that personal taxes were an important reason, while only 44 percent of firms overall said it was important. Also lack of skills was less important to firms that had difficulty in retaining clerical/sales workers than average, 56 percent versus 71 percent rating this reason as important.

For the relatively small number of firms rating technical/scientific/engineers as an important occupational group, they were less concerned about cost of labor and labor shortage than the overall sample. Apparently the supply of these workers is adequate for these firms that consider them important.

Because labor is so important to small and medium high-growth firms, the firms were asked what personnel issues were important to them. These issues were listed and firms ranked them on a four point scale from "important" to "not important" (Table A-5).

Table A- 5 Importance of Personnel Issues

Personnel Issues	Number of Respondents	Importance 1	4
Rising Labor Costs	282	3%	56%
Lack of Appropriate Skills	272	8	31
Declining Labor Supply	272	15	28
Drug/AIDS testing	273	41	11
Employee Health Benefits	278	3	56
Employee Parking/Commuting	273	62	4
Day Care	274	45	3
Organized Labor Issues	273	51	14
Work Force Diversity	261	35	8
Retirement/Pension	273	15	15
Flexible/Alternative Work Schedule	269	28	6

n=289

The most important current personnel issues, with more than 50 percent of the firms giving a rating of very important, were employee health benefits (56 percent) and rising labor costs (57 percent). Third and fourth in order of concern were lack of appropriate skills (31 percent) and declining labor supply (28 percent).

Retirement/pension issues were in the middle with 15 percent saying they were very important and 15 percent saying they were not important. The least important issues, those with at least 25 percent of the firms in the sample rating them as not important, were flexible/alternative schedules (28 percent), work place diversity (35 percent), drug/AIDS testing (41 percent), day care (46 percent), organized labor (51 percent), and employee parking/commuting (62 percent).

Three of the top issues dealt with basic labor costs and supply issues. Lack of skills suggests that there may be a mismatch between the skills people have and the skills employers need. When importance of personnel issues was examined for the various occupational groups few differences emerged. Forty-three percent of firms valuing technical/skilled workers said that lack of appropriate skills was an important problem. Also, those firms saying clerical/sales staff were important were more concerned about rising labor costs than the overall sample (66 percent versus 56 percent).

Training

Training is important to businesses in order to retrain workers for new jobs and to increase productivity, among other reasons. Training adds value to, what is for most firms, a relatively finite resource. SMHGFs were asked a series of questions regarding their training programs and practices.

Training is becoming increasingly important; only 19 percent of SMHGFs offer no formal training. Of firms offering formal training, 62 percent were doing more or much more than five years ago and less than 1 percent were doing less training than five years ago.

Nearly all firms that provide formal training do so to improve quality and productivity (Table A-6). Meeting increased technical complexity of jobs and teaching company procedures were listed as important reasons for training by more than three-quarters of the firms in the sample. Further down in importance were increasing work place safety and encouraging career advancement.

Less important, but still considered important by more than 50 percent of the firms, were correcting basic skills deficits and managing employee turnover. Less than one-half of the firms said that reducing employee absenteeism was an important reason for providing formal training.

The next series of question dealt with the topics that firms covered in their training

Table A-6 Why Firms Provide Formal Training

Reasons for Providing Formal Training	Number of Respondents	Importance (Score of 3 or 4)
Meet increased technical complexity of jobs	192	79%
Teach company procedures	200	83
Correct basic skills deficit	189	60
Encourage career advancement	189	69
Improve productivity/quality	208	98
Manage employee turnover	192	60
Reduce absenteeism	184	42
Increase work place safety	196	71

n=235

Table A-7 Frequency of Topics Covered in Training Programs

Topics	Number of Respondents	Often (Score of 3 or 4)
Manufacturing		
Processes/Equipment (including computer skills)	155	68%
Engineering/Scientific techniques	141	37
Quality improvement/control	163	81
Marketing/Sales		
Customer service	199	87
International skills (customs regulations, etc.)	156	11
Foreign languages	153	1
Marketing/Sales techniques	186	73
Administrative		
Clerical/Office skills	181	57
Computer skills for administrative functions	181	71
Managerial		
Strategic planning	181	64
Supervisory/leadership techniques	191	75
General		
Basic skills (reading, writing, math)	166	25
Communication skills	179	57
Career development	167	37
Interpersonal/personal skills	178	55

n=235

programs (Table A-7). Clearly, the most important training topic is customer service (87 percent). Other important topics include quality improvement/control (81 percent), supervisory/leadership techniques (75 percent), marketing/sales techniques (73 percent), computer skills for administrative functions (71 percent), and processes/ equipment (68 percent). Other training topics considered important by more than one-half of the respondents were strategic planning (64 percent), clerical/office skills (57 percent), communications skills (57 percent), and interpersonal/personal skills (55 percent).

Despite increasing global markets and competition, firms said that international skills and foreign languages were not important. Sixty-nine percent of firms said that international skills were not important as did 90 percent of firms regarding foreign languages. This coincides with where these firms' markets are located. Only 26 percent of

Table A-8 Sources of Formal Training

Sources	Number of Respondents	Important (Score of 3 or 4)	Number of Respondents	Important (Score of 3 or 4)
In-House	213	94%	208	82%
Apprenticeship/Internship for Licensure	165	25	124	36
Consultant/Commercial Course	181	36	154	42
Vocational/Technical Education	192	63	171	58
Community College	172	31	141	49
University/College	177	43	138	59
Primary/Secondary Institutions (Basic Skills)	171	63	146	4

the firms reported any foreign sales, and of the remaining 74 percent, only 11 percent said that they plan to start exporting in the next five years.

The most important source of training is by far in-house (Table A-8). Ninety-four percent of respondents thought this was important. Of these firms, 82 percent were satisfied with this training. Next was vocational/technical education which was rated by 63 percent of firms as important and 58 percent of them were satisfied with it. Primary/secondary institutions (basic skills) were cited as important by 63 percent of the respondents, but just 41 percent were satisfied with the training. University/college was listed by 43 percent as important and 59 percent were satisfied with this training.

Clearly the least important source of formal training was apprenticeship/ internship for licensure which was listed as not important by 75 percent, and only 36 percent of firms were satisfied with this training. Community college training was also considered less important by 69 percent of employers. Community colleges provided satisfactory training to 49 percent of firms that considered this type of training important. Consultant/commercial courses were not valued highly either and were listed by 65 percent of firms as not important. Consultant/commercial training was found satisfactory by 42 percent of those who said it was important.

Satisfaction was highest for in-house (82 percent), university/college (59 percent), and vocational/technical education (58 percent). Sources of training that were seen by firms to be less satisfactory were community colleges (49 percent), consultant/commercial courses (42 percent), primary/secondary institutions (41 percent) and apprentice/internship for licensure (36 percent).

Capital Access

Many studies show that small and medium businesses have a difficult time securing the capital they need to grow and expand. However, this was not the case for most of this sample. Bias may exist in the sample because it was taken out of Dun and Bradstreet Market Identifiers, a major source for small business financial information. It is likely that only firms having sought capital will show up in DMI. The type of firms being studied also could bias the results. Perhaps these firms were experiencing high growth because they were able to secure capital or because they had a good track record.

In this sample of small and medium high-growth firms, 78 percent of firms had sought capital for investment or working capital in the last five years.

Of these firms that sought capital, only 12 percent found the level of difficulty high (4). Another 21 percent said the level of difficulty was 3. On the other hand, 67 percent said they had a low, or close to low, level of difficulty in getting capital.

Table A-9 Primary Sources of Investment or Working Capital

Sources	Number of Respondents	Primary	Satisfaction Source High (Score of 3 or 4)
Stock offering	41	18%	33%
Venture capital	35	15	22
Personal equity	95	42	62
Retained earnings	107	47	55
Bond sale	35	15	37
Commercial paper	39	17	42
Commercial loan	181	79	73
Government loan	46	20	41
Grant	24	11	21
n=228			

The most common primary source of investment/working capital was commercial loans (Table A-9). Nearly 80 percent of firms had used this source. Other commonly used sources of capital included personal equity (42 percent) and retained earnings (47 percent). No other source of capital was used by more than 20 percent of the sample.

Commercial loans had the highest satisfaction level at 73 percent. Personal equity and retained earnings also had higher ratings of 62 percent and 55 percent, respectively. No other sources had satisfaction levels over 50 percent. Oddly, the source of capital that was the least satisfactory was grants, with 71 percent of firms rating satisfaction at low or 1. However, the number of respondents was very small. Also unsatisfactory were bond sales (60 percent) and venture capital (57 percent). Other unsatisfactory ratings, near 50 percent, were stock offerings (49 percent) and commercial paper (49 percent). Government loans also had a fairly low satisfaction level with 41 percent of firms rating it at 1.

Most (62 percent) of the firms that raised capital through a commercial loan secured that loan with hard assets such as equipment or buildings. Another popular security was accounts receivable, used by 57 percent of firms. Inventory was used by 48 percent of firms to secure commercial loans and cash was used by 22 percent.

Thirty-seven percent of SMHGFs had a debt-to-equity ratio of less than 1:1. Firms with a ratio of less than 2:1 made up 66 percent of the total. At the other end of the scale, 12 percent of firms had a debt-to-equity ratio of greater than 4:1.

Most (87 percent) firms had four or less non-trade secured creditors and nearly half (46 percent) had only one. Six percent had more than six non-trade secured creditors.

Firms with high debt-to-equity ratios had more difficulty in securing capital. Twenty-two percent of firms having difficulty in getting financing had debt-to-equity ratios of greater than 4:1 while overall this percent was 12.

Firms having difficulty getting financing also were more likely to have more non-trade secured creditors. One-quarter of these firms had more than four non-trade secured creditors while only 11 percent of the sample had more than four non-trade secured creditors.

The most frequently cited barriers to obtaining financing include collateral requirements and deposit requirements (57 percent), cost (54 percent), and lending limits (53 percent) (Table A-10). Other barriers cited less often were cash flow requirements (45 percent), local availability (39 percent) and risk of project (37 percent). Of less concern were cost of public offering (30 percent) and knowing where to go (29

Table A-10 Barriers in Obtaining Investment and/or Working Capital

Barriers	Number of Respondents	High (Score of 3 or 4)
Cost (interest rates and loan origination fees)	160	54%
Collateral requirements and/or offsetting deposit requirements	155	57
Lending limits	153	53
Cash flow requirements	152	45
Knowing where to go	145	29
Local availability	146	39
Risk of project	141	37
Discrimination	133	6
Amount and timing of return required by equity investors	116	24
Amount of control required by equity investors	114	24
Lack of Market for public offering	96	18
Cost of public offering, limited offering or private placement	94	30
None of the above	21	
n=228		

percent). Nine percent of firms said that none of these factors were a barrier to them.

Of those firms having sought investment capital and of those barriers listed by more than one-half of respondents, more than 50 percent responded that three barriers—collateral requirements and offsetting deposit requirements, cost (interest rates and loan origination fees) and lending limits—were high. Following closely was cash flow requirements (45 percent). Below this were local availability (39 percent) and risk of project (37 percent).

Of those having difficulty in getting capital, 83 percent said that collateral was a high barrier. Overall it was seen as a high barrier by only 57 percent. The next four barriers: cash flow requirements, lending limits, cost, and local availability, were all cited as high barriers by at least 60 percent of firms having difficulty raising capital. Not surprisingly, most of the barriers were higher for those firms experiencing difficulty in raising capital except risk of project which was virtually the same for those having some or no difficulty.

When firms do obtain capital, they are most likely to use it for working capital (64 percent) or buying new equipment (63 percent) (Table A-11). Other common uses for new capital include buying or improving new buildings (49 percent) and inventory (44 percent).

Energy

Of the 203 firms listing a primary heating source, 64 percent named natural gas, 17 percent listed electricity and 11 percent cited fuel oil as their primary source of heating.

Of the 123 firms responding with a primary source of processing energy, 78 percent listed electricity, while 17 percent said natural gas.

Reliability was the energy characteristic given the highest very important rating. It was cited by 80 percent of the firms as very important. Other energy characteristics, availability and cost, were rated at 74 percent and 68 percent, respectively. Surprisingly, cost was given the lowest importance rating of the three characteristics.

Reflecting businesses' general satisfaction with Minnesota's infrastructure, more than one-half of the sample was very satisfied with availability of energy. Less were very satisfied with reliability (43 percent). Cost, as usual, was the least satisfactory with 18 percent saying they were very satisfied. However, over one-half (61 percent) said they were satisfied.

Energy does not seem to be of great concern to SMHGFs in Minnesota. They give very high ratings to availability and reliability which are important energy issues. Firms are less satisfied with cost but it is also of less importance to them.

Table A-11 Uses of Capital

Uses	Number of Respondents	Percent Yes
Inventory	100	44%
Acquisition or improvement of land	46	20
Acquisition or improvement of buildings	111	49
Acquisition of new equipment	144	63
Research and development procedures	28	12
Extinguish existing debt	10	4
Refinance existing debt	43	19
Working capital (to include uses for basic operations, rent, leases, salaries and wages, costs of goods, marketing and the like)	145	64

n=228

Table A-12 Primary Mode of Transportation of Products

Mode of Transportation	Primary Mode Number	Primary Mode Percent	High Satisfaction (Score of 3 or 4)
Truck	147	60	89%
Freight Services	21	21	80
Air	15	15	88
Rail	8	3	40
Barge/Ship	2	1	57

Transportation

Because businesses need to transport their product to market and they are faced with the increasing importance of international trade, firms were asked to describe their major modes of transportation and what characteristics were most important to them.

Fifty-nine percent of firms said that the transportation of products was very important (score of 4) to the operation of their business. Seventy-six percent said it was important.

Some interesting differences came out when the importance of transportation was broken out by industry. Only 46 percent of high tech firms said that transportation was very important to their business, while non-durable and durable manufacturing rated the importance of transportation quite high, 92 and 90 percent, respectively.

High technology firms often produce high value items that are easy to ship, making transportation costs less important while traditional manufacturers may be involved in producing either lower cost products or larger items. In this case transportation costs become an issue.

The most often cited primary mode of transportation for product shipment was by truck at 60 percent, followed by freight services with 21 percent (Table A-12). Air was the primary mode of product transportation for 15 percent of firms, rail was 3 percent, and barge was less than 1 percent.

Firms were most satisfied with truck and air transportation, somewhat less satisfied with freight services, and relatively dissatisfied with rail and barge/ship, which, not surprisingly, are used infrequently.

Almost all the transportation characteristics are considered important, but reliability is considered the most important (Table A-13). At mid-60 percents were speed, cost and quality of service. As far as satisfaction, the only real difference occurred in cost. Only 11

Table A-13 Importance and Satisfaction of Transportation Characteristics

Transportation Characteristics	Number of Respondents	Importance (Score of 4)	Satisfaction (Score of 4)
Speed	213	64%	24%
Cost	216	66	11
Frequency	195	53	20
Reliability	210	78	23
Traceability	194	55	21
Safety	189	47	21
Quality of service	199	65	19
Preferred mode unavailable	92	27	18

Table A-14 Importance of Selected Technologies

Technologies	Number of Respondents	Importance (Score of 4)	(Score of 3 or 4)
Equipment for more fully automating your production process (e.g. computer integrated manufacturing)	255	36%	60%
Equipment/Systems for communication of information (data, voice, or visual)	258	33	67
Other equipment/systems to improve quality or productivity (e.g. computer aided design)	258	31	65
Advanced materials to improve product or processes (e.g. composites)	242	19	50

percent of firms were satisfied with cost, compared to ratings of 18 percent to 24 percent for the rest of the characteristics.

Business travel was very important to the operation of SMHGFs for 25 percent of the respondents. It was not important to 26 percent of the respondents.

Of those listing primary modes of business travel, 54 percent cited air, and 46 percent said automobile. Only 16 percent of air travelers were very satisfied with this mode of transportation while 32 percent of automobile travelers said they were very satisfied. Surprisingly, business travel use and satisfaction did not vary by industry.

Technology and Research and Development

With increasingly competitive markets, these expanding businesses were asked about the importance of technology, and research and development investments to their firms.

For high-growth firms the lack of importance for research and development was surprisingly low with 40 percent saying it was not important and only 20 percent saying it was important.

There were, however, some differences in the importance of research and development depending on the type of industry involved. High technology firms said research and development was important (37 percent). R&D was important to 29 percent of durable goods manufacturers and to 24 percent of non-durable goods manufacturers. In service and trade sectors, only 12 percent of firms said that research and development was important.

Of 148 respondents, 88 percent of the firms listed in-house/internal as their primary method of research and development. Nine percent listed subcontracting or ventures with other firms, and only 3 percent listed subcontracting or ventures with academic

Table A-15 Impact of State and Local Taxes

Ranking	Taxes
1	Worker's Compensation
2	Corporate Income Tax
3	Unemployment Insurance
4	Commercial/Industrial Property Taxes
5	Personal Income Tax
6	Sales Tax
7	Residential Property Tax
8	Research and Development Tax Credit

institutions. No one claimed to be conducting research and development with the federal government.

Between 84 percent and 89 percent of firms in the sample responded to the questions on the importance of four specified types of technology (Table A-14). Of those who listed importance of the technologies, about one-third listed equipment for automation, communication, improvement of quality and productivity as very important. Only 19 percent said advanced materials to improve product or processes was very important.

Services and trade tended to value technology less than manufacturers. Sixty-one percent of non-durable firms rated automation processes as very important, while other industries were close to the norm of 36 percent. Thirty-six percent of non-durable goods manufacturers also said that advanced materials technology was very important.

The importance ratings given equipment/ systems for communication of information were surprising. Durable and non-durable goods only rated this as very important, 19 percent and 20 percent, respectively. High tech firms and service and trade were close to the average.

There were no significant variances by industry for the other types of equipment technology.

Impact of Taxes and Regulations

Increasingly, government has come to play a role in economic growth and development either directly through tax incentives, loans, etc., or indirectly through tax policy and regulations. State governments have taken on a larger role in this area as the federal government has delegated or cut funding for various services. These moves have led governments to assess the effectiveness and quality as well as the impact of some of these programs. Business development programs targeted at smaller businesses remains a popular method of assisting business.

However, most businesses (61 percent) said that state business taxes and regulations have a very significant impact on their business operating costs. Nearly all (90 percent) said the impact was at least somewhat significant.

Not all small and medium high growth firms said that government taxes and regulations had a significant impact. Fifty-one percent of high technology firms said that taxes and regulations had a very significant impact while 81 percent of durable goods manufacturers felt that taxes and regulations had a very significant impact.

Because not all taxes are likely to have the same impact, we asked firms to rank the impact of taxes on their business (Table A-15).

The top four categories were taxes associated directly with the firms. They were: worker's compensation, corporate income tax, unemployment insurance and commercial/

Table A-16 Impact of Regulations

Regulations	Number of Respondents	Significant (Score of 3 or 4)
Pollution Control Regulations		
Air pollution	200	15%
Water pollution	204	14
Toxic waste	218	14
Solid waste	217	25
Employment Regulations		
Hiring and selection practices	265	21
Hours and wages regulations	264	27
Civil rights (discrimination)	262	10
Health and safety standards (OSHA)	264	20
Liability insurance	266	48

industrial property tax. Those with the lowest ranking were all taxes on individuals, except for the research and development credit which few firms said had any impact.

While taxes have been the government's major impact on business, regulations are probably catching up in terms of impact.The businesses in our sample were asked to assess the impact pollution control and employment regulations had on their firms (Table A-16).

Between 16 percent and 21 percent of the respondents said that pollution control regulations were not applicable to their business. Of those who said they were applicable, solid waste had the highest impact with 25 percent giving it a very significant rating. Air and water pollution had the lowest impact with 47 percent of the respondents in both cases giving it a 1. Toxic waste had 36 percent of respondents rating it as low impact.

Employment regulations had a greater impact on businesses. The highest impact was from liability insurance which was rated at 4 by 48 percent of respondents. The second tier which rated hiring and selection, 21 percent; hours and wages, 27 percent; and health and safety standards, 20 percent; were too close to call. The regulations with the least impact were civil rights which was cited as having no impact by 42 percent of firms.

Toxic waste regulations were seen as having more impact (score of 4) by high tech firms (27 percent versus 14 percent) while these same firms felt that solid waste impacted them less (16 percent versus 25 percent). Hiring practice regulations had very little impact on durable goods manufacturers (3 percent versus 21 percent) nor did hour and wage regulations for high technology firms (16 percent versus 27 percent). Civil rights regulations were generally seen by few firms as having severe impact (10 percent) but it had little impact on the manufacturers and more impact on the service and trade firms. This same breakout is seen for liability where the most sever impact was felt by service and trade while lesser impacts were felt by durable and non-durable manufacturing (39 percent and 32 percent versus 48 percent overall). The rating for OSHA was surprisingly evenly distributed except for durable manufacturers where it was 11 percent points higher (31 percent versus 20 percent).

Between 20 percent and 28 percent felt that pollution control regulation assistance was not applicable to their businesses. Of those who said that these regulations impacted their businesses, between 32 percent and 40 percent of firms said that the technical assistance was excellent (Table A-17).

Ratings were generally higher for employment regulation technical assistance, especially OSHA. The lowest ratings were for hiring and selection practices and civil rights technical assistance.

Table A-17 Quality of Technical Assistance

Regulations	Number of Respondents	Excellent (Score of 3 or 4)
Pollution Control Regulations		
Air pollution	89	32%
Water pollution	90	36
Toxic waste	109	40
Solid waste	58	35
Employment Regulations		
Hiring and selection practices	183	37
Hours and wages regulations	184	42
Civil rights (discrimination)	136	35
Health and safety standards (OSHA)	193	45
Liability insurance	212	43

Table A-18 Planned Changes in Staff

Occupational Group	Number of Respondents	Decrease (Score 1)	Increase (Score 4)	(Score 3 or 4)
Management	186	5%	8%	70%
Professional/Scientists/Engineers	122	7	14	67
Technical/Skilled	180	3	18	82
Clerical/Sales	178	3	10	67
Unskilled	152	8	15	59
No Changes Planned	71		25% of sample	

Business Changes for the 1990s

After examining current conditions, we asked businesses about the future and their plans in five years. It is clear that Minnesota businesses are both adjusting to expected changes and acting as change agents.

Labor

Again, labor is a major consideration. Business growth and hence economic growth are dependent on the availability of a skilled and productive workforce. As the growth of the Minnesota labor force slows, gains in the economy and personal incomes will have to come through greater productivity.

Small and medium high-growth firms are especially vulnerable to changes in the labor market. As the labor markets tighten, smaller businesses will have a difficult time competing with larger firms in terms of wages and fringe benefits. Smaller firms have traditionally hired more workers that have had less involvement in the permanent workforce. These firms may be particularly vulnerable if they employ large numbers of young employees, or labor groups that already have high participation rates in Minnesota, such as women.

Despite the fact that these are high-growth firms, 25 percent of the sample said that they do not plan to make any changes in their staffing in the next five years (Table A-18).

Of those firms that are planning changes, they are predominately planning to increase their staff. The biggest increase is planned for technical/skilled workers—82 percent of firms are planning to hire more of these workers. The weakest growth will be for unskilled workers but 59 percent of firms still plan to hire more of these workers. Between 67 percent and 70 percent of firms are expecting to increase hires in the rest of the occupational groups.

Table A-19 Personnel Issues—Importance in Five Years

Personnel Issues	Number of Repondents	Overall Importance	By Occupational Group: Management	Professional/ Scientists/ Engineers	Technical/ Skilled	Clerical/ Sales	Unskilled
Rising labor costs	267	66%	63%	57%	61%	62%	66%
Lack of appropriate skills	256	35	36	49	39	31	29
Declining labor supply	257	31	30	31	29	30	32
Drug/AIDS testing	255	15	15	14	15	12	14
Employee health benefits	262	57	56	58	63	57	59
Employee parking/ commuting	254	4	7	5	6	6	4
Day care	255	6	4	1	3	4	8
Organized labor issues	253	13	14	12	11	13	14
Work force diversity	244	9	10	6	7	7	16
Retirement/ pension	253	24	27	31	29	27	23
Flexible/ Alternative work schedule	248	9	11	12	9	10	12

n=289

A detailed look at the industry break-down showed that service and trade firms plan to hire fewer professional/scientists/engineers, technical/skilled and unskilled workers than the overall group. The manufacturing groups of high technology, durable and non-durable showed the same expansion expectations as the group as a whole.

Occupational groups are more important to those that plan to increase staff for professionals/scientists/engineers and unskilled only. However, these groups are the least important to SMHGFs overall.

Rising labor costs are expected to be the most important personnel issue in five years for two-thirds of the firms in the sample (Table A-19). Second in importance is employee health benefits. Other issues of concern to about one-third of firms were lack of appropriate skills and declining labor supply. These were the same top four personnel concerns that firms said they currently had.

Rising labor costs jumped in importance from 56 percent presently to 66 percent in five years. Retirement/pension also increased in importance, from 15 percent to 24 percent. Other issues increased only modestly in importance.

Personnel issues of little interest in five years continued to be employee parking/commuting which was not important to 55 percent of firms and organized labor issues which were not important to 44 percent of the sample.

When personnel issues were analyzed by occupational group, the only differences that emerged were that firms increasing professionals/scientists/engineers were more

Table A-20 Importance of Training Topics in Five Years

Training Topics	Number of Respondents	Importance (Score of 1)	(Score of 4)
Manufacturing			
Processes/Equipment (including computer skills)	154	10%	58%
Engineering/Scientific techniques	141	23	31
Quality improvement/control	160	8	64
Marketing/Sales			
Customer service	201	2	69
International skills (customs regulations, etc.)	152	57	12
Foreign languages	150	71	2
Marketing/Sales techniques	193	4	60
Administrative			
Clerical/Office skills	191	3	31
Computer skills for administrative functions	189	5	40
Managerial			
Strategic planning	191	4	48
Supervisory/leadership techniques	195	2	58
General			
Basic skills (reading, writing, math)	171	29	29
Communication skills	189	5	51
Career development	175	10	23

n=235

concerned about lack of appropriate skills than the group overall (49 percent versus 39 percent). These firms also tended to be less concerned about rising labor costs for professional/scientists/engineers than overall.

Changes In Training

Labor availability and skills needed will undoubtedly change in the future. Businesses have the most influence over the composition of their labor force in the area of training. Currently, 81 percent of SMHGFs offer formal training to their employees and less than 1 percent are offering less training than they did five years ago.

About two-thirds of firms said customer service and quality improvement and control would be very important training topics in five years (Table A-20). Also considered very important were marketing/sales, manufacturing processes/equipment and supervisory/leadership training. Again, least important were foreign languages and international skills. Other less important training included basic skills and engineering/scientific techniques.

Transportation

The least change is expected in truck transportation which is the most frequently used (60 percent) and has the highest level of satisfaction (88 percent). Of those firms that do expect change in their use of trucking, 91 percent expect to increase use significantly (Table A-21). One-third of firms expect no change in the other modes of transportation. Air and freight service transportation will be used more by 88 percent and 80 percent of firms, respectively. Fifty percent of firms expecting change in their use of barge/ship transportation said they would use less in five years, as did 38 percent of rail users.

Trucking is the most stable form of transportation and will increase the most. There will be more change in the other modes but the increases will be slightly less for air and freight service and much less for rail and barge/service. This seems to correspond with satisfaction and current usage.

Firms were also asked what transportation problems would inhibit their economic growth in five years (Table A-22). Eighteen percent of firms said that they did not expect

Table A-21 Change and Amount of Change for Transportation

Mode of Transportation	Number of Respondents	No Change	Number of Respondents	Increase Significantly
Truck	125	50%	101	91%
Air	82	33	64	88
Rail	81	33	21	62
Barge/Ship	76	31	20	50
Freight Services	81	33	66	80

n=246

Table A-22 Transportation Problems in Five Years

Transportation Problems	Number of Respondents	Severity (Score of 4)
Reduction of air service availability	121	17%
Reduction in air service quality	116	15
Airport congestion	112	9
Lack of rail service	96	7
Deteriorating roads and bridges	124	25
Inadequate shipping services	110	25
Poor road access	107	25
Road congestion	118	26
Lack of mass transit	100	10
Problems in transporting hazardous materials and waste	100	11
Increasing costs	132	49
Reduction in trucking service availability	122	29
None expected	39	18

n=215

any of the following transportation problems to inhibit their economic growth.

Of those firms that foresaw some problems, increasing costs were of the greatest concern with 49 percent of firms expecting this problem to inhibit their growth severely (Table A-22). One-quarter of the firms were also concerned about highway transportation issues. Deteriorating road and bridges (25 percent), poor road access (25 percent) and road congestion (26 percent) would all severely inhibit their economic growth. Other problems cited by at least 25 percent of the sample included reduction in trucking service (29 percent) and inadequate shipping services (25 percent). Air travel is of less concern with all three air transportation questions getting responses between 9 percent and 17 percent.

Of least concern to SMHGFs was transportation of hazardous waste (11 percent), lack of mass transit (10 percent) and lack of rail service (7 percent).

Not surprisingly, firms whose primary transportation mode is trucking said that the following problems would severely inhibit their growth more than the group overall. These problems were poor road access, road congestion, increasing costs and reduction in trucking service availability.

Technology

Rapidly changing technology is a major factor in modern business and Minnesota firms need to keep on top of these changes or be left behind. Smaller businesses are especially affected as technology, particularly computers, enables these firms to compete with larger

Table A-23 Increase/Decrease in Primary Mode of Research in Five Years

Mode of Research	Number of Respondents	Decrease 1	2	Increase 3	4
In-house/Internal	123	1%	14%	59%	26%
Subcontract or venture with other firms	12	0	8	75	17
Subcontract or venture with academic institutions	5	20	40	20	0
Subcontract or venture with federal government	0	0	0	0	0

Table A-24 Importance of Technologies in Five Years

Technologies	Number of Respondents	Increase Future	Now (Score of 4)
Equipment for more fully automating your production process (e.g. computer integrated manufacturing)	237	47%	36%
Equipment/systems for communication of information (data, voice, or visual)	241	44	33
Other equipment/systems to improve quality or productivity (e.g. computer aided design)	239	46	31
Advanced materials to improve product or processes (e.g. composites)	225	30	19

firms. Some studies state that smaller firms are more innovative and so we would expect to find these firms to be changing more rapidly or introducing new products and services.

In this case, however, Minnesota SMHGFs appear to be less innovative than some of the other groups studied including large firms, high technology firms and exporting firms. Only 64 percent of SMHGFs plan to introduce a new product in the next five years.

Thirty-four percent of firms said that research and development investments would be very important to the success of their business in five years. This compares to 20 percent who said it was currently important. Firms citing research and development as important totaled 36 percent currently and 59 percent said it would be important in five years.

While they make up only 19 percent of the sample, 40 percent of the firms that rated the importance of research and development as very important were high technology firms. The durable and non-durable manufacturers both had roughly the same proportions, while services and trade which make up 59 percent of the sample only account for 39 percent of the firms which consider research and development important in five years.

Twenty-six percent of firms conducting in-house/internal research and development expected to be increasing it significantly in the next five years (Table A-23). For those primarily conducting subcontracts or joint ventures, 17 percent expected it to increase significantly. For those few firms working with academic institutions, not one expected to be increasing R&D significantly, and 20 percent said they would decrease R&D significantly.

Close to one-half of the firms said that the first three of the four technologies listed below would be important in five years (Table A-24). Advanced materials was seen as less important both now and in the future. All the technologies listed increased in importance in five years between 11 percent and 15 percent.

Table A-25 Importance of Government Services and Recommendations for Spending

Government Services	Number of Respondents	Importance (Score 1)	(Score 4)	Number of Respondents	Spending (Score 1)	(Score 4)
Education						
Elementary/ Secondary	271	3%	69%	253	6%	26%
Higher Education	268	6	49	248	6	18
Libraries	256	17	26	234	9	8
Social Services and Income Maintenance						
Public Welfare	266	46	10	252	64	2
Hospitals	263	17	18	249	19	4
Health	266	13	21	249	15	6
Employment Security	263	22	13	248	40	2
Transportation						
Highway	268	8	34	251	8	14
Air	264	24	16	246	20	5
Water	260	63	3	244	48	1
Public Safety						
Police Protection	269	8	26	251	6	14
Fire Protection	270	6	28	251	6	10
Corrections	264	27	11	249	16	7
Protective Regulation	261	29	8	248	29	3
Environment and Housing						
Natural Resources	263	20	22	241	15	12
Parks and Recreation	262	22	16	242	16	10
Housing and Community Development	265	23	13	246	22	7
Sewerage	262	17	14	247	9	7
Other Sanitation	249	17	10	235	11	6

n=289

The Role of Government

Government plays a significant role in the operation of businesses through services like infrastructure and education to regulations and taxes. While businesses sometimes perceive government as a problem especially in the area of taxes, they also realize that it provides services they would otherwise have to provide for themselves. This may be particularly true of smaller businesses where taxes can be more burdensome, yet they depend on government for protective services and employee training.

In Table A-25, firms were asked to rate the importance of 19 government services and whether spending should be increased or decreased for these services. Government services of greatest importance to SMHGFs were elementary/secondary education (69 percent), and higher education (49 percent). Other services considered important were highway transportation (34 percent), fire protection (28 percent), police protection (26 percent) and libraries (26 percent).

Those services considered least important were water transportation (63 percent), public welfare (46 percent), protective regulations (29 percent) and corrections (27 percent). Natural resources were evenly split in importance (20/22 percent).

Businesses that considered a particular service important were generally willing to follow up that concern with increased spending. More than one-quarter (26 percent) of firms wanted to spend more on elementary/secondary education. Eighteen percent of firms said that more should be spent on higher education. At least 10 percent of firms said they were willing to spend more on highway transportation (14 percent), police protection (14 percent), natural resources (12 percent), parks and recreation (10 percent) and fire protection (10 percent).

Again those areas considered less important were targeted for less spending. The services that firms wanted to cut were public welfare (64 percent), water transportation (48 percent), employment security (40 percent) and protective regulation (29 percent).

Education

Businesses showed strong interest in and support for education, reflecting their desire for a highly skilled labor force. Education is already a major budget item for the state of Minnesota, yet SMHGFs said more should be spent on education. This is surprising since Minnesota already spends 16 percent more than the U.S. average on elementary education and 28 percent more than average on higher education.

While elementary education was very important to 69 percent of the firms in the sample, it was particularly important to non-durable manufacturers, 81 percent of whom gave it a very important rating.

Firms that want to spend more on elementary/secondary education also tend to value in-house training. Overall, 63 percent of firms want to spend more on elementary education while 74 percent of firms that said in-house training is important want to spend more on this type. Of the firms that want to spend less on elementary education, only 55 percent rate in-house training as important. This is also true to a lesser extent with higher education and libraries.

The overall very important rating for higher education was 49 percent. High technology firms rated it at 61 percent but only 31 percent of durable goods manufacturers said it was very important.

Those firms that would like to see more spending on higher education also value university/college training more than the overall group.

Firms that were labor-intensive said higher education was very important (62 percent versus 49 percent overall). Twenty-eight percent of labor intensive firms wanted to spent more on higher education than the firms overall (18 percent). Only 38 percent of those firms that were capital-intensive said higher education was very important. Higher education was also of slightly greater importance to firms which said that research and development would be very important in five years.

Social Services

This is another major program area for the state, however, social services are not considered important by many firms and very few want increased spending in this area. In fact, most firms would like decreased spending especially in welfare (64 percent) and employment security (40 percent). Minnesota spends 58 percent more on employment security than the U.S. average, 37 percent more than the nation on public welfare, 19 percent more on hospitals, and about the same in health. There was no variation in firms wanting decreased social services by industry, firm type or age.

Transportation

A topic of major importance for more than one-third of the firms, transportation is dominated by the importance of highways. Despite the fact that Minnesota spends nearly 50 percent more on highways than average, 14 percent of firms still wanted to spend significantly more. For increased highway spending (58 percent), firms relying on truck

transportation did not vary much from the average but freight services wanted more spent (68 percent) and those firms using air transportation wanted less spent (45 percent) on highways. Only 22 percent of high technology firms said that highways were very important while the overall importance rating was 34 percent.

Air transportation was surprisingly unimportant. Nearly one-quarter of firms considered air transportation "not important." In fact, 20 percent wanted the state to spend less. This is interesting considering that compared to the United States, Minnesota already spends 38 percent less on air transportation. Not surprisingly, firms who said that their primary mode of transportation is air wanted more spending on air (42 percent versus 32 percent). Trucking firms want the same amount spent on air. In the case of air transportation, given an importance rating of 16 percent overall, 33 percent of durable goods manufacturers said air transportation was very important.

Water transportation is "very important" to only 3 percent of firms, the lowest importance rating of any government service. Not surprisingly, nearly one-half of the sample said that spending on water transportation should be greatly reduced. One reason for the strong reaction against water transportation in the survey may be the fact that Minnesota spends 271 percent more on water transportation than the national average.

Public Safety

In the area of public safety both fire and police protection are considered important with corresponding ratings for more spending. More than one-quarter of the firms said fire and police protection were "very important." Fourteen and 10 percent of firms wanted to increase spending for police and fire protection, respectively. Corrections and protective regulations, however, did not follow this pattern. Both of these areas had low importance ratings and very few firms said to increase spending, especially in protective regulations. Minnesota underspends the United States in all categories of public safety.

Environment and Housing

These services ranged in importance from 10 percent for other sanitation to 22 percent for natural resources. Firms tended to be evenly split on spending for parks and natural resources, and sewerage but wanted less spent on housing and community development, as well as other sanitation.

While the overall very important rating for natural resources was 22 percent, non-durable goods manufacturers gave it a very important rating of 34 percent. On the other hand, 20 percent of firms overall rated natural resources as not important while only 7 percent of durable goods manufacturers did.

Of those firms that said natural resources were very important, only 44 percent were trade and service firms although they made up 59 percent of the sample.

Summary/Overview

Small and medium-sized firms are a critical part of the Minnesota economy, accounting for half a million jobs in the state. These firms represent an important source of employment and future economic growth.

Minnesota has been recognized nationally by various business publications as providing a good environment in which small and medium-sized business can grow. However, the number of small and medium-sized firms has been growing at a slower rate than overall business growth.

Throughout the nation, state involvement in small business development has increased dramatically over the last decade. Minnesota has also recognized the importance of small and medium-sized businesses, encouraging business development as an integral part of the state's overall economic development efforts.

The results of the survey show that Minnesota's small and medium-sized businesses seem optimistic about their futures. While they face obstacles common to many smaller businesses such as increasing labor costs, scarcity of skilled workers and

government taxes and regulations, they generally foresee a future of continued growth and consolidation.

A majority of SMHGFs (firms of 20 to 499 employees with above average growth in employment and sales) in the survey sample were in service and trade industries. More than one-third of the firms were manufacturers. Nearly one-fifth of the firms were high tech. SMHGFs primarily serve local markets and seem to have little interest in developing international skills or markets.

Management, technical/skilled, and clerical/sales are the most important labor groups to small and medium-sized high growth firms. SMHGFs have more difficulty in recruiting management and technical/skilled workers, but little problem retaining workers. Recruiting difficulties arise from cost of labor and lack of skills in the labor force. The major personnel concern for SMHGFs is the cost of health benefits for employees. Other areas of concern are cost of labor, lack of appropriate skills and declining labor supply. Of the 75 percent of the firms increasing their employment, technical/skilled workers will be in the greatest demand. The cost of labor and cost of health care benefits will remain issues of concern in the future, as will lack of appropriate skills and declining labor supply.

Most firms offer training and more than one-half will offer more in the future. Nearly all the firms offering training do so to improve quality and productivity as well as customer service, marketing/sales, and processes and equipment. These firms prefer to do their training in-house.

Contrary to many studies, SMHGFs in Minnesota say they do not encounter high barriers to capital. They have sought capital, have successfully obtained it and were relatively satisfied with the process. The capital raised is used for new equipment and working capital.

SMHGFs appear to be relatively satisfied with the major modes of transportation in Minnesota. The predominant transportation mode is truck followed by air and freight services. All of these will increase in use in the future.

Research and development is less important to these high growth firms than to the other business groups surveyed. This may reflect the high number of service and trade firms in this sample compared to the other industries. Just over one-half of these firms will introduce a new product in the next five years.

Over half of the sample rated government's influence on their business as very significant. They are especially concerned with workers' compensation. Other issues of concern are corporate income tax, unemployment compensation and commercial property tax. Firms rated the impact of other government actions, such as regulation, surprisingly low.

Aside from the areas of education, transportation and fire and police protection, these firms do not see a broad role for government. SMHGFs prefer to do their own research, seldom working with academia or the federal government. Training is done primarily in-house. They do use some government training programs but are less satisfied with the results. Very few firms use government-sponsored capital sources and those firms that do are very dissatisfied with them.

SMHGFs do, however, see that the government services in education, transportation and protection are important enough to warrant higher spending even though Minnesota already spends more than the national average in education and transportation.

Overall, Minnesota's SMHGFs appear to be doing well and are preparing for the challenges of the future.

Bibliography

Acs, Z. and Audretsch, D., 'The Determinants of Small-Firm Growth in U.S. Manufacturing,' *Applied Economics*, 1990, No. 22, pages 143-153.

Birch, D., 'After the Crash,' *INC.*, December, 1988.

Birch, D., 'Prematurely Gray?' *INC.*, November, 1988.

Birch, D., 'The Q Factor,' *INC.*, April, 1987.

Brock, W. and Evans, D., 1987, 'Small Business Economics,' *Small Business Economics*, 1988, No. 1, pages 7-20.

Business Week, 'Hot Growth Companies,' May 21, 1990.

Case, J., 'The Development of Small and Medium-Sized Enterprises—Some of the Most Entrepreneurial Cities in America,' *INC.*, March, 1990.

Evans, D., 'The Relationship Between Firm Growth, Size and Age: Estimates for 100 Manufacturing Industries,' *Journal of Industrial Economics*, June, 1987, vol. 35, no. 4.

Evans, D., 'Tests of Alternative Theories of Firm Growth,' *Journal of Political Economy*, 1987, vol. 95, no. 4.

Evans, D. and Jovanovic, B., in press, 'Estimates of a Model of Entrepreneurial Choice under Liquidity Constraints,' *Journal of Political Economy*.

Fazzari, S., Hubbard, R., and Peterson, B., 'Financing Constraints and Corporate Investment,' *NBER Working Paper No. 2387*, Cambridge, MA.: National Bureau of Economic Research, 1987.

Kotkin, J., 'The Great American Revival,' *INC.*, February, 1988.

Lundstrom, A., 'Empirical Findings' (Sweden), *Journal of Small Business*, January, 1990.

Mangelsdorf, M., 'INC.'s Guide to "Smart" Government Money,' *INC.*, August, 1989.

Office of Technology Assessment, Washington, D.C.: U.S. Congress, Technology, Innovation and Regional Economic Development, July, 1989.

Phillips, B. and Kirchhoff, B., 'Formation, Growth and Survival; Small Firm Dynamics in the U.S. Economy,' *Small Business Economics*, 1989, No. 1, 65-74.

Reynolds, P. and Miller, B., *1987 Minnesota New Firms Study*, Center for Urban and Regional Affairs, 1988.

Satterhwaite, M., 'Location Patterns High Growth Firms,' *Commentary*, Spring, 1988.

Scherer, F., *Industrial Market Structure and Economic Performance* (2d ed.), Boston: Houghton Mifflin, 1980.

Sheeline, W., 'Avoiding Growth's Perils,' *Fortune*, August 13, 1990.

Tomlinson, J., 'Minnesota Leads in Spawning New Firms,' memo, Minnesota Department of Revenue, May 19, 1990.

U.S. News and World Report, The 1990 Guide to Small Business, October 23, 1989.

U.S. Small Business Administration, *The State of Small Business*, Washington, D.C.: Government Printing Office, 1988.

Venegas, E., *Understanding Job Growth in Minnesota*, Minnesota Department of Trade and Economic Development, September, 1986.

B

Greater Minnesota Manufacturers

by J. Neil Thomas, Economic Analyst

Table B-1 Greater Minnesota Unemployment Rates: 1980-89

Year	State	Non-Metro	Metro
1980	5.9%	4.3%	7.8%
1983	8.2	6.4	10.2
1986	5.3	4.1	6.9
1989	4.4	3.7	5.2

SOURCE: Minnesota Department of Jobs and Training, Research and Statistics Office.

Introduction

Throughout the 1970s, U.S. farm exports drove a vigorous agricultural economy until world demand contracted. The recession caused farmland values to decline and increased financial stress in the early 1980s. Mineral extraction industries benefitted during the 1970s from rising worldwide energy and materials prices, but these industries too have declined, losing two-thirds of their jobs between 1979 and 1987. In 1990, mining has recovered slightly and is at 41 percent of its 1979 level.

In 1989, the Greater Minnesota economy supported just over half as many jobs as held in the Twin Cities Metropolitan area. Overall employment growth in Greater Minnesota has traditionally been slower, by one or two points, than in the metropolitan regions. In 1983, unemployment in Greater Minnesota was 10.2 percent compared with 6.4 percent in the Twin Cities (Table B-1). Unemployment has fallen since then across the state to 5.2 percent in Greater Minnesota and 4.4 percent in the Twin Cities. In more recent years, growth in both regions has been more balanced; employment has increased an average 2.6 percent annually in Greater Minnesota. Twin Cities metro area employment grew slightly more slowly at 2.3 percent.

In 1989, the Greater Minnesota average income was $17,984—about two-thirds of the average income in the Twin Cities. Furthermore, the nominal average incomes in Greater Minnesota and metropolitan Minnesota have been diverging at slightly less than 1 percent annually over the decade due the slightly slower non-metropolitan income growth.

In 1985, metropolitan businesses began outnumbering non-metropolitan counterparts. Since 1983, the number of establishments has grown in the Twin Cities metropolitan area by an annual average of 3.3 percent totalling 67,165 in 1989. During the same time period in Greater Minnesota, the number grew only 1 percent per annum to a total of 60,500. The average firm in Greater Minnesota employed 13 people in 1989, less than its average metropolitan counterpart with 19 employees.

Greater Minnesota Manufacturing

Changing patterns in worldwide demand have weakened food production and resource extraction, two traditionally strong industries in Minnesota. While these industries are still of special importance to the economy of Greater Minnesota, there are concerns about sustaining viable Greater Minnesota communities.

Of particular interest to Greater Minnesota are manufacturers that provide more than one-third of the manufacturing jobs in the state. Manufacturing jobs typically pay higher wages, generate more exports to other states and countries, and produce more indirect income than other sectors. Furthermore, each manufacturing job indirectly creates 1.5 other jobs in contrast to 0.2 indirect jobs created by service industries. Modern manufacturing industries create special demands on local labor forces and institutions. This chapter examines Greater Minnesota's business climate and some of the major concerns

Table B-2 Non-Agricultural Employment in Non-Metro Minnesota, 1980-1989

Year	Total State (000)	Manufacturing Employment State (000)	Manufacturing Employment Non-Metro (000)	Non-Metro Share of State Total	Manufacturing Growth Annual Average Metro	Manufacturing Growth Annual Average Non-Metro
1980	1,770.2	371.2	126.8	34.1%		
1981	1,761.3	364.0	123.8	34.0	1.8%	-2.3%
1982	1,707.3	346.8	115.3	33.3	-3.6	-6.9
1983	1,718.2	346.1	115.0	33.2	-0.2	-0.3
1984	1,819.8	373.8	124.7	33.4	7.8	8.5
1985	1,864.8	375.3	125.2	33.4	0.4	0.4
1986	1,892.0	368.7	125.5	34.0	-2.8	0.2
1987	1,958.4	376.4	130.7	34.7	1.0	4.2
1988	2,022.1	393.6	139.4	35.4	3.5	6.7
1989	2,021.7	399.0	144.5	36.2	0.1	3.7

SOURCE: Minnesota Covered Employment and Wages, Department of Jobs and Training

facing manufacturers in Greater Minnesota in the 1990s.

Government Responses

The disparity of economic performance among Twin Cities and Greater Minnesota communities has concerned Minnesota policymakers throughout the 1980s. One legislative response to these concerns was to enact Chapter 386 of the 1987 Minnesota Session Laws (West) in order to provide a comprehensive rural economic development strategy for Greater Minnesota.

The basic responsibility of coordinating Greater Minnesota development programs was assigned to the Rural Development Board of the Department of Trade and Economic Development which administers two targeted finance assistance programs.

The Greater Minnesota Corporation was created to stimulate technology development and transfer in Greater Minnesota. Four regional research facilities were authorized, including the Agricultural Utilization Research Institute, to develop new uses for agricultural products.

Other elements of the legislative strategy promote natural resource management, employment in innovative technology businesses, and diversification of development financing.

Essentially, the legislation attempts to target and develop sustainable future sources of employment and earnings for Greater Minnesota residents. The broad scope of this legislation underscores a variety of Greater Minnesota economic issues and addresses the comprehensive nature of any strategy designed to sustain a viable Greater Minnesota economy confronted by a changing world environment.

Major Issues: Increased Economic Activity and Labor Shortages

Roughly one-third of Minnesota's manufacturing jobs are with Greater Minnesota firms. Non-metropolitan manufacturing employment has grown approximately 4 percent annually between 1986 and 1989, more than three times the metropolitan rate of growth (Table B-2). At the same time, average manufacturing wages in Greater Minnesota have remained approximately 30 percent lower than in the Twin Cities area. Manufacturing industries in Minnesota have rebounded from the recession.

Given these high levels of growth, production facilities seem functionally viable in non-metropolitan areas where traditional inputs such as land and labor are less costly. Non-metropolitan locations are preferred for

routinized manufacturing. Production facilities of mature manufacturers are therefore locating in Greater Minnesota areas, while administrative, sales, and development functions often remain in urban centers.[1]

However, reduced unemployment can become a two-edged sword since it is the availability of labor which significantly influences manufacturing employment growth.[2] As Greater Minnesota manufacturing firms expand and unemployment falls, decreasing Greater Minnesota unemployment may lead to future labor shortages constraining sustainable Greater Minnesota manufacturing growth.

Technology and Worker Education

Greater Minnesota businesses face another basic dilemma: the benefits of lower Greater Minnesota labor costs as well as increased availability of technology may be simply outweighed by inappropriate and inadequate skill levels.[3]

Traditional Greater Minnesota industries have been served by a workforce with a broad variety of skills but new technologies which historically substituted for labor, especially information technologies, can now play a broader role.[4]

Innovations in technology can now be substituted for all factors of production allowing increased economic activity, reduced costs, shortened turnaround times, and decreased energy consumption.[5]

In order to facilitate adoption of new technologies in production increased skill levels—especially in basic math, reasoning, and problem solving—are required at all levels in the work force.[6] Increasing adult education to change the level and composition of skills in the workforce acts as a complement to investments in technology. There have been concerns that skill levels and occupational mixes in Greater Minnesota may not be appropriate as modern manufacturing businesses adopt new technologies.

Credit and Finance

Although few non-metropolitan firms employ computer-integrated manufacturing systems, most firms planned to invest in new technologies as part of a long-term strategy to modernize routine production functions of assembly, material handling, and fabrication.[7] However, in order to update or expand into new technology and capital equipment, many companies need access to credit.

There is some debate about whether or not Greater Minnesota firms have a harder time obtaining credit for their business activities than their Twin Cities counterparts. One study of credit markets finds only small differences between credit availability for business activity in metropolitan and non-metropolitan areas. Nevertheless, more barriers to credit confront non-metropolitan firms due to banker inexperience and higher collateral value variance—the range of values assets can be sold for in the market-place.[8] On the other hand, others attribute changes in bank loan growth in non-metropolitan areas simply to changes in regional business conditions rather than an institutional reluctance to lend.[9]

If Greater Minnesota manufacturers indeed experience significant barriers to credit, these barriers would inhibit the Greater Minnesota manufacturing firm's ability to take advantage of new production and information technology to sustain growth and compete in the world market.

Transportation

One obvious disadvantage to Greater Minnesota production is remoteness from populous markets. As manufacturing firms continue to grow and output increases, there is greater demand for transportation. The larger the manufacturing plant, the more important the transportation factor influences location decisions.[10]

According to an analysis of road networks in Illinois, Minnesota, Ohio, and Wisconsin, 43 percent of county-maintained roads have barely adequate or inadequate surfacing. Engineers consider traffic levels on these roads high enough to justify maintaining them but the cost to the average county

Table B-3 Major Industrial Activity of Sampled Manufacturers

SIC	Primary Product or Service	Percent of Sample
20	Food and Kindred Products	21.4%
32	Stone, Clay, and Glass Products	17.9
34	Fabricated Metal Product	14.6
35	Industrial Machinery and Equipment	14.6
24	Lumber and Wood Products	8.8
	Other	23.7

would exceed $27 million dollars or $81,000 per mile. County administrators consider current revenues inadequate to cover these needs.

Administrative options include increasing revenues, reducing or eliminating services, and improving service productivity.[11] Although Minnesota has the lowest amount of intolerable county road surfacing in the Great Lakes region, the dilemma remains for Greater Minnesota administrators and businesses on how to balance maintenance revenues and transportation business costs to sustain a growing manufacturing sector.

Sample Description

The sample of Greater Minnesota manufacturers consists of 240 manufacturing firms outside the seven-county Twin Cities metropolitan area out of approximately 2,000 manufacturing establishments in the state. Five hundred twenty three firms, stratified by location within the state based on the regional proportion of manufacturing employment in each region according to the Minnesota Directory of Manufacturers, were asked to complete the survey. The return rate was 46 percent. The sample was designed to establish a 95 percent statistical significance level with a 5 to 7 percent margin of error.

Greater Minnesota Manufacturing Firm Survey Profile

The typical Greater Minnesota manufacturing firm is independent with 23 years experience marketing locally within the state with light sales across the Midwest. Few companies have national or international markets. The typical firm employs fewer than 20 people and has annual sales of less than $1 million. Primary Greater Minnesota manufacturing industries include: food and kindred products; lumber and wood products; stone, clay, and glass products; fabricated metal products; and industrial machinery and equipment. Production methods are predominantly labor intensive.

The median age of Greater Minnesota firms is 23 years; the sample mode is 20 years. The lower quartile of the sample firms have existed for less than 13 years while the upper quartile range from 45 to 130 years in business. Relatively few firms surveyed have been in business less than five years; only 2.9 percent or seven of the firms surveyed. The low proportion of young firms may reflect inherent bias in the directory sources although it confirms the findings of other researchers: Manufacturing businesses have a low start-up success rate but high survivability once established. The study ranked one hundred fifty eight most commonly started rural business activities using a national sample of 281,000 firms. Only three activities ranked in the top 50 businesses in entry, survival, and growth categories; miscellaneous machinery manufacture, electrical contracting, and petroleum wholesale. Eight of the top 10 rural growth business activities are in the manufacturing sector.[12]

Greater Minnesota firms are typically independent companies (84.6 percent) or subsidiaries of U.S. companies (9.2 percent). Less than 2 percent of the sample are a U.S. parent company or a subsidiary of a foreign parent.

The major industrial activity in the Greater Minnesota sample of manufacturers involves food and kindred products (Table B-3).

Table B-4 Most Important Occupational Groups for Greater Minnesota Manufacturers

Occupational Group	Percent of Sample Responding Very Important	Important and Very Important
Management	70%	95%
Professionals/Scientists/Engineers	16	33
Technical/Skilled	33	82
Clerical/Sales	28	72
Unskilled	18	42

Most Greater Minnesota manufacturers in the sample produce durable goods (46 percent) along with just over one-third (37 percent) manufacturing non-durable goods. A smaller population (15 percent) of firms produce high technology goods.

Greater Minnesota firms are small with 88 percent employing fewer than 100 people; more than half have fewer than 20 employees. Almost half have annual revenues less than $1 million.

Greater Minnesota firms tend to concentrate on local or Minnesota markets with only light sales to the Midwest region. More than 30 percent of the firms sell all their products locally. Half of the firms sell 6 percent or less of their products in the Midwest region.

Terminology

Firms were asked to rate the importance of, or their satisfaction with, a particular factor or issue on a scale of one to four with one representing the lowest and four the highest rating. For the most part in the text of this chapter, the four ratings have been consolidated to ease description of issues. For example, 'important' or 'satisfied' represents the aggregation of scores 3 and 4. The text will show when the analysis diverges from this scheme.

Correlation coefficients were standardized into three categories: weakly, moderately and strongly. 'Weakly correlated' indicates a range of values from-0.3 to 0.3; 'moderately correlated' covers from-0.67 to-0.33 and from +0.33 to +0.67; 'strongly correlated' describes the ranges-1.0 to-0.67 and 0.67 to 1.0. 'Positively' and 'negatively' refer to the sign of the correlation coefficient.

Current Conditions and Issues

Labor

Local economies can be distinguished by "what they make" versus "what they do" or industry versus occupational mix. Local occupational mix determines education and skill levels of the workforce which in turn influence a region's propensity for economic growth and diversity.[13]

Traditionally, human resources and land are less costly in Greater Minnesota. This creates a comparative advantage for firms and branches performing routinized manufacturing functions outside the Twin Cities metropolitan area. Administrative, sales, and development functions often remain in urban centers although these functions are also performed by firms in Greater Minnesota.[14]

However, it is the availability of labor which significantly influences manufacturing employment growth.[15]

The mix of occupations staffing Greater Minnesota firms provide insight into the present and future demands on the labor force, educational and training priorities, and

Table B-5 Difficulty Recruiting and Retaining Important Occupational Groups

Occupational Group	Difficulty Recruiting: All Sample Firms	Difficulty Recruiting: If Occupation Is Important	Difficulty Retaining: All Sample Firms	Difficulty Retaining: If Occupation Is Important
Management	61%	53%	39%	33%
Professionals/Scientists/Engineers	67	66	50	41
Technical/Skilled	71	67	44	38
Clerical/Sales	35	54	24	22
Unskilled	23	30	32	44

NOTE: "All Sample Firms" column reports responses 3 or 4 (difficult and very difficult) as a percentage of all that responded to the question; and, the column 'If Occupation Is Important' reports responses 3 or 4 as a percentage of those firms that considered the particular occupational group important or very important and responded to the question.

potential for future manufacturing employment growth.

Benefits of lower rural labor and real estate costs as well as increased availability of technology may be offset by lower skill levels. Rural growth is inhibited mainly by labor and skill shortages.[16]

This section explores the important occupational groups for Greater Minnesota manufacturing firms and the firms' experiences recruiting and retaining these groups.

Important Human Resources

Firms were asked to rate the importance of five aggregated occupational classes on a scale of one to four from unimportant to very important. The ratings are summarized in Table B-4. Workers with managerial, technical, or sales skills were the most important occupational groups to Greater Minnesota manufacturers.

Management, technical and skilled workers, and clerical and sales personnel were important (scores of 3 or 4) to significantly more of the Greater Minnesota manufacturing firms than the professional and unskilled groups. Almost every firm, or 95 percent of the respondents, considered management important or very important. The most important non-management occupational groups were technical/skilled (82 percent) and clerical/sales personnel (72 percent).

The importance of management far outweighed the importance of any other occupational group since managers were rated as very important (score of 4) by 70 percent of the firms. Only 33 percent of the respondents considered the second ranked group—technical/skilled—very important.

Professionals (including scientists and engineers) and unskilled employees were reported to be important by a minority of firms.

The sample of Greater Minnesota firms relied heavily on two non-management occupational groups, skilled/technically trained workers and clerical/sales personnel. This profile indicates dominant production, administrative, and sales functions for most firms in Greater Minnesota with little precision operation or research and development activity.

Recruiting and Retaining Important Human Resources

Non-metropolitan locations are most typical for routinized manufacturing requiring lower production costs in a mature firm.[17] However, these activities require sufficient availability of management and technically trained and skilled personnel to meet labor demands without driving up wages for those important groups. Some studies conclude that growth is inhibited mainly by two factors—labor and skill shortages.[18] This section explores the level of recruiting and retention difficulty experienced by manufacturers in Greater

Table B-6 Reasons for Difficulty in Recruiting Human Resources

Reason	Percent of Sample	Percentage of Firms with Important Occupational Group: Management	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
Cost of Labor	79%	76%	53%	88%	45%	32%
Lack of Skills	69	67	52	88	39	23
Labor Shortage	39	32	22	32	20	17
Personal Taxes	51	47	36	60	32	13

NOTE: The first column indicates the percent response important and very important in the whole sample (score of 3 or 4); each subsequent column reports the same responses by those firms where the occupational group is of some importance (score of 3 or 4).

Minnesota. Firms were asked to rate the difficulty experienced recruiting and retaining five standard occupational classes. The responses are summarized in Table B-5.

Greater Minnesota firms reported technical and skilled employees were significantly more difficult to recruit than management personnel. Seventy-one percent of the respondents reported difficulty recruiting technical and skilled labor. To a lesser degree, managers were difficult to recruit with 61 percent reporting difficulty. Clerical and sales staff were considered difficult to recruit by only 35 percent of the firms.

Professionals and scientists, although reportedly less important than management or skilled workers, were also difficult to recruit. The least important group, unskilled workers, were the least difficult to recruit. More than 77 percent reported little or no difficulty, even in firms where unskilled labor is important. This suggests there were no perceived shortages in the Greater Minnesota general labor market.

Interestingly, firms that considered management important had marginally less difficulty recruiting management than the sample experienced, possibly evidencing internalized recruiting practices. However, such interpretation is limited due to the predominant importance of managers in the sample.

Retention appears to be less difficult than recruiting for all groups. No occupational group was considered very difficult (score of 4) to retain by more than 13 percent of the firms.

The most difficult group to retain among Greater Minnesota firms were the professionals, scientists, and engineers. Fifty percent indicated difficulty retaining this group despite its relative unimportance as an occupational group.

Two of the most important occupational groups, the technical/skilled and management personnel were most frequently reported difficult or very difficult to retain by 44 and 39 percent respectively of Greater Minnesota manufacturers. There were no statistical differences in the level of difficulty between these two groups or in the levels experienced by sub-groups where these groups were important.

Forty-four percent of firms that rated unskilled labor as important also rated unskilled labor as difficult to retain.

Reasons for Difficulties in Recruiting and Retaining Occupational Groups

Forty-five percent of the firms in the sample had been in business for more than 25 years. Studies of location decisions before and during the early 1970s suggest that new and expanding traditional industries had located in Greater Minnesota to take advantage of higher un-and under-employment rates and the consequently lower labor costs than were available in dense metropolitan labor markets.[19] Labor market concerns were

Table B-7 Reasons for Difficulties in Retaining Occupational Groups

Reason	Percent of Sample	Percentage of Firms with Important Occupational Group: Management	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
Cost of Labor	83	89	79	98	53	77
Lack of Skills	62	67	61	75	38	51
Labor Shortage	42	50	39	63	32	48
Personal Taxes	21	50	46	52	30	41

especially important factors for new branch plants.[20]

Furthermore, while non-metropolitan entrepreneurs feel they exercise little control over economic conditions, they express frustration about the level of skills or expertise in the workforce especially for administrative occupations.[21] The availability of skilled labor influences decision-making more than the cost of labor for high technology firms.[22]

The following section investigates the major reasons given by firms regarding their recruiting and retention difficulties. Firms were asked to rate five common reasons for difficulties encountered in recruiting and retaining five occupational classes. The responses to the top four issues are summarized in Tables B-6 and B-7. Climate was rated unimportant by almost all firms.

A significant majority of the sample of manufacturers cited the cost of labor (79 percent) and lack of appropriate skills (69 percent) as the main obstacles to recruiting employees (Table B-6). The impact of personal taxes on recruitment was distributed uniformly across the responses (51 percent) and only 39 percent of the firms cited shortages in labor for their overall difficulty in recruiting employees.

The cost of human resources was considered the major factor in retention by a significant majority (83 percent) of the responding sample firms, followed closely by lack of skills (62 percent) as shown in Table B-7.

On closer inspection of important occupational groups as shown in Table B-6, lack of appropriate skills and cost of labor emerged as the major recruiting obstacle regardless of important occupational group.

For most Greater Minnesota manufacturing firms, (88 percent) technical and skilled employees were difficult to recruit mainly because of the lack of skills in the workforce. Firms considered cost of obtaining skilled labor a barrier to recruitment to an equal extent (88 percent). Only 32 percent of skilled labor-dependent firms indicated shortages in labor as a recruitment barrier. Apparently, there are sufficient workers to meet staffing requirements although the occupational profile of the Greater Minnesota workforce has inadequate shares of appropriately skilled and technically-trained workers.

Interestingly, it is only among firms that considered skilled and technical workers important that personal taxes were considered a significantly high barrier (60 percent) to their recruitment.

Firms considering management important followed a similar profile as those considering skilled labor but the importance of taxes and lack of skills as reasons for recruiting difficulty were significantly less.

Table B-8 Difficulty Recruiting Important Occupational Groups in Firms of Different Ages

	(Percentage Group Reporting Difficulty—score of 3 or 4)				
Age	Management	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
Less than 5	43%	28%	28%	0%	57%
5 to 10	48	39	48	30	18
10 to 25	45	34	63	24	16
Greater than 25	40	34	56	30	18

Table B-9 Difficulty Recruiting Important Occupations in Different Types of Firms

	(Percent Reporting Difficulty Recruiting—score of 3 or 4)				
Firm Type	Management	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
Independent	47%	33%	57%	27%	17%
Branch	55	41	50	41	32

On closer examination of retention (Table B-7), two reasons—cost of labor and shortage of skills—were reported as important significantly more often by firms where skilled/technical employees were important than among any other group. Only among firms where skilled and technical employees were important (63 percent) was shortage of labor cited as a majority contributor to difficulty in retaining personnel. This suggests that inadequate skill levels in the Greater Minnesota workforce may cause greater demand on the limited skilled and technical pool than other groups.

Personal taxes were of some importance to less than one-quarter (21 percent) of the respondents.

The firms reporting difficulties in recruiting and retaining the different occupational groups were categorized according to major characteristics of the sample such as firm age, firm type, industry type and firm size. Tables B-8 through B-11 summarize the percent responses of those firms having difficulty recruiting their important occupational groups by firm characteristics.

Younger firms reported more difficulty recruiting unskilled labor than older firms. Almost 60 percent of the firms less than five years old had difficulty recruiting unskilled labor. This group constituted only 3 percent of the respondents and may not provide significant information (Table B-8).

Firms older than 10 years reported difficulty recruiting skilled workers more frequently than younger firms. A majority of firms over 10 years old expressed difficulty. These older firms constituted 84 percent of the respondents.

Independent companies appeared to have marginally less difficulty recruiting all types of labor than branches of U.S. firms except skilled and technical personnel. At 17 percent, independents had significantly less difficulty recruiting unskilled workers than branch establishments (32 percent). Independent firms made up 85 percent of the respondents (Table B-9).

A significant majority of high technology firms (63 percent) reported having some difficulty recruiting managers. Across all industry types, firms reported having the most difficulty recruiting technical and skilled employees, especially the high technology(66 percent) and durable goods (57 percent) manufacturers (Table B-10).

Table B-10 Difficulty Encountered Recruiting Important Occupations by Industry

Industry	(Percent Reporting Difficulty Recruiting—score of 3 or 4) Management	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
High-Tech	63%	48%	66%	29%	17%
Non-durable	53	36	51	31	21
Durable	38	30	57	23	16

Table B-11 Difficulty Recruiting Important Occupations by Firm Size

Employee Size	(Percent Reporting Difficulty Recruiting—score of 3 or 4) Management	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
Fewer than 20	38%	26%	50%	31%	18%
20-99	60	42	68	27	18
100-499	55	45	60	20	25
More than 500	71	58	57	0	14

Only 38 percent of small firms (those with fewer than 20 employees) had difficulty recruiting managers. In contrast, a majority of larger firms had difficulty recruiting this group. Small firms also had the least difficulty recruiting skilled workers although a majority of all sizes of firms reported difficulty. The relative ease of unskilled and clerical/sales personnel recruitment appeared uniformly distributed across all size classes (Table B-11).

The level of difficulty encountered by large firms in recruiting their important labor classes is not surprising. Even if larger firms have more recruiting expertise than smaller firms, greater difficulty stems from their heavier demands on the limited workforce.

Major Personnel Issues

Many personnel issues facing Greater Minnesota manufacturers are linked with declining rural and non-metropolitan populations, although the decline has slowed since the 1970s. Another trend facing Greater Minnesota since the 1970s is an aging population.[23] Greater Minnesota manufacturers were asked to rate the importance of 13 personnel issues.

Not surprisingly, the major issues were the same reported important during the discussion of recruiting and retention, cost of labor and the lack of appropriate skills. In addition, increasing health costs emerged as an issue of more frequent concern than the lack of skills in the workforce.

Current and future personnel issues followed a common statistically-indistinguishable profile. However, the most important (score of 4) issues of labor costs, skill levels and health costs were expected to increase in severity among the respondent firms. This section confines itself only to current issues.

Of most concern to manufacturers in Greater Minnesota were rising labor costs (85 percent), employee health benefits (75 percent), and lack of appropriate skills (61 percent). The combined importance responses—important and very important—to these three major issues cannot be statistically separated. However, by considering reports of extreme importance (score of 4), the issues can be significantly ranked in order of importance: 1) cost, 2) health benefits, and 3) skills (Table B-12).

Table B-12 Importance of Current Personnel Issues

Issues	Very Important (Score of 4)	Important and Very Important (Score of 3 or 4)
Rising Labor Costs	55%	85%
Lack of Appropriate Skills	26	61
Employee Health Benefits	47	75

Table B-13 Importance of Personnel Issues by Important Occupational Groups

		(Percent Reporting Difficulty Recruiting—score of 3 or 4)				
Issues	Percent of Sample	Management	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
Rising Labor Costs	85%	87%	82%	86%	88%	87%
Lack of Appropriate Skill	61	60	75	66	61	56
Declining Labor Supply	47	47	51	47	51	55
Employee Health Benefits	75	75	76	78	79	82

NOTE: The first column describes the importance (response 3 or 4) of a particular issue to the whole sample whereas the subsequent columns describe proportions of firms that considered the particular occupation important.

Only 24 percent of the responding firms rated organized labor important.

The various personnel issues, scrutinized with respect to important occupational groups, are summarized in Table B-13.

All occupational groups rated the same three issues as most important with the exception of lack of appropriate skills. It was rated an important issue to significantly more firms which considered professionals, scientists, and engineers important (75 percent) than the sample as a whole (61 percent).

Training

Recent studies have shown that few rural or non-metropolitan firms employ computer-integrated manufacturing systems although most firms plan to invest in new technologies as part of a long-term strategy to modernize assembly, material handling, and fabrication. Foreign and domestic competition as well as the availability of technologies stimulate incentives to automate in order to reduce costs, improve quality, and increase capacity. In order to facilitate adoption of new technologies in production, increased skill levels, especially in basic math, reasoning, and problem solving, are required at all levels in the workforce. Adult education and training complement investments in technology.[24]

This section investigates the extent and uses of formal training in Greater Minnesota manufacturing firms. Firms indicated the changes they had made in formal training compared with five years ago. Table B-14 summarizes sample responses.

A majority (61 percent) of Greater Minnesota manufacturers provide formal training for their employees and compared with five years ago, most firms have increased their level of training. Sixty-four percent of the respondents reported an increase in training. Although one-third of the respondents had not changed training levels, only 2 percent had reduced their training programs over the last five years (Table B-14).

Table B-14 Current Extent of Formal Training Compared with Five Years Ago

	Percent of Firms with Formal Training Changes from Five Years Ago				
	No Formal Training	Formal Training	Same	More	Much More
Percent of Sample	39%	61%	33%	45%	19%

Table B-15 Increase in Training by Recruiting and Retention Difficulty of Occupation Groups

	Percentage of Firms with Important Occupational Group Reporting Difficulty and Offering More Training				
	Management	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
If Difficulty Recruiting	66%	75%	64%	73%	70%
If Difficulty Retaining	65	65	66	67	66

Conceptually, firms may respond to difficulties in recruitment with increased training of existing staff to meet shortfalls. However, no significant correlation exists between difficulty in recruiting particular groups and changes in training over the last five years. Reported increases in training by important occupational group is summarized in Table B-15.

Firms experiencing difficulty recruiting professionals/scientists/engineers, clerical/sales and unskilled labor have increased their training programs significantly more than the group as a whole. There is no significant difference in increased training for groups experiencing difficulty retaining their most important employees and the group as a whole.

While manufacturers do not appear to have changed the extent of formal training to respond to recruiting and retention difficulties, intuition suggests that firms select training topics in response to market demands. A broad body of literature describes the motivation for selecting particular training topics. Businesses use a wide variety of information sources to solve market problems.[25] Since information substitutes or complements all types of productive input, the topics covered in training programs provide insight into the relative importance of factors of production and marketing and skill deficits in the workforce. Greater Minnesota firms were asked how often 15 major topics were covered in company training programs. Table B-16 summarizes the responses.

Almost nine out of 10 employers providing formal training were committed to improving and controlling the quality of their products through educating their workforce. Most frequently, Greater Minnesota manufacturers reported quality improvement and control (85 percent) as a frequently covered training topic. In fact, 47 percent of the sample reported that quality improvement and control were very often (score of 4) covered in training courses.

Training was also predominantly used to impart knowledge of production processes, equipment and computer skills (74 percent) and customer service (74 percent).

Topics of secondary importance were

Table B-16 Frequency of Training Topics Covered in Employee Education Programs

Topics	Very Often	Fairly and Very Often
Manufacturing		
Processes/Equipment	36%	74%
Engineering/Scientific Techniques	9	39
Quality Improvement/Control	47	85
Marketing/Sales		
Customer Service	38	74
International Skills	2	9
Foreign Languages	0	0
Marketing/Sales Techniques	20	57
Administrative		
Clerical/Office Skills	10	39
Administrative Computer Skills	19	62
Managerial		
Strategic Planning	21	62
Supervisory/Leadership Techniques	27	60
General		
Basic Skills (Reading, Writing, Math)	11	25
Communication Skills	13	50
Career Development	9	27
Interpersonal Skills	9	46

administrative computer skills (62 percent), strategic planning (62 percent), leadership techniques (60 percent) and marketing and sales (57 percent).

Some studies indicate that information is becoming the major factor of production in the economy but non-metropolitan areas are slow to use the new information technologies.[26] Whereas information has historically been used to substitute only labor, it now also substitutes for energy, natural resources,[27] and capital allowing increased production at lower prices in shorter timespans.[28] A majority of the Greater Minnesota manufacturers sampled provided frequent training in administrative computer skills in addition to production computer skills.

Strategic planning and personnel management are also thought to have been overlooked in non-metropolitan industry. Supposedly, few non-metropolitan firms practice strategic planning or only plan occasionally, possibly as a temporary measure, despite evidence that planning improves survivability and prosperity.[29] Other studies found the emphasis of business activity placed on production planning and management, capital management, financial planning, budgeting, and manager-employee training rather than inventory purchasing and control which are stressed in the academic business literature.[30] In Greater Minnesota, a significant majority of sampled firms frequently covered strategic planning and supervisory and leadership training.

However, the response of the sample adds little credence to previously studied management beliefs that marketing and personal selling consumes most time, requires the most skill and training, but contributes most to business success.[31] While a majority of Greater Minnesota manufacturers that offered formal training frequently covered marketing and sales topics, it was not the primary training topic.

Other topics were reportedly covered often by only a minority of firms. Basic skills normally addressed in the elementary and secondary levels of education were frequent topics in only one-quarter of the firms.

Greater Minnesota manufacturing firms were asked to rate the importance of eight major

Table B-17 Reasons for Offering Employee Training

Reasons	Very Important	Important and Very Important
Increase Technical Complexity	34%	78%
Teach Company Procedures	31	82
Correct Basic Skills Deficit	17	63
Career Advancement	13	57
Quality, Productivity	62	95
Manage Turnover	21	56
Reduce Absenteeism	17	41
Increase Safety	52	95

Table B-18 Importance of and Satisfaction with Different Sources of Formal Training

Sources	Very Important	Important and Very Important	Very Satisfied	Satisfied and Very Important
In-House	63%	97%	25%	77%
Apprenticeship/Internship	15	36	15	51
Consultant/Commercial Course	8	35	11	51
Vocational/Technical Education	23	68	17	73
Community College	3	24	5	53
University/Four Year College	14	36	14	54
Primary/Secondary	33	67	18	67

reasons for providing formal training for their employees. Their responses are summarized in Table B-17.

Almost all firms (95 percent) that provided training considered training programs important primarily to improve quality and productivity as well as increase safety in the workplace. This latter result should be noted with particular reference to the effects of safety and health (OSHA) and workers' compensation regulations discussed below. Of lesser yet still high importance were training courses to teach company procedures (82 percent) and meet the increasing technical complexity of the workplace (78 percent).

Reasons of secondary importance were the use of training courses to correct basic skills (63 percent), encourage career advancement (57 percent), and manage turnover (56 percent).

Two important points deserve to be restated. First, almost two-thirds of the firms considered training very important (score of 4) to improve in quality and productivity in the workplace. This response reaffirms the importance placed by Greater Minnesota firms on product quality and market competitiveness. Second, and paradoxically, the high percentage of firms reporting the importance of training to correct basic skills deficits (63 percent) seemed at odds with previous responses where only one-third (36 percent) of the firms frequently covered basic skill topics. The answer may lie in the replaceability of unskilled workers compared with other groups; firms may be unwilling to invest their own resources in basic skill training for unskilled workers, relying instead on the primarysecondary school system.

Preferred Sources of Formal Training

Greater Minnesota businesses manufacturers were asked to rate the importance of seven sources of formal training. Their responses, summarized in Table B-18, indicate an overwhelming preference for in-house training over which they have direct control or vo-

Table B-19 Comparison of National Personal Income, Loan, and Asset Growth for 1972 and 1987

County Type	Personal Income Growth		Total Loan Growth		Total Asset Growth		Loan Asset Ratio	
	72-79	80-87	72-79	80-87	72-79	80-87	72-79	80-87
Metro	3.1%	2.6%	9.9%	9.9%	9.7%	7.0%	52.3%	55.5%
Non-Metro	4.3	1.4	12.7	5.3	10.5	6.7	53.9	51.7
Manufacturing	3.7	1.3	11.2	6.3	9.2	7.0	55.3	52.9

SOURCE: Federal Reserve System, Bureau of Economic Analysis, and USDA data.[33]

tech courses whose content they directly influence.

The most important sources of formal training sources among firms that provide them were in-house, vocational-technical, and basic level skill courses. In-house training was cited as important by 97 percent of the respondents and 77 percent reported satisfaction with this choice. Vocational/technical training and basic skills training were important to more than two-thirds of the companies (68 and 67 percent respectively). Community college was considered important by only 24 percent.

Since basic skills were relatively important yet infrequently covered in company training, responsibility for development of basic skills was primarily left to the school system. A majority of firms were satisfied with the choices of sources of training they have rated as important.

Quality and Productivity Training

Since quality and productivity improvements have become an essential element of competitive manufacturing, it is appropriate to focus on the staffing requirements in firms that have made these commitments.

Quality improvement and control was considered important for 95 percent of the respondents and very important for 65 percent. There were, however, no significant correlations between the importance of quality and productivity improvement and control and the importance of a particular occupational group. Greater Minnesota firms therefore appear to be able to invest in quality and productivity improvement without necessarily altering the staffing profiles of their operations.

Capital Access

This section explores the debate of whether or not Greater Minnesota firms can obtain adequate credit for their business activities. While there are only small differences between credit availability for business activity in metropolitan and non-metropolitan areas, barriers may still confront non-metropolitan firms due to banker inexperience with the manufacturing sector and higher ranges of collateral values.[32]

At the national level, loan growth in non-metropolitan areas has declined while metropolitan growth remained flat. While the loan-asset ratio increased in metropolitan areas, it declined in non-metropolitan areas. The changes for non-metropolitan manufacturing counties exhibit similar, although less pronounced, declines (Table B-19).

Non-metropolitan manufacturing assets grew slightly faster than total loan growth and at surprisingly robust levels considering the rapid slowdown in personal income. Two interpretations of accumulating net assets dominate: banks are reluctant to lend; and, the supply of assets is greater than the demand for loans. Drabenstott theorizes the latter and attempts to eliminate cyclical trends in the declining growth pattern and summarizes that the rural manufacturing

Table B-20 Characteristics of Firms Experiencing Difficulty Securing Credit

Characteristic	Correlation Coefficient	Interpretation
Age	-0.2	The older firms have less difficulty
Debt/equity	0.2	Firms with higher D/E ratio have greater difficulty
Secured creditors	0.2	Firms with more secured creditors have more difficulty

Table B-21 Comparison of Firm Attributes Experiencing Difficulty

	Sample	Less than 1:1	1:1 to 2:1	2:1 to 4:1	More than 4:1
Percent Difficulty for each Ratio of Debt-to-Equity	30	28	32	45	75
	Sample	1	2 to 4	4 to 6	6 or more
Percent Reporting Difficulty by Number of Secured Creditors	30	28	38	0	67

counties' demand for loans is down resulting in reduced loan activity.

On the other hand, the Economic Growth Report, 1990 (CD Publications) observed that tighter local bank credit policies had restricted the supply of loans to rural firms, increasing the demand for Economic Development Agency-sponsored development credit.[34]

Greater Minnesota manufacturers were asked whether they had tried to secure capital during the last five years and, if so, what level of difficulty they had experienced during the process.

Surprisingly few of the Greater Minnesota firms sampled reported difficulties securing credit (Table 18). More than one-half (58 percent) of the firms had sought capital during the last five years. Of these firms, only 36 percent had more than a little difficulty securing the capital. Even more surprising given the quantity of literature focusing on problems in non-metropolitan credit markets, only 17 percent reported extreme difficulty in securing credit. Two-thirds of those that sought credit cited cost as the biggest barrier to securing credit.

Apart from firm age, difficulty in securing capital is significantly, weakly correlated only with debt-to-equity ratio and secured creditors (Table B-20).

These three criteria are commonly used by banking institutions to assess the risk and viability of a credit transaction. Firms with a debt-to-equity ratio higher than 2:1 had significantly more difficulty securing credit than firms with lower ratios. Firms with more than one secured creditor reported significantly more frequent difficulty than those with only one (Table B-21). It would appear that a firm's difficulty in securing credit in Greater Minnesota is linked to the financial practice and health of the firm.

Table B-22 Satisfaction with Primary Source of Capital

Source	Percent of Firms' Satisfaction with Source: Very High	High and Very High
Stock Offering	8%	19%
Venture Capital	7	23
Personal Equity	18	46
Retained Earnings	22	53
Bond Sale	11	22
Commercial Paper	8	16
Commercial Loan	24	67
Government Loan	7	22
Grant	11	27

Sources of Capital

Greater Minnesota manufacturers were asked to rate the level of satisfaction with primary sources of investment and working capital over the last five years. Table B-22 summarizes their responses.

Commercial loans (67 percent) were the most popular form of raising capital. Personal equity (46 percent) and retained earnings (53 percent) were the second most popular. Public offerings and venture capital were the least frequently used methods.

In order to establish the extent and level of barriers to credit faced by Greater Minnesota manufacturers, they were asked to rate 12 barriers. The responses are summarized in Table B-23. Firms indicated that the barriers they faced were mainly low with the exception of cost and collateral requirements.

Major barriers encountered by a majority of firms were the cost (66 percent) and collateral requirements (57 percent) for obtaining credit. This response is not surprising for two reasons: market interest rates have been high over the last five years, and some research points out that advantages of lower non-metropolitan borrowing rates disappeared when interest rates in non-urban and urban banking markets became equally competitive.[35]

Significantly less than a majority of borrowers cited cash flow, lending limits, risk and local availability as barriers. Discrimination was cited as the least obstructive barrier.

There were no significant differences in the barriers to credit for groups which experienced difficulty securing credit and those that did not. The cost of credit is a barrier for a marginally smaller proportion of firms that experienced difficulty than those that did not. Lender control plays a great role for a minority of borrowers. Firms that need capital and have great difficulty getting it see cost as less of an obstacle since their major barriers are linked to current indebtedness.

Traditional banking practices typically link access to credit with future uses of credit. Asset-based lending typically considers the value of real assets whereas cash flow-based lending is linked to working capital. Greater Minnesota manufacturers indicated the use they made of secured capital and their responses reveal the behavior of both borrowers and lenders.

Capital was primarily used to finance new equipment (61 percent), inventory (56 percent), and working capital (54 percent). Demand for credit to construct or acquire buildings was more moderate (36 percent). Refinance debt (16 percent), research and development (15 percent), land (12 percent), and extinguishing current debt (6 percent) were the least frequent uses.

Among the group of firms that experienced difficulty securing credit, a significantly greater proportion intended to acquire inventory (68 percent) and refinance existing debt (25 percent) than reported by the entire sample of borrowers. Fewer of them intended to construct or acquire buildings (55 percent).

Table B-23 Major Barriers to Obtaining Capital over the Last Five Years

Barrier	Percent of Firms Experiencing Barrier: Very High	High and Very High
Cost	28%	66%
Collateral	29	57
Lending Limits	22	44
Cash Flow	14	48
Knowledge	16	37
Availability Locally	20	38
Risk	9	35
Discrimination	1	3
Rollover of Return	6	23
Lender Control	6	20
Public Offer Market	8	19
Cost of Public Offering	4	10

Table B-24 Primary Heating and Processing Energy Sources

Energy Source Use	Percent of Respondents: Heating	Processing
Electricity	18%	54%
Natural Gas	49	17
Fuel Oil	10	5
Propane	13	8
Coal	1	0
Own	4	1
Other	2	1

It appears therefore that firms attempting to obtain credit to purchase real assets experienced less barriers than did other borrowers. Inventory was considered a second best collateral compared to buildings. Inventory value is highly sensitive to market demand and is valued lower in an asset-based lending system; debt refinancing provides no new assets or collateral at all.

As a final note to this section, consider the following similarities in commercial and consumer credit behavior. While studies of consumer credit in non-metropolitan areas revealed a slightly higher rejection rate, they found no significant differences in metropolitan and non-metropolitan loan evaluation and lending behavior. Non-metropolitan consumers chose to hold 18 percent less debt than their metropolitan counterparts, suggesting a lower demand for credit in non-metropolitan areas. Non-metropolitan households more frequently considered credit a bad idea than metropolitan consumers, mainly because of high interest rates and finance charges.[36] Given the large number of small firms in the sample, the personal attitudes and preferences of key personnel may strongly influence a firm's borrowing behavior and explain the low levels of commercial loan activity in Greater Minnesota.

Energy

According to at least one study access to utilities was a major factor in plant location decisions between 1984 and 1987.[37] Minnesota's extremes in climate make energy an important input. Greater Minnesota manufacturers' primary energy sources for heating and processing are summarized in Table B-24.

Electricity was the preferred energy source for processing by a majority of firms surveyed (54 percent), whereas gas was preferred for heating by 49 percent of the firms. Natural gas is cheap but interruptable. The alternative fuels, oil and electricity, are more expensive although relatively inexpensive compared to other regions in the country.

The firms rated the importance of, and satisfaction with, the cost, reliability and availability of their primary energy source. Almost all firms (96 to 97 percent) considered three factors—cost, reliability and availability—equally important in the evaluation of energy sources. Only 71 percent of the respondents considered cost very important compared with availability (78 percent) and reliability (81 percent). This result may be because Minnesota energy prices are among the lowest in the country.

In general, Greater Minnesota manufacturers were satisfied with their primary energy source. Almost 90 percent (89 percent) of the respondents were satisfied with reliability and availability of energy sources. Costs factors were less satisfactory, although a majority (57 percent) were still satisfied.

Transportation

Product transportation is a major cost to manufacturers on both input and output sides of their operations. Transportation administrators face the dilemma of balancing maintenance revenues against business costs. The maintenance of an average county road exceeds $81,000 per mile per year.[38]

Transportation investment impacts labor markets and population. A study found that investment in non-metropolitan transportation networks intended to improve physical access to non-metropolitan area industry creates an immediate short term stimulation in construction. However, this investment reinforces economic concentration around established, central locations as out-migration of jobs occurs.[39]

Studies indicated that transportation costs were not only a main factor of firm location decision-making in the late 1970s and early 1980s,[40] but also that the transportation factor had greater influence on larger manufacturing plants.[41]

This section of the survey investigated the importance and quality of various modes of transportation in Greater Minnesota and related issues. Product transportation was important to 80 percent of the firms. It was very important to two-thirds (66 percent) of them. Theoretically, the importance of transportation can be differentiated across the firms' characteristics of size and type.

The importance of product transportation was positively correlated to a firm's employee size (correlation coefficient +0.2). Seventy five percent of firms with less than 20 employees considered transportation important or very important, whereas a significantly greater percentage (at least 85 percent) of firms with more than 20 employees considered product transportation important or very important. Ninety-five percent of firms employing between 100 and 499 workers considered transportation of some importance.

Product transportation was significantly more important to branches of U.S. companies (87 percent) than independent companies (76 percent) although only 9 percent of the respondents were branch companies. This result implies that branch firms were probably located according to comparative advantages of local factors and ship more heavily within a network of other companies whereas independent firms (which dominate the sample) depend more heavily on serving local markets over short distances.

Primary Mode of Transportation for Products

Table B-25 summarizes the firms' primary mode of product transportation and their satisfaction with the service.

Truck, at 74 percent, and freight, at 44 percent, were the most popular forms of transportation among Greater Minnesota manufacturers.

Users of the two most prevalent modes of transportation were satisfied with the modes. Truck users were the most satisfied with transportation services (93 percent), followed

Table B-25 Primary Product Transportation Mode and Primary Mode User Satisfaction

	Truck	Air	Rail	Water	Freight
Primary Mode	74%	6%	12%	7%	44%
Satisfied with Primary Mode	93	60	44	57	82

by freight users (82 percent). The majority of firms using air (60 percent) and water (57 percent) transportation were also satisfied. Rail shipment, however, was the least satisfactory (44 percent) form of product transportation.

Important Transportation Characteristics

Almost all Greater Minnesota manufacturers cited cost (98 percent), quality of service (97 percent), reliability (96 percent) and speed (90 percent) as the most important characteristics of their preferred modes of transportation.

For the two most important forms of transportation—truck and freight—cost, quality, reliability and speed were the most important factors that contributed to satisfaction. The relative importance of these characteristics were similar for the sample as a whole with one exception: marginally more firms chose trucking (85 percent) over freight (76 percent) when safety was of concern.

Except for the cost of transportation, more than 80 percent of the firms were satisfied with the characteristics of their primary mode of shipping. About one-half (54 percent) were satisfied with the cost of transportation.

Importance of Business Travel

Increased use of communication technologies such as personal computers, WATS phone system, facsimile machines and the strong linkages between Greater Minnesota manufacturers and nearby Twin Cities metropolitan markets sometimes substitute for extensive business traveling and personal meetings. In some regions, business organizations match supplies and demands of local and regional firms, strengthening local networks of businesses and reducing search and travel time.[42] Since the majority of firms in the sample serve local markets, business travel should be relatively unimportant. The survey results confirm this hypothesis. For almost two-thirds (65 percent) of the responding firms, business travel was unimportant (score of 1 or 2). Business travel was very important (score of 4) for only 13 percent of the firms.

Almost twice the share of firms (92 percent) considered the automobile satisfactory compared to air travel (57 percent) as a primary business transportation mode, a result indicating strongly established local networks.

Research and Development

Locality specialties can be classified into five broad, overlapping areas: entrepreneurial, central administrative, research and development, precision operations, and routine operations. Firms may disperse these functions throughout several locations according to local specialty.[43]

Traditionally, research and development or product innovation had been thought to be best suited to urban centers with appropriate institutional, occupational, and industrial mix. Production of well-defined, mature goods are more viable than research and development or innovation in non-metropolitan areas where the costs of land and labor are cheaper and skills are less specialized.

The survey revealed low levels of anticipated innovation. Only 54 percent of the sampled manufacturing firms intended to introduce new products in the next five years. Only 35 percent of Greater Minnesota manufacturers considered research and development

Table B-26 Importance of Technologies for all Firms and Those Where R&D was Important

Technology	Percent of All Respondents Very Important	Percent of All Respondents Important and Very Important	Percent of Firms with R&D Important and Very Important
Production/Automation	28%	59%	75%
Communications/Information Technology	22	52	69
Quality/Productivity Improvement	23	56	76
Advanced Materials	23	51	73

expenditures important and only 20 percent considered them very important.

These results may be due to the relatively small size of typical Greater Minnesota manufacturers, in terms of both sales and employment, and their routinized production role. Importance of research and development expenditures was moderately correlated to firm size (+0.5). As firms become bigger, research and development becomes relatively more important. As noted in the introduction however, average unit size has grown slowly until recently.

Smaller firms may be routinely producing basic or intermediary goods to be shipped to other locations locally. Such firms would not therefore depend on in-house product innovation for their survival and growth but on the low-unit-cost manufacture of component parts for products innovated elsewhere. For these firms, the rate of adoption of more efficient technology given stable employment levels becomes a more relevant issue than investment of resources in new product development.

New Products

An overwhelming majority of firms (82 percent) investing in R&D prefer to maintain in-house control of their R&D activity. Private subcontracting or joint ventures with other firms was a poor runner-up (15 percent), while federal government or academic involvement in greater Minnesota research and development activity was almost non-existent.

Businesses Investing in Research and Development

Earlier studies suggested that few non-metropolitan firms employed computer-integrated manufacturing systems, although most firms planned to invest in new technologies as part of a long-term strategy to modernize assembly, material handling, and fabrication. Automation reduces costs, improves quality, and increases capacity.[44] Furthermore, while studies have suggested that information has also become the major factor of production in the economy, non-metropolitan areas are slow to integrate new information technologies into their operations.[45]

According to another study, given greater accessibility of more efficient production and information technologies, small manufacturing industries and high technology cottage industries will increasingly choose to locate in non-metropolitan areas and existing firms will integrate new technology as part of their growth stratagem.[46]

This section investigates the importance of four types of technology used by Greater Minnesota manufacturing firms. The firms' responses are summarized in Table B-26.

At least one-half of the sample of firms rated each of the four technologies somewhat or very important. The majority considered production and automation technology, and quality and productivity improvements important (59 and 56 percent respectively)

Table B-27 Relationship between Technology Types

Technology	Production/ Automation	Communications/ Information	Quality/ Productivity	Advanced Materials
Production/Automation	1.00			
Communication/Information	0.48	1.00		
Quality/Productivity	0.61	0.61	1.00	
Advanced Materials	0.40	0.47	0.59	1.00

Table B-28 Important Technologies by Firm Age

Age	Automation	Information	Quality	Materials
Less than 5	100%	80%	80%	80%
5 to 10	61	50	67	54
11 to 25	52	52	52	44
More than 25	52	52	55	55

and about one-quarter considered them extremely important.

A significantly higher proportion of firms that considered research and development important rated the four technologies important than the sample as a whole. The importance of technology to research and development activity was also supported by a moderate, positive correlation between importance of R&D and the importance of quality oriented technology (correlation coefficient +0.4). A significantly smaller proportion of firms rated automation technology and research and development important (59 percent) compared with the whole group.

Quality and productivity improvement technology was moderately correlated with the other technologies (correlation coefficient +0.6, Table B-27). This suggests that firms consider quality and productivity improvement important factors in the adoption of any other technology.

A higher proportion of the youngest firms (less than 10 years old) placed importance on investments in new production processes and automation than older firms. A majority of firms under five years in business and almost two-thirds (61 percent) of those between five and 10 years reported that production and automation technologies were important. They also placed more emphasis on information, quality and productivity. The relative importance of advanced materials was unclear. (Table B-28).

Branches of U.S. corporations considered all forms of technological investment important more frequently than independent firms did. Since branch firms are to some extent responsive to the operational requirements and resources of their remote, and typically metropolitan, headquarters, this result strengthens the assertion that independent, non-metropolitan firms are slower in adopting new technology than their metropolitan counterparts (Table B-29).

Although a majority of all types of manufacturing firms considered quality important, high technology companies cited importance of investment in quality and productivity systems and equipment significantly more often (67 percent) than other manufacturers (51 to 56 percent). A larger share of high technology firms (61 percent) also considered investment in new materials important compared to 48 to 51 percent of other types of firms.

For all four technology types, the importance

Table B-29 Important Technologies for Different Firm Types and Industry

Type	Automation	Information	Quality	Materials
Independent	57%	51%	55%	49%
Branch	85	61	69	72
Industry High Tech	62%	49%	67%	61%
Non-Durable	60	53	51	51
Durable	60	50	56	48

Table B-30 Important Technologies by Firm Size

Firm Size	Automation	Information	Quality	Materials
Less than 20	44	38	45	45
20 to 99	73	70	67	55
100 to 499	79	58	74	74
More than 500	86	72	71	71

of technology was weakly, positively correlated to firm size (correlation coefficient +0.3).

Small firms (less than 20 employees) were less concerned about investments in technology than larger firms (Table B-30). Only 20 percent reported that research and development was important and 38 to 45 percent reported the importance of particular technologies compared with a 58 to 86 percent range for the larger firms (more than 100 employees). This result was notable given the typically small size of Greater Minnesota firms sampled.

Impact of Taxes and Regulations

Taxes are frequently blamed for inhibiting economic growth, especially in surveys. However, historical business climate studies typically show that taxes have only a minor impact on the location decisions of firms and are not disincentives to location decisions.[47] Some research has also found that taxes were not perceived by firms as adverse location factors as long as government expenditures were in turn perceived as benefits.[48] More recent studies generally confirm the results of earlier research although evidence presented at the 82nd Annual Conference of the National Tax Association pointed out some subtleties. For example, taxes impact manufacturers depending on the maturity of the firm.[49] This section examines some of the issues of taxation and regulation on Greater Minnesota Manufacturers.

Of particular interest to Greater Minnesota manufacturers are property taxes. A survey of relocating firms found that more than two-thirds of relocating plants moved into areas with similar or higher property taxes. About 50 percent experienced no change in tax regimes and approximately 25 percent relocated to areas with higher property taxes. Once again, actions indicate that property taxes are not significant factors in location decisions.[50]

There are some examples of controlled experiments to investigate the direct effects of tax changes. For example, in one experiment, a temporary sales tax imposed on purchases in a small town created only a slightly adverse effect on sales.[51]

Income taxes and tax incentives have typically had only limited influence on business location decisions. One investigator concluded that although commonly used by communities to attract companies, tax levels and financial incentive packages were found

Table B-31 Tax Burden Rankings

Issues	Rank
Workers' Compensation	1
Unemployment Insurance	2
Commercial/Industrial Property Tax	3
Corporate Income Taxes	4
Sales Taxes	5
Personal Income Tax	5
Residential Property Tax	7
Research and Development Tax Credit	8

by one study to be generally relegated to the status of tie-breakers.[52] Another showed that incentives tended to improve the business climate but had no direct effect on location decisions.[53] Other studies find no evidence that investments in infrastructure impact on location decisions or contribute to the growth of the local economy.[54] Other research has found that property tax rates were secondary factors to manufacturing firms[55] and personal income taxes were less significant.[56]

Taxes are routinely accused of stifling new firm creation and growth. However, evidence suggests that new firms are influenced mainly by demand factors like market size and accessibility and supply factors like labor, raw materials, transportation and capital availability, but only moderately by business taxes. For expanding firms, economies of scale, market accessibility, and productivity were important factors while business taxes were the least important.[57]

Nevertheless, not all studies discount the influence of taxes on business decisions. Some studies suggest that while state and local taxes only slightly influenced business location especially for single-establishment firms,[58] others found that business taxes were important factors for new branch plants.[59] Another study concludes that the presence of high taxes reduces the disposable income of highly skilled labor, specifically acting as a disincentive to firms using innovative technologies. Increased high technology use increases the importance of non-traditional factors and the ability of communities to influence decision-making. Taxes ranked as the third most important factor in location decision especially during the site selection phase. The availability of skilled labor influences decision-making more than the cost of labor for high technology firms.[60]

Overall Impact of Taxes and Regulations

Businesses were asked to rate the overall impact of taxes and regulations on their business operation and to rank the relative impacts of eight taxes and credits. Table B-31 summarizes the responses.

Most Greater Minnesota manufacturers considered taxes and regulations to have a significant impact on the successful operation of their businesses. While 86 percent reported significant impact, a majority (60 percent) considered the impact very significant.

Without doubt, the tax costs of workers' compensation topped the charts for burdensome taxes. Workers' Compensation was ranked most burdensome by almost two-thirds of the firms. Unemployment insurance was ranked as the second most serious tax burden by 32 percent of the firms.

Taxes on property, income, and sales were equally reported to be moderately influential to business success. The ranking among these choices were varied, indicating a range of opinions in the sample about the impact of these taxes.

Not surprisingly, since few companies considered research and development important, the research and development tax credit had the least impact on the sample

Table B-32 Overall Impact of Regulations

Regulation	Not Applicable	Very Significant Impact	Significant and Very Significant Impact
Air Pollution	14%	22%	43%
Water Pollution	11	25	44
Toxic Waste	12	18	39
Solid Waste	8	27	56
Hiring and Selection Practices		19	47
Hour and Wage Regulation		24	56
Civil Rights		8	23
Health and Safety—OSHA		38	66
Liability Insurance		48	81

businesses. A further implication of the low R&D credit impact might be that credit in its present form does not motivate the typical Greater Minnesota manufacturer to consider innovating its own product or process.

Regulations

Greater Minnesota manufacturers were also asked to rate the impact of 10 employment and environmental regulations on the success of their businesses. Table B-32 summarizes the responses.

For the most part, while regulations affect almost all firms, they had less of an impact on business operation than did taxes. With the exception of solid waste, health and safety, and liability insurance regulations, impacts of regulations were uniformly distributed across the sample.

Among a majority of firms, air and water pollution and toxic waste regulations had little or no impact on the successful operation of their business. Solid waste regulation has a significant impact on the operation of a majority (56 percent) of the respondents.

Hour and wage regulations, health and safety regulations, and liability insurance had an impact on a majority of firms. Liability insurance had the most impact (81 percent) followed by health and safety (66 percent). In fact, 48 percent cited liability insurance as having a very significant impact on their business.

The severe impact of liability insurance has resulted from the level of awards in the courts. The impact of workers' compensation and OSHA regulations on firms, however, depends directly on the levels of employee safety in a given industry. Adoption of automation technology has been shown to have the potential to create a more pleasant and less hazardous workplace. Even in instances where production remains labor intensive, tasks have shifted from manual labor to monitoring.[61] As firms adopt these technologies, causing the occupational composition and duties of the workforce to shift, secondary effects such as lower workers' compensation rates could benefit manufacturers.

Fifty-six percent reported an impact from hour and wage regulations. Civil rights regulations had the least impact on manufacturing firms (23 percent).

Branch firms typically reported greater impacts from regulation than did independent companies. However, toxic waste regulations reportedly affected a similar proportion of firms of both types equally (38 percent) and liability affected a greater proportion of independent firms (82 percent) than branch firms (73 percent).

Not surprisingly, liability insurance had significantly less impact on branch firms (which may absorb the cost throughout the entire corporation) even though the impact was high.

Table B-33 Quality of Regulatory Assistance

Regulations	Not Applicable	Excellent	Near Excellent and Excellent
Air Pollution	21%	2%	39%
Water Pollution	18	8	49
Toxic Waste	16	5	42
Solid Waste	13	9	45
Hiring and Selection Practices	3	39	
Hour and Wage Regulation	5	45	
Civil Rights	4	43	
Health and Safety—OSHA	13	61	
Liability Insurance	9	51	

Large firms typically reported lower impacts from regulations than firms with less than 20 employees. This was an interesting result given the large number of small firms in the sample.

Greater Minnesota manufacturers rated the quality of technical assistance provided by the regulatory authorities. Table B-33 summarizes their responses.

Pollution and waste regulations had some impact on between 80 and 90 percent of the sample.

Other than health and safety regulations and liability insurance assistance, the quality of technical assistance was rated poorly (scores of 1 and 2) by a majority of firms. Sixty-one percent of the respondent firms rated OSHA health and safety regulation assistance good or excellent (scores of 3 or 4).

Satisfaction with assistance was negatively correlated with the impact of taxes for solid waste (correlation coefficient -0.18), air pollution (correlation coefficient -0.15), and toxic waste (correlation coefficient -0.15). In other words, satisfaction with technical assistance decreased slightly as the importance of the regulation increased.

Considering a sample of only those firms to whom regulation was important, a significant majority of firms reported satisfaction with solid waste regulations and OSHA health and safety regulation assistance. Since OSHA regulations were rated the second most burdensome, the high ratings for technical assistance were especially noteworthy.

Business Changes for the 1990s

Just as changing world demand for raw materials and agricultural products altered the make-up of Greater Minnesota industry in the 1980s, so can accessible production and administrative technologies be expected to change the Greater Minnesota economy in the 1990s. Technology will effect growth, competitiveness, workforce composition, educational and other infrastructure demands, and Greater Minnesota manufacturers' strategic plans to achieve stable profitability.

Manufacturing companies are difficult to start up but have a high survival rate in non-metropolitan areas.[62] This presents Greater Minnesota manufacturers with a dilemma. Stable, profitable firms appear to feel that their recipe needs little change and that change may even jeopardize future profitability and success. However, growing competition demands adoption of new technologies to increase quality, efficiency and productivity.

Staffing Patterns and Labor

A majority of firms in Greater Minnesota reported no intention to alter their staffing patterns over the next five years. Those firms that did intend to change their staffing were planning only moderate increases or

Table B-34 Intended Staffing Changes

Occupational Group	Percent of respondents reporting either no change or some type of change Significant Decrease 1	Moderate Decrease 2	No Change 3	Moderate Increase 4	Significant Increase 5
Management	3%	15%	58%	22%	1%
Professionals/Scientists/ Engineers	2	14	63	20	1
Technical/Skilled	1	10	55	30	4
Clerical/Sales	2	20	61	17	0
Unskilled	6	16	56	18	4

Table B-35 Staffing Changes for Group of Firms Planning Change

Occupational Group	Percent of Firms Planning Change Significant Increase	Some Increase and Significant Increase
Management	2%	57%
Professionals/Scientists/Engineers	3	57
Technical/Skilled	8	75
Clerical/Sales	0	43
Unskilled	10	51

decreases, with a resulting moderate net increase in demand for labor.

While only a minority of firms (37 to 45 percent) planned staffing changes, firms most frequently reported planned increases in technical and skilled labor recruitment (34 percent) in the next five years. Less than one quarter of them (17 to 24 percent) reported plans to increase other occupational groups. Table B-34 shows that very few firms planned extreme increases and decreases (scores of 1 and 4) in employment.

Focusing more closely on only those companies that plan changes, their responses are summarized in Table B-35.

Of the firms planning changes, three-quarters of them will be seeking to expand their technical and skilled laborforce: only 8 percent planned big increases. The greatest decrease will be in clerical and sales staff (57 percent). This pattern suggests a demand for increased skills that will increase demands on training systems, upward pressure on skilled occupational wages, and skill shortages in the short run.

Planned Changes in Staffing Pattern by Firm Characteristics

For the most part, staffing changes were similar to the modest changes across the whole Greater Minnesota group with few interesting exceptions.

The greatest changes will reportedly occur in the older firms with more than 10 years in business. Across all occupational groups, more than one-third of the older firms will increase their staffing. Less than one-fifth of the younger firms with between five to 10 years in business planned to increase their staffing.

The greatest increases in employment will likely come from the non-durable sector where a significantly greater percentage of firms (41 to 60 percent) expected increased demand for all types of labor than did other sectors (0 to 32 percent).

Table B-36 Percentage of Firms that Planned to Increase Staffing of their Important Group and their Difficulty Recruiting and Retaining Them

	Percentage of Firms Planning Increases				
	Management	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
If Occupation was Important	100%	75%	44%	85%	56%
If Recruiting Problem Existed	64	83	75	35	30
If Retention Problem Existed	40	51	35	25	41

Among firms that had difficulty recruiting or retaining their important occupational groups, future recruiting behavior may be changed to reflect that difficulty by substitution of capital for labor or increases in training. The next section explores how the mix of important and hard to recruit occupational groups in Greater Minnesota manufacturing industries will change. Survey results regarding staffing changes by importance, recruiting difficultly, and retention difficulty of occupational groups are summarized in Table B-36.

Greater Minnesota manufacturers which planned to change staffing levels rated management and skilled groups the most important. Wherever management was rated important, increases in management were planned, and almost two thirds (64 percent) of the firms that had difficulty recruiting them were planning increases.

Among firms rating technical and skilled workers important, only 44 percent were considering increased employment. Three-quarters (75 percent) of the firms where recruiting technical and skilled staff was difficult reported plans to increase staffing.

Among firms where recruiting and retaining of the professionals was difficult, a majority of firms planned increased staffing of those workers. Greater Minnesota firms were less concerned with plans to increase clerical and unskilled workers even when they reported recruiting difficulties.

It appears that firms planning to increase their professional and skilled staff were already experiencing recruiting difficulties, perhaps suggesting that efforts to increase important staff resulted in higher sensitivity to recruiting problems.

Greater Minnesota manufacturers' rating of the importance of 11 personnel issues are reported in Table B-37.

Rising labor costs was the most frequently cited issue facing firms; 87 percent reported rising labor costs important or very important. Just as with other cost issues, businesses typically rated any issue directly affecting the bottom line as important. Lack of appropriate skills and the cost of health benefits were also rated important.

Firms that rated management and skilled groups important cited several different issues as significantly more important than the group as a whole. Lack of appropriate skills was cited more frequently (78 percent as compared to 61 percent for the whole) as a major issue by firms where skilled labor was important. Even more of these firms recognized this as a major issue in the future (85 percent compared with 68 percent for the whole).

Considering the issues facing firms where skills were important, lack of appropriate skills (85 percent), declining labor supply (66 percent), drugs and AIDS testing (46 percent), day care (35 percent), workforce diversity (44 percent) and retirement pension plans (74 percent) were more frequently cited as important future issues than the group as a whole.

With the exception of the workforce diversity and retirement and pension plan issues, firms

Table B-37 Future Issues for Firms Planning Increased Staffing

Issues	Sample	Management	Technical/ Skilled
Rising Labor Costs	87%	92%	92%
Lack of Appropriate Skills	68	83*	85*
Declining Labor Supply	54	71*	66*
Drugs/Aids Testing	37	53*	46*
Employee Health Benefits	76	84	86*
Parking/Commuting	9	11	8
Day Care	22	35*	35*
Organized Labor	28	33	32
Workforce Diversity	32	36	44
*Retirement/Pension	63	70	74
*Flexible/Alternative Schedules	44	51	52

*indicates significantly different proportion reported in occupational sub-sample from entire sample of firms planning increased staffing

where management was important reported a similar profile for future issues.

Greater Minnesota firms attached little importance to organized labor, parking/ commuting, or drugs/AIDS testing issues.

Changes in Technology

Different technologies demand a variety of labor skills so it is especially interesting to investigate how firms' staffing plans will change in the future in conjunction with changing technological needs. Capital can both substitute and complement labor.

Firms performing research and development functions and innovating new products offer different occupations than firms not focused on these areas. The following section investigates the anticipated links between staffing patterns, technology, and research and development.

Greater Minnesota firms rated the capital-labor intensity of their business operations. The capital-to-labor ratio provided insight into the relative importance of human capital to the firms' production processes.

A majority (57 percent) of Greater Minnesota manufacturing firms have labor intensive operations. More than one-quarter (28 percent) rated themselves very labor intensive (score of 1) in contrast to only 10 percent which considered themselves very capital intensive firms (score of 4). This result concurs with earlier studies which revealed that while some industries adopt capital intensive techniques in regions of abundant labor, other industries continue to be labor intensive.[63] In fact, retaining labor intensive characteristics in a wage competitive environment while other firms adopt capital intensive technologies may offer some advantages.[64] Furthermore, durable goods industries in particular tend to respond to market conditions by increasing capital intensity.[65]

While all types of technology in the next five years were rated as important by 12 to 16 percent more firms than technologies at the time of the survey, no significant conclusions can be drawn about the adoption of technology in the next five years based on basic firm characteristics such as age or industry type.

Automation was anticipated to be important to marginally more firms (75 percent) than other technologies (65 to 67 percent). Interestingly, a slightly lower proportion of independent firms are represented among the firms rating automation important than are represented in the entire sample of manufacturers.

Table B-38 Increase in Staffing for Labor Intensive and Capital Intensive Firms

	Percentage of Firms with Important Occupational Group				
Intensity	Management	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
Labor Intensive	56%	47%	77%	49%	48%
Capital Intensive	56	67	76	40	57

A marginally higher proportion of capital intensive firms reported planned changes in staffing during the 1990s than firms considering themselves labor intensive. A majority (55 percent) of them planned to change their staffing patterns compared with 47 percent of the labor intensive firms. Planned increases in particular occupational groups are summarized in Table B-38.

Significantly more capital intensive firms planned to increase staffing of professional, scientific and engineering occupations (67 percent) as well as unskilled workers (57 percent) than labor intensive firms (47 and 48 percent respectively). Marginally more labor intensive firms (49 percent) planned to increase clerical and sales staffing than capital intensive firms (40 percent). This suggests that labor intensive firms will stress administrative and marketing activity in their business strategies for the 1990s whereas the capital intensive firms will stress technical aspects of production instead.

Technology and Staffing

This section investigates the importance of four technologies relative to changes in staffing. Marginally more personnel changes (all responses 47 percent) were planned by firms where information was important than by firms (35 to 39 percent) where other types of technology were important.

Greater Minnesota manufacturers anticipate that automation technology will generally complement skilled labor and management but will be a substitute for unskilled workers. Firms where technology will be important in the next five years reported overall staffing increases for management, professionals and skilled labor. Unskilled labor staffing will remain unchanged while modest decreases will occur in clerical and sales staff.

Firms that considered each type of technology important plan to recruit more technical and skilled personnel (77 to 80 percent) although a majority of firms (58 to 68 percent) will also be increasing management and professional staff.

The Changes in Staffing Linked to Future Importance of R&D

If technology is changing the composition of the workforce, how will other forces shape firms' hiring patterns? This section investigates how manufacturers with research and development functions will differ from other Greater Minnesota manufacturers in general in the next five years (Table B-38).

Firms said research and development would become important to a majority of Greater Minnesota manufacturing firms (55 percent) in the future compared with about one-third (35 percent) considering it important at the time of the survey. Almost one-third (29 percent) reported that research and development would become very important in five years compared with only 20 percent at the time of the survey.

Significantly fewer firms (35 percent) that performed research and development activity reported no planned staffing changes compared to the whole group (50 percent) as shown in Table B-39.

Reported increases in staffing in firms where research and development will be important in five years were marginally higher than the increases reported by the whole group. While

Table B-39 Difference in Staffing Increases for Firms where R&D was Important and Whole Sample

	Percentage of Firms with Important Occupational Group					
	No Change	Manage-ent	Professionals, Scientists and Engineers	Technical and Skilled	Clerical and Sales	Unskilled
Percent of Sample	50%	24%	21%	33%	17%	22%
Percent of group where R&D Important in 5 Yrs	35	33	30	49	22	31

technical and skilled workers will be in greater demand than all other occupational groups for Greater Minnesota manufacturers, an even greater proportion of firms rating research and development investment important planned to increase employment of technical and skilled personnel. Almost one-half of the firms (49 percent) that project that research and development would be important plan to be recruiting technical and skilled personnel compared with only one-third (33 percent) for the entire group.

Future Links Between Technology and Research and Development

This section examines the relationship between technology in production, administration, and research and development functions. While a higher proportion of firms rated all forms of technology important in the future, no significant differences can be attached to the relative importance of the different technologies. Production and automation technologies were important to a marginally higher proportion of firms than advanced materials were.

A significantly lower percentage of firms where future automation and quality improvement technologies were important also rated future research and development important compared with the whole group. This suggests that these firms planned to be further along the product cycle, concentrating on routinized mass production rather than development, than was the group as a whole.

Links between Research and Development, New Products and Staffing Pattern

About one-half of Greater Minnesota manufacturing firms in the sample (53 percent) planned to introduce a new product within the next five years. Future staffing changes were reported by firms planning to introduce a new product (compare Table B-33 with Table B-40).

There will be a significantly higher proportion of firms planning to introduce a new product that will increase employment of all occupational groups (32 to 45 percent) except for clerical and sales (23 percent) during the next five years compared with the whole group (non-clerical 21 to 33 percent) and clerical, 17 percent. Clerical and sales staff increases were not significantly different between the two groups.

Compared with the sample as a whole, a significantly lower percentage of firms with fewer than 20 employees were represented in a sub-sample of firms that planned to introduce a new product or considered future R&D important. This suggests that size is positively linked to product development.

There was a slightly greater representation of branches of U.S. companies and a corresponding under-representation of independent firms in the sub-sample of manufacturers that considered future R&D important. Furthermore, plans to introduce a new product were positively, weakly

Table B-40 Staffing Changes with New Product

Occupational Group	If new product planned: No change	Increase
Management	40%	34%
Professionals/Scientists/Engineers	45	35
Technical/Skilled	38	45
Clerical/Sales	43	23
Unskilled	39	32

correlated with difficulty in acquiring capital, implying that firms planning to introduce new products had had greater difficulty acquiring credit. This suggests that lenders in Greater Minnesota may be attributing new products with high risk.

In summary, technology, new products and research and development will play a more important role in shaping business operations and staffing patterns over the next five years than at the time of the survey. Changes, however, will take place across the entire Greater Minnesota manufacturing sector.

Future Training Topics

Greater demands for skilled workers and awareness of recruiting difficulties for these occupations suggests also an increased awareness of the importance of technical training for manufacturing workers. Firms rated the importance of 14 training topics to the future success of their business operation. The responses are summarized in Table B-41. Almost all firms that considered a topic important also considered the topic important in the future.

Engineering and scientific manufacturing techniques, clerical skills, basic skills, career development, and international and language skills were rated the topics that will be covered least often in five years.

Between 40 to 57 percent of the firms which did not offer formal training planned to start training in manufacturing processes (43 percent), engineering and scientific techniques (40 percent), quality assurance and productivity (57 percent), customer service (50 percent) and leadership (50 percent) within the next five years.

Future importance in training were all negatively, weakly correlated to changes in staffing patterns, suggesting that firms may plan to provide more training to their employees instead of relying on recruitment.

Among firms planning to increase management and skilled labor, significantly more firms cited future importance of training in manufacturing processes, engineering techniques, administrative computer skills, strategic planning, leadership and communications skills than did the group of firms not planning staffing changes. Although training in other topics will increase, it will be important only to a minority of companies.

In summary, greater demands will be made on training and education systems in Greater Minnesota in the 1990s than presently exists. Topics directly related to the production and marketing of goods will be streesed in particular.

Transportation

Product transportation issues, especially those related to the trucking industry, are important to Greater Minnesota manufacturers. As manufacturing activity in Greater Minnesota increases, greater demands will be placed on transportation systems. This section investigates the changes anticipated by Greater Minnesota firms and the issues that will become important in the future. Firms where asked to report changes in their use of five major modes of transportation in the

Table B-41 Importance of Future Training Topics

Topics	Very Important	Important and Very Important
Processes/Equipment	50%	85%
Engineering/Scientific Techniques	20	61
Quality Improvement/Control	61	92
Customer Service	57	90
International Skills	11	26
Foreign Languages	3	13
Marketing/Sales Techniques	38	78
Clerical/Office Skills	23	67
Administrative Computer Skills	32	86
Strategic Planning	50	87
Supervisory/Leadership Techniques	45	87
Basic skills (Reading, Writing, Math)	34	59
Communications Skills	40	81
Career Development	18	60

Table B-42 Changes in Transportation Use in the Next Five Years

	Percent of Firms Reporting				
Mode	Significant Decrease	Some Decrease	No Change	Some Increase	Significant Increase
Truck	0%	3%	59%	26%	11%
Air	4	3	72	14	6
Rail	4	6	77	9	4
Water	2	5	81	8	3
Freight	1	5	63	24	7

next five years. Their responses are summarized in Table B-42.

All modes of transportation will be used more heavily by the sample firms in the next five years. Significantly more trucking and freight services and marginally more air transportation will be used in the future.

Trucking was reportedly the primary mode of 75 percent, and freight of 44 percent, of the firms surveyed. Of firms that responded, the majority were not planning changes in transportation usage (59 percent). Moderate increases were planned by about one-third of the truck (37 percent) and freight (31 percent) users. This translates into an overall increased demand on the road transportation system in Greater Minnesota for shipping.

Transportation Usage and Sales Market

As manufacturing activity grows and markets expand, transportation will become more important to Greater Minnesota manufacturers. Transportation needs are based on the distance to market. Planned changes in demand of trucking and freight, summarized in Table B-43, point out some interesting differences between firms that serve local and regional markets.

A significantly higher proportion of firms with at least one-half of their sales in local or regional markets planned to increase their use

Table B-43 Transportation Changes in Firms with 50 Percent or more Sales to Specific Markets

	Truck			Freight		
	Decrease	No Changes	Increase	Decrease	No Changes	Increase
Local	3%	60%	37%	5%	67%	29%
Regional	5	68	26	14	71	14
National	5	62	33	0	55	45

*If 50 percent or more sales to specific market

Table B-44 Severity of Future Transportation Problems

Problems	Percent of Firms Reporting Somewhat and Very Severe Problem and that Planned Some or Significant Decrease	No Change	Some or Significant Increase
Reduced Air Service	39%	36%	25%
Lower Air Service Quality	36	37	27
Airport Congestion	39	38	24
Lack of Rail Service	46	36	18
Deteriorating Roads and Bridges	16	26	58
Inadequate Shipping Service	21	33	46
Poor Road Access	23	30	47
Road Congestion	23	30	47
Lack of Mass Transit	49	38	13
Hazardous Material Transport	43	34	24
Increased Costs	10	24	66
Reduced Truck Service	15	28	57

of trucking rather than freight. The converse was true for firms with at least one-half of their sales in national markets. A significantly greater proportion of firms serving local markets planned to increase their use of both trucking and freight. Since most firms in the sample served local markets, this result suggests an increase in demands on local transportation systems and services with more modest increases on the regional system.

Transportation Issues

As previously reported, Greater Minnesota firms considered all the transportation factors important, but cost and reliability factors were cited as very important to almost three-quarters. Quality of service was of secondary importance. When rating the severity of 12 future transportation problems, Greater Minnesota manufacturers were concerned primarily with problems related to cost, reliability and quality attributes of their primary mode. Firms that intended to increase their transportation use were generally most sensitive to road transportation problems whereas firms intending to decrease their use of their primary mode were generally most sensitive to air and rail problems, lack of mass transit and the transportation of hazardous waste. The sensitivity of firms with different plans for future transportation use is examined in the following section and is summarized in Table B-44.

Two-thirds (66 percent) of the firms planning to increase use of transportation rated increasing costs as the most severe transportation problem that would inhibit their growth. A majority of firms also rated deteriorating roads and bridges (58 percent) and reduced truck service (57 percent) as problems.

Table B-45 Important Spending Issues and Recommendations

Issues	Very Important	Important and Very Important	Spend A Lot More	Spend More and Spend A Lot More
Education				
ElementarySecondary Education	59%	84%	16%	56%
Higher Education	39	76	15	51
Libraries	14	45	8	32
Social Services and Income Maintenance				
Public Welfare	8	28	2	9
Hospitals	16	55	4	32
Health	25	63	9	39
Employment Security	12	47	2	19
Transportation				
Highways	44	83	16	63
Air Transportation	6	26	5	21
Water Transport	4	14	4	14
Public Safety				
Police	24	70	7	51
Fire	35	77	10	52
Corrections	9	38	3	31
Protective Regulation	8	36	2	20
Environment and Housing				
Natural Resources	27	60	13	42
Parks and Recreation	15	46	8	33
Housing and Development	14	47	5	31
Sewerage	19	58	11	46

Not surprisingly, the severity of problems related to the major mode of transportation—trucking—outweighed problems related to other modes. These problems were, however, perceived to be more severe among firms that anticipated increased trucking use in the next five years. A greater proportion of the group of firms planning increases in trucking use anticipated severe impacts from inadequate shipping service, road congestion, and reduction in service availability than the group of firms planning no changes. Marginally more reported a severe future impact of costs.

In summary, Greater Minnesota firms anticipated that their modest planned increases in demands for road transportation would create future problems that would inhibit the growth of their manufacturing activity.

Priorities for Government

The role of government as a provider of public services and infrastructure maintenance is understood. However, opinions vary on the direction and scope of government policy. Having investigated the major issues affecting the business climate in Minnesota, the survey gave Greater Minnesota manufacturers a unique opportunity to evaluate government policies and establish their own spending priorities for programs of the 1990s.

Greater Minnesota firms rated the importance of government spending on 18 basic government programs and changes in the level of spending they deemed appropriate for each program. Their responses are summarized in Table B-45.

The government programs most frequently cited as important by responding Greater Minnesota manufacturers were elementary and secondary education (84 percent), highway transportation system (83 percent),

fire services (77 percent) and higher education (76 percent). Less than one-quarter (10 to 16 percent) of the firms recommended that a lot more should be spent on these programs. Although spending priorities were clear, recommended spending increases were modest.

A majority of firms reported that police protection (70 percent), health services (63 percent), natural resources (60 percent), sewerage (58 percent), and hospitals (50 percent) were of secondary importance.

The survey provided a unique opportunity for Greater Minnesota manufacturers to advocate spending changes for the government programs listed. For comparison, the state and national average expenditure[66] was provided for each program. Typically, firms advocated increased spending on the programs most important to them. A majority of firms indicated a need for greater spending on only six services or programs: highway transportation (63 percent), elementary and secondary education (56 percent), fire protection services (52 percent), and police protection and higher education (51 percent each). Together, these programs account for more than 40 percent of state spending. Minnesota already spends more on average than the nation does on highway transportation and education but spends less on average on public safety.

More than three-quarters of the firms indicated a need for less spending on five services or programs: public welfare (91 percent), water transportation (86 percent), employment security (81 percent), protective regulation (80 percent) and air transportation (79 percent). Minnesota spends more on average on public welfare, water transportation, and employment security than the nation does.

A larger proportion of firms with less than five years in business (83 percent) rated higher education important than did the older firms (67 to 72 percent) in the sample. Three-quarters of these younger firms advocated higher spending on higher education compared with about one-half of the older firms.

Paradoxically, while marginally fewer of the youngest firms rated libraries important (33 percent) than the other groups (41 to 47 percent), significantly higher proportion of them (50 percent) advocated increased spending on libraries than did the other groups (27 to 38 percent).

A significantly lower proportion of high technology firms (48 percent) considered sewerage important than did the durable (65 percent) and non-durable goods producers (55 percent). With the exception of air transportation and parks and recreation, a smaller proportion of high technology firms rated the programs important than the durable and non-durable goods manufacturers. More high technology firms rated air transportation policy important than the other industries did, although few (14 percent) indicated more should be spent.

Only a minority of high technology firms (39 to 40 percent) indicated a need for an education spending increase at elementarysecondary levels. About one-half (48 percent) of the high technology firms cited a need for increased highway spending in contrast to the majority (64 to 65 percent) of other manufacturers. Less than one-half of the high technology firms (37 percent) and the non-durable goods manufacturers (44 percent) advocated more spending on sewerage services. One-half (50 percent) of the durable goods producers reported more spending was necessary.

With the exception of the parks and recreation issue, significantly more branch firms reported environmental and housing issues important (70 to 90 percent) compared with the independent firms (45 to 58 percent). Also, a significantly greater proportion of branch firms advocated spending more on those important issues than the independent firms. A majority of the independent firms advocate less spending on these policies, whereas a majority of the branch firms would increase spending on natural resources and sewerage.

A majority of the firms advocated increased spending on their primary mode of product transportation. A majority of firms from all

major modes advocated spending more on highways although a significantly larger proportion of firms using trucks and air transportation firms advocated increased spending on highways.

More than three-quarters of firms that planned to increase their use of primary transportation mode (79 percent) advocated more spending on highways. Significantly more of the firms citing reduced air service levels (33 percent) as a major issue advocated increased spending in air transportation than the group as a whole (21 percent). This sub-sample was very small.

A majority of firms that were increasing the staffing levels of their important occupational groups advocated increased elementary and secondary education spending. Increased spending on elementary and secondary education was advocated by significantly more firms where professional (96 percent) and clerical and sales staff (67 percent) increases were planned than the group as a whole (56 percent). In fact, firms where professionals were important and planned to increase professional staffing advocated spending on elementary and secondary education significantly more frequently (96 percent) than any other group did.

Significantly more firms that rated quality control technology as important (62 percent) advocated spending more on higher education than did the sample as a whole (51 percent).

In summary, while recommending reduced spending in most areas, Greater Minnesota manufacturers advocate increases in areas of importance to their businesses.

Summary and Conclusion

In general, the survey reveals Greater Minnesota manufacturers' preference for stability and modest change in factors affecting their businesses.

Staffing

A majority of Greater Minnesota manufacturing firms run labor intensive operations. Workers with managerial, technical, or sales skills are their most important occupational groups. This profile indicates the presence of dominant production and administrative-sales functions for most firms in Greater Minnesota with little precision operation or research and development activity. Technical and skilled employees are most difficult to recruit, even more so than management personnel. The cost of labor and lack of appropriate skills are the main difficulties encountered in recruiting employees and are issues of current and future concern to Greater Minnesota manufacturers. Future health benefit costs concern more than three-quarters of the firms. Organized labor issues are unimportant.

Most firms in Greater Minnesota do not intend to alter their staffing patterns in the next five years and only a very few plan extreme increases and decreases. The greatest increases in employment during the 1990s are planned in the non-durable sector and in capital-intensive firms. The greatest demand will be on the technical and skilled labor pool. One-third of the firms plan increases in technical and skilled labor recruitment. Firms with important investments in technology and research and development will recruit more technical and skilled personnel although most plan increases in management and professional staff, too. Firms planning to introduce a new product will maintain or increase staffing.

This pattern suggests a demand for increased skills that will put more demands on training systems, put upward pressure on skilled occupational wages, and may result in short-run skill shortages.

Training

Most Greater Minnesota manufacturers already provide formal training for their employees. Compared with five years ago, firms have increased their level of training. They are committed to improving and controlling the quality of their products through educating their workforce. Most training programs improve quality and productivity as well as increase safety in the workplace.

Training will be more frequently covered in

the future. One-half of the firms which do not currently offer formal training will initiate training programs. Some firms will train their employees rather than increase staff. Greater demands will be made on training and education systems in Greater Minnesota in the 1990s than presently exists, especially for topics directly related to the production and marketing of goods.

Credit

More than one-half of the firms surveyed sought capital during the last five years, and of these firms, just more than one-third had more than a little difficulty securing the capital. Cost was the biggest barrier to securing credit. Commercial loans were the most popular form of raising capital.

The major uses of new capital were new equipment and inventory purchases and working capital. Firms that experienced difficulty securing credit tended to acquire inventory and refinance existing debt. Firms using credit to purchase real assets experienced lower barriers than other borrowers did.

Energy

Firms are satisfied with their energy systems. They are especially satisfied with the features they rate as most important—reliability and availability.

Transportation

Product transportation is important to almost each firm. Most firms use trucking or freight to deliver their products. They are satisfied with the characteristics of their primary shipping mode, although least satisfied with its cost. As firms become bigger, product transportation becomes more important.

Greater Minnesota firms typically serve local markets; road transportation was preferred to air travel for business travel. Business travel is relatively unimportant.

All modes of transportation will be used more heavily in the future. Although most firms are not planning changes, truck and freight use will increase moderately. This translates into an overall increased demand on the surface transportation system in Greater Minnesota. Firms are concerned that increasing costs would inhibit their future growth. They are also concerned about the negative impacts of deteriorating roads and bridges and reduced truck service on their future business performance.

Technology, New Products, and R&D

The introduction of new products and investment in technology and research and development will play a more important role in shaping the Greater Minnesota manufacturing sector over the next five years than at the time of the survey. Changes, however, will take place throughout the entire Greater Minnesota region in all industries.

About one-half of the firms intend to introduce a new product in next 5 years. Even fewer consider research and development expenditures important. Firms investing in R&D prefer to maintain in-house control of their R&D activity.

Production technologies are important to firms where R&D is important. Investments in technology are more important to larger firms.

Taxes and Regulations

Taxes and regulations impact the successful operation of almost all businesses. Workers' compensation and unemployment insurance are most burdensome.

Regulations impact the majority of business operations, but to a lesser extent than taxes. Liability insurance and health and safety (OSHA) regulations have most impact. Solid waste regulation also impacts the majority of firms.

The quality of technical assistance for regulatory compliance rates poorly. Firms are most sensitive about the quality of assistance for regulations that are most important to them.

Government Policy and Spending Priorities

Although spending priorities are clearly directly beneficial to business, firms advocate only modest spending increases. Greater Minnesota manufacturers rate the following programs as most important and also support increased spending on them: elementary and secondary education, highway transportation system, fire services and higher education.

Three out of four firms would prefer to spend less on five services or programs: public welfare, water transportation, employment security, protective regulation, and air transportation.

Endnotes

1. Barkley, D.L., The Decentralization of High Technology Manufacturing to Nonmetropolitan Areas, *Growth and Change* (Winter 1988).

2. Plaut, T. and J.E. Pluta, Business Climate, Taxes and Expenditures, and State Economic Growth in the United States, *Southern Economic Journal*, Volume 50 (June 1983) pages 99-119.

3. Schacter, M., Far From the Madding Crowd, *Wall Street Journal* (May 19, 1986) page 16d.

4. Cleveland, H., The Twilight of Hierarchy: Speculations on the Global Information Society, *Public Administration Review*, Volume 45 (1985) page 185.

5. Hawken, P., *The Next Economy*, Rinehart and Winston, New York, N.Y. (1983).

6. Rosenfeld, S.A., E.E. Malizia, and M. Dugan, *Reviving the Rural Factory: Automation and Work in the South*, Southern Growth Policies Board, Southern Technology Council, North Carolina (March 1988).

7. Rosenfeld, S.A., E.E. Malizia, and M. Dugan, ibid.

8. Friedman, J.M., *Credit Rationing in Non-Metropolitan Markets for Small Business Loans*, Working Paper 88-02 State and Regional Research Center (April 1988).

9. Morris, C. and M. Drabenstott, Financing Rural Businesses: What Role for Public Policy? *Economic Review*, Federal Reserve Bank of Kansas City, (September/October 1989).

10. Dorf, R.J. and M.J. Emerson, Determinants of Manufacturing Plant Location for Nonmetropolitan Communities in the West North Central Region of the U.S., *Journal of Regional Science*, Volume 18, No. 1 (1978) pages 109-120.

11. Chicoine, D., R.T. McWilliams, N. Walzer, Financing Rural Roads and Bridges, *APWA Reporter*, Volume 55, American Public Works Association, No. 2 (February, 1988) pages 18-19.

12. Birch, D.L., Where to Go When You Want to Start a Business in a Remote Location, *INC.* (February 1988) pages 14-15.

13. Thompson, W.R., Policy-Based Analysis for Local Economic Development, *Economic Development Quarterly*, Volume 1, No. 3 (August 1987) pages 203-213.

14. Barkley, D.L., op.cit.

15. Plaut, T. and J.E. Pluta, op.cit.

16. Schacter, M., op.cit.

17. Barkley, D.L., op.cit.

18. Schacter, M., op.cit.

19. Goldstein, M.E., A Note on Urban and Nonurban Employment Growth in the South, 1940-1960, *Journal of Regional Science*, Volume 10 (1970) pages 397-401.

20. Kieschnick, M., *Taxes and Growth: Business Incentives and Economic Development*, Council on State Planning Agencies, Washington, D.C. (1981).

21. Hoy, F., and B.C. Vaught, The Rural Entrepreneur—a Study in Frustration, *Journal of Small Business Management*, Volume 18, No. 1 (January 1980) pages 19-23.

22. Premus, R., *Location of High Technology Firms and Regional Economic Development*, U.S. Congress Joint Committee, Washington, D.C. (1982).

23. Bringewatt, M. and D. Nelson, *The Community Vitality Project, Minnesota Foundation*, (January, 1988).

24. Rosenfeld, S.A., E.E. Malizia, and M. Dugan, op.cit.

25. Young, E.C., and H.P. Welsch, Information Source Selection Patterns as Determined by Small Business Problems, *American Journal of Small Business*, Volume 7, No. 4 (April-June 1983) pages 42-49.

26. Dillman, D.A., Social Issues Impacting Agricultural and Rural Areas as We Approach the 21st Century, *New Dimensions in Rural Policy: Building Upon Our Heritage*, ed. R.C. Wimberley, D. Jahr, and J. Johnson, Government Printing Office, Washington, D.C. (1986).

27. Cleveland, H., op.cit.

28. Hawken, P., op.cit.

29. Sexton, D.L., and P. Van Auken, A Longitudinal Study of Small Business Strategic Planning, *Journal of Small Business Management* (January 1985), pages 7-15.

30. Hess, D.W., Relevance of Small Business Courses to Management Needs, *Journal of Small Business Management*, Volume 25, No. 1 (January 1987) pages 26-34.

31. Hess, D.W., ibid.

32. Friedman, J.M., op.cit.

33. Morris, C. and M. Drabenstott, op.cit.

34. *Economic Growth Report*, CD Publications, Silver Spring, MD., No. 90-14 (26 July 1990) page 3.

35. Scott, J.A. and W.C. Dunkelberg, *Rural Versus Urban Bank Performance: An Analysis of Market Competition for Small Business Loans, Journal of Bank Research*, Volume 15, No. 3 (Autumn 1984) pages 167-178.

36. Lerman, Donald L., Rural Consumer Debt: Is Recent Growth a Problem? *Rural Development Perspectives*, Volume 6, No. 2, Economic Research Service, USDA, (February 1990) pages 25-29.

37. *Business Week*, Area Development Survey (Manufacturing Industries), (1987).

38. Chicoine, D., R.T. McWilliams, N. Walzer, op.cit.

39. Deak, E., E. Heinze, and C.L. Hilewick, *A Simulation of Communications and Transportation Investments, Growth and Change*, Volume 11, No. 3 (July 1980) pages 26-38.

40. Hekman, J.S., Survey of Location Decisions in the South, *Economic Review*, (June 1982) pages 6-19.

41. Dorf, R.J. and M.J. Emerson, op.cit.

42. Gillmor, D., Import Substitution—or Buying from the Neighbors, *New York Times*, (May 8, 1988) page F13(N).

43. Thompson, W.R., op.cit.

44. Rosenfeld, S.A., E.E. Malizia, and M. Dugan, op.cit.

45. Dillman, D.A., op.cit.

46. Dillman, D.A., The Social Impacts of Information Technologies in Rural North America, *Rural Sociology*, Volume 50, pages 1-26.

47. Stafford, H., *The Anatomy of the Location Decision: Content Analysis of Case Studies, Spatial Perspectives on Industrial Organization and Decision Making*, ed. F.E. Hamilton, Wiley, N.Y. (1974) pages 169-188.

48. Plaut, T. and J.E. Pluta, op.cit.

49. Papke, L., Taxes and other Determinants of Gross State Product in Manufacturing: A First Look, *Proceedings of the 82nd Annual Conference* 1989, National Tax Association, Columbus, Ohio (1989) pages 274-282.

50. Schmenner, R.W., *The Manufacturing Location Decision: Evidence from Cincinnati and New England*, Harvard Business School, Cambridge, MA (1978).

51. Mikesell, J.L., and C.K. Zorn, Impact of the Sales Tax Rate on its Base: Evidence from a Small Town, *Public Finance Quarterly*, Volume 14, No. 3 (July 1986) pages 329-338.

52. Schmenner, R.W., *Making Business Location Decisions*, Prentice-Hall, Englewood Cliffs, NJ (1982).

53. Schmenner, R.W., *The Location Decisions of Large Multiplant Companies*, Department of Housing and Urban Development, Washington, D.C. (1980).

54. Carroll, Robert and Wasylenko, M., The Incentives Game: Win, Loose, or Draw? *Proceedings of the 82nd Annual Conference* 1989, National Tax Association, Columbus, Ohio (1989) pages 268-274.

55. Dorf, R.J. and M.J. Emerson, op.cit.

56. Hekman, J.S., Survey of Location Decisions in the South, *Economic Review* (June 1982) pages 6-19.

57. Kieschnick, M., op.cit.

58. Deich, M., State Taxes and Manufacturing Plant Location, *Proceedings of the 82nd Annual Conference* 1989, National Tax Association, Columbus, Ohio (1989) pages 290-299.

59. Kieschnick, M., op.cit.

60. Premus, R., op.cit.

61. Rosenfeld, S.A., E.E. Malizia, and M. Dugan., op.cit.

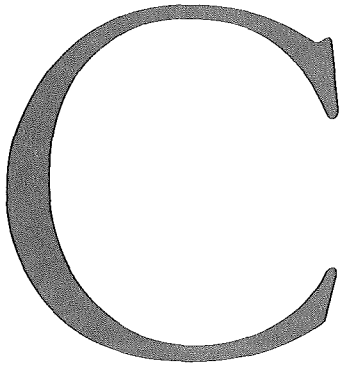
62. Birch, David L., op.cit.

63. Persky, Joseph, 'Dualism, Capital-Labor Ratios and the Regions of the U.S.,' *Journal of Regional Science*, Volume 20 (1978) pages 377-381.

64. Gerschenkron, A., *Economic Backwardness in Historical Perspective, Harvard University Press*, Cambridge, MA. (1962).

65. Suarez-Ville, Luis, A Note on Dualism, Capital-Labor Ratios, and the Regions of the U.S., *Journal of Regional Science*, Volume 23, No. 4 (1983) pages 547-552.

66. *Government Finances in 1987-1988*, U.S. Department of Commerce, Bureau of the Census.



Small and Medium-Sized Exporters

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Introduction

In the 1990s, U.S. businesses will likely compete more than ever before with foreign firms. A U.S. firm's decision not to export will not stop foreign competitors from selling their products in the United States. To succeed in the national market, a U.S. firm will need to be internationally competitive.

DTED's commitment to helping Minnesota businesses establish and expand in international markets is evidenced by the wide array of export assistance services provided by the Minnesota Trade Office, the development of the Minnesota international trade model (the first state trade model) and continuing analyses of Minnesota's exporting companies and patterns. This study is intended to help state policy makers and DTED program managers better target limited state resources for export promotion efforts.

Overview of Literature

The literature on firm export behavior identifies various stages of export development. Associated with the varying stages are perceived obstacles to exporting and export assistance needs. One study identifies a six-stage export development process.[1] In stages one and two, the firm is unwilling and uninterested, respectively, in exporting. In stage three, the firm becomes interested in exporting and in stage four the firm begins experimenting with exporting. In stage five, the firm is a semi-experienced small exporter and in stage six, the firm is an experienced large exporter. Another study proposes a three-stage export development model.[2] In stage one, the firm is a non-exporter, possessing no information about the exporting process. In stage two, the firm is a marginal exporter, a firm that is familiar with the basics of exporting and may have filled unsolicited orders but is not necessarily highly committed to exporting. In stage three, a firm is an active exporter, having mastered the export process and having made a commitment to exporting as a way of achieving the firm's goals.

These classifications of exporting firms are important because they show that firms perceive different obstacles to exporting and have different export assistance needs based on their stage of export development. Previous research has identified numerous obstacles to exporting for non-exporting firms and firms in the early stages of the export development process. These include a lack in the following areas: export motivation, surplus product or production capacity, capital and staff available to devote to exporting. Lack of information on exporting procedures, export documentation, transportation procedures, funds transfer, foreign markets and foreign marketing practices is also seen as an obstacle for new-to-export firms.[3] Studies have also identified many obstacles to exporting for exporting firms or firms in the later stages of the export development process. These include: finding foreign distributors and new markets, advertising in foreign markets, warehousing, financing, competing with foreign firms, dealing with foreign market restrictions and general trade barriers, and the rising value of the U.S. dollar.[4]

In general, non-exporters, marginal exporters and small exporters perceive obstacles to exporting that deal with the firm's own resources or capabilities (e.g. production capacity, export expertise). Obstacles that are external to the firm (e.g. trade barriers, foreign competition, transportation costs, language barriers) are perceived to be equally problematic for firms of all sizes and across all stages of export development.[5] Furthermore, non-exporters may perceive obstacles to exporting (e.g. lack of tax incentives, foreign market distance, lack of third party assistance) which exporters do not view as obstacle or perhaps have overcome.[6]

The most useful form of export assistance identified by firms include obtaining foreign market information for specific industries or products, locating foreign distributors, participating in trade shows, financing export transactions, and, for smaller firms, obtaining information about the mechanics of exporting.[7] At least one study found that the most important improvement to increasing the ability of firms to export would be to reduce worker's compensation costs, unemployment insurance costs and labor costs in general.[8] This suggests that a public

commitment to export development requires an overall commitment to business development.

While government export development services exist, the use of these programs has been found to be somewhat limited, especially among the smaller firms for whom the programs are intended.[9] It has been suggested that this is the result of a lack of awareness of the programs and/or that the information provided by the programs is not appropriate for the export development stage of the firm.

Focus of Chapter

This chapter will attempt to address two general questions regarding exporting firms: (1) What are the important operating factors facing Minnesota's manufacturing exporters? and (2) What are the obstacles to exporting or export assistance facing this group of Minnesota firms?

Sample

A total of 507 self-reported exporting firms with fewer than 500 employees in Minnesota were surveyed for this study. The surveyed firms were randomly selected from a list of 1,340 firms listed in the *1989 Minnesota Directory of Manufacturers* as having international markets and fewer than 500 employees. Large firms were not selected for this survey because this study is designed, in part, to assist the Minnesota Trade Office in developing effective export promotion programs and the Minnesota Trade Office's mandate is to assist small and medium-sized Minnesota companies. The response rate for the survey was 47 percent with 240 surveys returned, of which 224 were determined to actually be exporters. This response rate establishes a 95 percent confidence level that the margin of error for results is within 7 percentage points.

Characteristics of Respondents

The number of years in business for respondents ranges from one to 111. The median is 22 years. Only 5 percent of the respondents have been in business for five years or less. Consistent with findings in a previous trade survey, 85 percent of the respondents have been in business for at least 10 years.[10]

Among the types of business establishments, the vast majority, 85 percent, were reported to be either independents or headquarters. Only 14 percent of the respondents reported being branch firms. Export promotion efforts will likely have the greatest influence with independents and headquarters since these firms have the decision-making authority to expand into international markets whereas branch firms are unlikely to have that same discretion.

Four of the top five industries of respondents were high technology industries: non-electrical machinery with 25 percent of the respondents, fabricated metals with 13 percent, electrical machinery with 12 percent, instruments with 8 percent, and chemicals and allied products with 7 percent. Non-electrical machinery, electrical machinery and instruments also represent the state's largest exporting industries. The next most significant industries for the respondents were: rubber and plastics, printing and publishing, transportation equipment and food and kindred products.

Since only firms with 500 or fewer employees were surveyed for this study, the size of the responding firms was relatively small with 73 percent of the respondents employing fewer than 100. Thirty-four percent of all respondents were very small firms, employing fewer than 20 employees. In comparison, a previous survey of all potentially exporting firms, including large firms, found that only 15 percent of the exporting respondents reported fewer than 20 employees.[11]

Also as a result of surveying only small and medium-sized firms, the annual sales of responding firms was relatively low. Twenty-five percent of the respondents reported annual sales of less than $1 million. The largest sales category reported was $1 million to $5 million with 31 percent of all respondents reporting sales in this range. An additional 27 percent of respondents reported sales in the $5 million to $25 million range. Only 14 percent of all firms reported annual sales in excess of $25 million. In a previous

Table C-1

Occupations	Number of Firms	Percent Reporting Very Important (Score = 4)
Management	216	69%
Professional/Scientists/Engineers	208	45
Technical/Skilled	216	36
Clerical/Sales	211	24
Unskilled	212	12

international trade survey, 35 percent of the responding exporters reported sales in excess of $25 million. Again, this survey included large exporters as well as small to medium-sized firms.[12]

The market area for the respondents was substantially more national than local, regional or international. The median share of sales made to local customers was 9.5 percent, regional customers—13 percent, national customers—59 percent and international customers—4.5 percent. However, 30 percent of the firms responding received 10 percent or more of their total sales from exports.

Respondents were generally in the middle to advanced stages of export activity, with 47 percent reporting that they exported occasionally and another 34 percent reporting that they had exported frequently. Forty-eight percent of the respondents reported that they had exported for more than 10 years, while 26 percent reported exporting less than five years.

Format of the Survey

The survey was designed to collect four general categories of information: 1) firm characteristics; 2) importance of current business factors and quality of operating conditions; 3) plans for changes in business operations over the next five years; and 4) recommendations for the role of government services and spending. (See Appendix A for copy of the survey.)

When asking firms to rate the importance of a factor or issue or severity of a problem, firms were generally given a four point scale where a score of 4 means "very important" or "severe" and a score of 1 means "not important" or "not severe."

Current Issues and Conditions

This section examines how Minnesota's small and medium-sized exporters view current business operating conditions in Minnesota and how they assess the importance of certain human and capital investments, including labor conditions and issues, access to capital, energy, transportation and research and development investments.

Labor

The quality and availability of labor have long been considered critical factors to business operations and among Minnesota's business advantages. This section examines whether or not Minnesota's small and medium-sized exporters are having difficulty recruiting or retaining key labor groups and which personnel issues they view as most important to their current operations.

As displayed in Table C-1, small and medium-sized exporters reported management as by far the most important of the five labor groups included in the study, with 69 percent of the respondents reporting this group to be "very important" to their business. Following managers, the two other most highly skilled of the four occupational groups—professionals/scientists/engineers and skilled/technical labor—were considered most important.

Table C-2 Difficulty Recruiting or Retaining Personnel

Occupation	Percent with Difficulty Recruiting (Score 3 or 4)	Percent with Difficulty Retaining (Score 3 or 4)
Management	68%	28%
Professional/Scientists/Engineers	66	33
Technical/Skilled	60	31
Clerical/Sales	30	24
Unskilled	15	29

Table C-3 Reasons for Difficulty Recruiting and Retaining

Reason For Difficulty	Number of Respondents	Percent Reporting Some Importance to Recruiting (Score 3, 4)	Number of Respondents	Percent Reporting Some Importance to Retaining (Score 3,4)
Cost of Labor	108	72%	46	76%
Lack of Skills	96	60	45	54
Labor Shortage	95	47	51	40
Personal Taxes	49	60	37	52
Climate	24	21	42	29

Minnesota exporters also reported significant difficultly recruiting these labor groups. Sixty-eight percent of small and medium-sized exporters reported some difficulty recruiting managers and 66 percent reported some difficulty recruiting professionals, scientists and engineers, with a score of 3 or 4. (Table C-2) Those firms experiencing some difficulty recruiting both managers and professionals, scientists and engineers did not differ from the population of exporters in terms of age, company type, industry or size.

The most important reason for having difficulty recruiting employees was "cost of labor." More than 72 percent of firms reported that this reason was at least somewhat important, followed by "lack of skills" and "personal taxes," each with 60 percent of firms reporting that those reasons were at least somewhat important to their recruiting difficulties.

Those exporters that experienced difficulty recruiting managers and professionals, the two most important labor groups, reported the same reasons as contributing to their difficulty. Cost of labor was the most important reason, followed by lack of skills and personal taxes.

Minnesota's small and medium-sized exporters reported significantly less difficulty retaining employees then recruiting them. Twenty-eight percent and 33 percent, respectively, of respondents found that it was at least somewhat difficult to retain managers and professionals, the two most important labor groups. Only 6 and 5 percent respectively reported that retaining these groups was "difficult."

As displayed in Table C-3 exporters' reasons for difficulty in retaining employees closely reflected their reasons for difficulty recruiting. Cost of labor was reported as by far the most important reason, with 76 percent of respondents reporting that it was at least

Table C-4 Importance of Personnel Issues

Issue	Percent Reporting Very Important (Score 4)	Percent Reporting Not Important (Score 1)
Rising Labor Costs	48%	5%
Lack of Skills	21	10
Declining Labor Supply	14	19
Drug/AIDS Testing	7	45
Employee Health Benefits	51	3
Day Care	3	52
Parking/Commuting	2	62
Organized Labor	11	51
Workforce Diversity	3	38
Retirement Pension	11	15
Alternative Work Schedule	5	36

somewhat important, with a rating of 3 or 4 on the four point scale, and 30 percent reporting that it was very important. Again, more than half rated "lack of skills" as at least somewhat important.

Personnel Issues

Exporters were also asked to rate the importance of a list of 11 personnel issues to their company on a four point scale. The issues, presented in Table C-4, cover a variety of topics of current public debate. The two issues identified as currently most important to their company are "rising labor costs" (48 percent responded as very important) and "employee health benefits" (51 percent responded as very important).

In addition, a majority of exporters, 58 percent, reported that lack of skills is at least somewhat of a concern to them currently (a score of 3 or 4). Of the 11 selected issues, the three reported most frequently as not important were "employee parking/ commuting," "day care," and "organized labor issues."

Similar trends emerged when examining these issues by importance of labor group. For example, those exporters for whom management employees were important also reported rising costs and health benefits as the two most important personnel issues. Interestingly, only 12 percent of those employers who reported unskilled labor as important to their business reported that organized labor issues were very important to their current operations. This broad consensus suggests that labor relations are simply not problematic to Minnesota's exporters at this time.

One notable exception is that "lack of skills" was reported to be a very important issue by nearly one third (31 percent) of those exporters who reported skilled and technical workers to be very important to their operations, as compared to only 21 percent for the group as a whole. Appropriate training of the workforce will continue to be critical for these exporters.

Training

In order to examine human capital investments, survey respondents were asked to indicate their use of formal training and their satisfaction with training sources.

Most Minnesota exporters are investing in their employees through training programs. Only 22 percent reported that they provided no formal training. Of the 78 percent of firms that did conduct formal training, 72 percent of respondents reported that they had increased their formal training activities as compared to five years ago. This trend held when examining training by importance of occupational groups. More than 70 percent of firms that rated each of the five occupational groups as important reported that they were providing more formal training than they were five years ago. This includes the group

Table C-5 Importance and Satisfaction with Training Sources

Sources	Percent Rating Very Important (Score 4)	Percent Rating Very Satisfied (Score 4)	Satisfaction of Firms Rating Source Very Important (Score 4)
In-House	47%	18%	29%
Apprenticeship	7	17	50
Commercial/Consultant	7	7	33
Voc/Tech Education	20	14	23
Community College	7	7	11
University/College	25	18	39
Primary/Secondary Inst.	35	10	24
Other	33	22	—

of firms that considered unskilled workers to be most important to their operations.

Of the 129 firms that reported the most difficulty recruiting personnel, 74 percent reported that they had increased formal training in the last five years, very similar to the group as a whole. In contrast, nearly 90 percent of the firms that reported the most difficulty retaining staff had increased formal training.

The two sources of formal training most frequently reported as "very important" were in-house formal training (47 percent) and primary/secondary institutions for basic skills (35 percent). Apprenticeships and community colleges were most frequently scored as "not important."

Similar patterns emerged when examining source of training and difficulty recruiting and retaining the five occupational groups. More than 40 percent of firms reporting difficulty recruiting and 50 percent of those with difficulty retaining each group identified "in-house" programs as very important. However, a higher proportion of firms that reported having difficulty recruiting personnel rated primary/secondary institutions as a very important source of formal training than the did group of exporters as a whole. This held true for each of the occupational groups, ranging from 40 percent of firms that had difficulty recruiting professionals, scientists and engineers, to 58 percent of firms that had difficulty recruiting unskilled labor identifying primary and secondary institutions as very important for formal training.

Minnesota exporters did not express a high level of satisfaction with the listed training sources. No source received a rating of "very satisfied" by more than 20 percent of respondents. However, those rating the training sources as "very important" did express a somewhat higher level of satisfaction with the source (Table C-5). Primary/secondary institutions were rated among the least satisfactory sources of training. Less than half rated it even somewhat satisfactory. Given the importance of this source of training, the low scores are a matter of concern.

Small and medium-sized exporters were also asked to rate how frequently various training topics were offered. Of the 15 topic categories listed (Table C-6), the topics small and medium-sized exporters most frequently reported as giving "often" were process/equipment topics (including computer skills), quality improvement and control techniques, and customer service training. Topics most frequently covered by firms experiencing difficulty retaining staff do not differ from the group has a whole.

It is also interesting to note that international skills and foreign languages were among the least common training topics. It is somewhat surprising that exporters would report

Table C-6 Frequency of Training Topic Offering

Training Topics	Percent of Firms That Teach "Often"	Number of Firms Responding
Manufacturing		
Processes/Equipment	41%	142
Engineering Techniques	19	132
Quality Improvement/Control	47	141
Marketing/Sales		
Customer Service	43	143
International Skills	4	127
Foreign Languages	0	126
Marketing/Sales	22	139
Administrative		
Clerical/Office Skills	12	138
Computer	25	138
Managerial		
Strategic Planning	22	136
Supervisory	32	142
General		
Basic Skills	7	127
Communications	14	135
Career Development	7	129
Interpersonal/Personal Skills	16	134

essentially no formal training on international topics.

When asked the reason for giving formal training, more than two-thirds rated improving quality/productivity as "very important," by far the most highly rated of the eight listed reasons. This fact, and the importance of customer service and quality as training topics, suggests that the quality movement is making significant inroads among Minnesota exporters.

Capital Access

Clearly, adequate capital is necessary for business to achieve long-term growth. As part of the survey, Minnesota exporters were asked a series of questions regarding their use of financing and perceived barriers to adequate capital access.

Not surprisingly, nearly two-thirds (63 percent) of small and medium-sized exporters had sought investment or working capital in the last five years. The most frequently used type of financing by far was a commercial loan, with 107 firms reporting it as a primary source. Satisfaction with the various financing tools was low, with commercial loan receiving the highest proportion of firms reporting a "high" level of satisfaction. (Table C-7)

Of those seeking capital, only 20 percent reported a "high" level of difficulty in getting the capital, while 30 percent reported the level of difficulty as "low." Exporters who had difficulty getting capital had younger businesses than the group of exporters as a whole, with relatively few in the over 25 years of age category (35 percent versus 44 percent) and more in the under five years of age category (12 percent versus 5 percent). Exporters who had difficulty getting capital were also smaller, with 91 percent employing less than 100 as compared to 73 percent of the group as a whole.

Not surprisingly, the financial characteristics of the firms are also highly correlated with the difficulty of getting capital. Firms reporting higher debt-to-equity ratios and

Table C-7 Importance of and Satisfaction with Financing Tools

Type of Financing	Number of Firms Listing as a Primary Source	Percent Highly Satisfied
Stock Offering	27	15
Venture Capital	35	9
Personal Equity	54	19
Retained Earnings	61	21
Bond Sale	30	10
Commercial Paper	20	5
Commercial Loan	107	27
Government Loan/Grant	55	15

Table C-8 Barriers to Obtaining Capital

Barrier	Number of Firms Responding	Percent Reporting "Low"	Percent Reporting "High"
Cost (interest rates, etc.)	89	18%	29%
Collateral	89	13	34
Lending limits	85	26	24
Cash flow requirements	89	14	27
Knowing where to go	81	48	17
Local availability	88	32	22
Risk of project	87	31	17
Discrimination	73	84	4
Return required by equity investors	65	48	12
Control required by equity investors	68	44	28
Lack of market for public offering	57	63	19
Cost of public offering	51	63	20
None of above	138 12%	—	—

larger numbers of creditors had significantly more difficulty acquiring capital.

As displayed in Table C-8, exporters were also asked to rate the seriousness of a list of 12 barriers they might have faced when seeking capital. Only 12 percent of the respondents reported that they did not face any of the listed barriers. Collateral requirements were most frequently rated as posing a high level of barrier by more than one-third of respondents (34 percent). Discrimination was most frequently rated as posing a low barrier to obtaining capital; 84 percent rated discrimination a "low" barrier.

Of firms reporting that obtaining capital was very difficult, the proportion rating the level of barrier as "high" was about double that of the general population for all 12 barriers. However, the relative ranking of the 12 barriers was the same, with collateral requirements most frequently rated as a high level of barrier and discrimination least frequently rated high.

As displayed in Table C-9, the most common uses of financing were for working capital, acquisition of new equipment and inventory. Uses of capital for those exporters who had experienced difficulty getting financing did not generally vary from the group as a whole. However, a somewhat higher proportion of this group did use the capital for extinguishing and refinancing debt and a somewhat smaller proportion used it for acquisition of real or personal property than the group as a whole. It is interesting that nearly one-third of exporters used capital for research and development expenses. This area does not directly generate income or collateral to back debt, thus it would be

Table C-9 Uses of Capital

Uses of Capital Financing	All Exporters	Exporters with Difficulty
Inventory	55%	50%
Land Acquisition/Improvement	16	8
Building Acquisition/Improvement	39	31
New Equipment	60	54
Research & Development	29	35
Extinguish Debt	20	27
Refinance Debt	24	31
Working Capital	65	65

anticipated that it would be difficult to secure credit for these purposes.

Energy

Energy is a critical input into most industrial processes. As a result, exporters were asked about the importance of various energy service characteristics and the level of satisfaction with their current system. Only companies that considered energy costs to be an important share of their total costs were asked to respond to these questions. Eighty percent of firms responded suggesting the importance of energy to this group.

Natural gas was the most commonly identified heating fuel, while electricity was the most commonly reported processing fuel for small and medium-sized exporters. Of the three listed service characteristics—cost, reliability and availability—reliability was listed as the most important with 83 percent of firms reporting that they considered it "very important." Surprisingly, of three characteristics listed cost of energy was least frequently rated as "very important." Nevertheless a high proportion, 68 percent of firms, did give it that rating.

Of the three characteristics, respondents were least satisfied with the cost of their energy service, with only 16 percent reporting that they were very satisfied. Respondents were most satisfied with the availability of their energy source, with more than half (53 percent) reporting that they were very satisfied.

When examining satisfaction with the three variables by primary heating fuel, responses varied most for the "availability" characteristic. Satisfaction with availability ranged from a high of 50 percent of users of natural gas reporting that they were very satisfied, to a low of 24 percent of users of electricity reporting that they were very satisfied with availability.

Responses by primary processing fuel varied most markedly in their satisfaction with cost. While only 13 percent of firms that use electricity as their primary processing fuel reported that they were very satisfied with the cost, 42 percent of users of propane as their primary processing fuel reported that they were very satisfied with it.

Transportation

Transportation systems are one aspect of the business climate on which state policy and programs can have a significant effect through investments in highways, airports, etc. As a result, businesses were asked a group of questions regarding the importance of transportation and their satisfaction with various aspects of these systems.

Sixty-five percent of the group of small and medium-sized exporters reported that transportation was very important to the operation of their company. With a few exceptions, the importance of transportation did not vary by firm characteristic. However, only 42 percent of firms in the six to 10 years of age group, only 40 percent of non-manufacturing firms, and 33 percent of firms employing 500 or more employees reported that transportation was very important to

Table C-10 Primary Mode and Satisfaction with Mode

Mode	Distribution of Primary Mode	Percent Satisfied (Score 3 or 4)	Percent Dissatisfied (Score 1 or 2)
Truck	55%	91%	9%
Air	20	90	10
Rail	4	43	57
Barge	2	56	44
Freight Services	19	81	19

their business operations. Firms serving primarily regional markets, as opposed to local, national or international markets, rated transportation as most important to their business, with 79 percent rating it as "very important."

As presented in Table C-10, exporters are generally satisfied with their transportation systems. Fifty-five percent of respondents listed truck transport as their primary mode of transportation and 33 percent reported that they were very satisfied with the mode. The next most frequently listed primary mode was air transport, with 20 percent of respondents, followed by freight services with 19 percent of respondents, listing it as their primary mode of transportation. One-third of both air transportation and freight services users reported that they were very satisfied, and 90 percent were at least somewhat satisfied with the mode.

Rail and barge were the least frequently used modes and also received the lowest levels of satisfaction with only 10 percent and 17 percent, respectively, of firms using the mode reporting that they were very satisfied with the service.

Exporters were given a list of eight transportation characteristics and asked which were most important to their company. Three emerged as most important: reliability, with 82 percent rating it as "very important," cost and quality of service, each with a 70 percent rating of "very important."

Firms using air transportation as their primary mode of transportation rated speed and traceability as more important characteristics than the rest of the group. Users of truck transportation rated speed as significantly less important than either air or freight services users.

Research and Development

The small and medium-sized exporters group was also asked a series of questions about their investments in research and development and implementation of new technologies. These questions were intended to identify the importance of such investments and technologies to current business operations.

Forty-four percent of the exporters group reported that research and development (R&D) investments were "very important" to their current operations, while only 12 percent reported that such investments were not important. The group of firms that consider R&D to be "very important" reflected the group as a whole in terms of age group, type of business, industry group and size groups. However, firms rating R&D as very important are somewhat younger and somewhat more concentrated in "high technology" businesses than the group of exporters as a whole.

Eighty-one percent of the exporters primarily conducted their R&D activities in-house, 10 percent subcontracted with other firms for their R&D activities, while 5 percent subcontracted with the federal government or an academic institution. Of firms reporting that R&D investments were "very important," 88 percent primarily conducted their R&D in-house.

Table C-11 Importance of Technology Groups

Technology	Percent Rating Somewhat Important (Score 3 or 4)	Percent Rating Very Important (Score 4)
Automation Equipment	62%	31%
Communications Equip./Systems	58	21
Quality/Productivity Systems	70	32
Advanced Materials (composites)	58	22

Firms were asked to rank the importance of four groups of technologies to their business operations (Table C-11). Nearly one-third of the exporters group reported that automation equipment and quality/productivity systems were "very important" to their current business operations. Nearly 70 percent reported that quality/productivity systems were at least somewhat important.

The importance of technologies to improve quality/productivity reflects the importance of quality/productivity as a reason for, and topic of, training. This general pattern may suggest a broad commitment to quality improvement.

Firms rating the four technology groups as very important closely reflected the entire group of exporters, when comparing by age group and firm type. Those firms rating automation equipment and quality/productivity systems as very important tended to be larger than the group as a whole. Approximately, 80 percent of firms that rated these two technologies employed more than 20 workers, while only 65 percent of the total group employed 20 or more workers.

Firms that reported that R&D investments were very important to their current business operations rated all of the four technology groups as more important than the group as a whole. Forty-six percent rated systems and equipment to improve quality and productivity as "very important," as compared to 32 percent of the group as a whole. Forty-three percent rated automation equipment as very important, as compared to 31 percent of the group as a whole.

Impact of Taxes and Regulations

One purpose of the Minnesota Enterprise 1990 Business Survey was to understand how businesses assess the relative impact of various taxes and regulations on the business and the degree to which current technical assistance programs help address that impact.

Not surprisingly, 55 percent of firms reported that the overall impact of state business taxes/regulations was "very significant," while only 6 percent reported that state business taxes had no impact. This did not vary by industry group or size category. However, an even higher proportion, 70 percent of very young firms, those under five years of age, reported that taxes had a very significant impact on their business operations.

A much smaller share of firms, only 22 percent, that were branches of foreign companies reported that taxes had a very significant impact on their company. And only 40 percent of firms that were branches of a U.S. company rated tax impact as very significant, in contrast to 55 percent of the group as a whole. While the number of firms is very small, this may suggest that firms choosing a Minnesota location have accepted the tax burden, but firms forming and growing-up in Minnesota feel the tax burden is forced upon them.

In order to discriminate among the various state taxes, firms were asked to individually rank the impact of seven taxes and one tax credit on their current business operations. By far the highest proportion, 59 percent, of firms ranked workers' compensation first in

Table C-12 Tax Impact

	Rank of Taxes
Workers' Compensation	1
Unemployment Compensation	2
Corporate Income Taxes	3
Commercial/Industrial Property Taxes	4
Personal Income Taxes	5
Residential Property	6
Sales Tax	7
R&D Tax Credit	8

Table C-13 Impact of Regulations

Regulations	Percent Rating Very Significant Impact	Percent Rating Rating No Impact
Air Pollution	12%	34%
Water Pollution	15	33
Toxic Waste	18	27
Solid Waste	20	20
Hiring/Selection Practices	12	22
Hours/Wage Regulations	15	24
Civil Rights	6	36
Health/Safety Standards	21	14
Liability Insurance	45	8

terms of impact on their business operations. Interestingly, commercial/industrial property taxes, which have recently been reformed and lowered, ranked fourth. Commercial/industrial property taxes had been a priority for change by business groups. This moderate ranking may suggest that reform addressed some of their concerns. The R&D tax credit was given by far the lowest score, obviously having little impact on most exporters. Table C-12 presents the ranking of the taxes, from highest to lowest, based on total score.

Businesses were also asked about the impact of regulations on their business operations. Two types of regulations were covered: pollution control and employment standards regulations. Exporters reported that these regulations had less impact on their business operations than taxes and regulations overall.

In fact, the pollution control regulations with the highest proportion of firms rating it as having "very significant impact" was the solid waste category. Twenty percent of respondents gave it that rating, as compared to 55 percent of businesses rating taxes/regulations overall as having a very significant impact.

The regulation with the highest proportion of firms reporting it as having a very significant impact on their business operations was liability insurance, with 45 percent of firms giving it that rating. In contrast, more than one-third of businesses reported that air pollution and civil rights regulations had no impact on their businesses. (Table C-13)

In general, firms that reported that pollution regulations had a very significant impact on their business operations closely reflected the group of exporters as a whole in terms of age, business type, industry and size. Firms that reported air and water pollution regulations to have a very significant impact on their business tended to be less concentrated in a

Table C-14 Quality of Technical Assistance

Regulations	Percent Rating Excellent (Score 4)	Percent Rating Poor (Score 1)
Air Pollution	5%	18%
Water Pollution	5	17
Toxic Waste	8	19
Solid Waste	6	17
Hiring/Selection	5	17
Hours/Wages	4	13
Civil Rights	5	21
Health/Safety Standards (OSHA)	8	18
Liability Insurance	8	23

high technology industry than the group of exporters. Only 32 and 41 percent, respectively, of the firms rating these regulations as having a very significant impact on their business were classified as high tech, in comparison to 52 percent of the group as a whole. Firms that reported air and water pollution regulations to have a very significant impact on their businesses also tended to be bigger and older than the group of exporters as a whole.

The two employment standards reported to be most burdensome were liability insurance and health/safety standards. Firms reporting that health and safety standards had a very significant impact on their operation tended to be more concentrated in non high tech, durable goods manufacturing industries and less concentrated in high technology activities than the group as a whole. These firms also tended to be somewhat smaller than the group as a whole, with 83 percent of the firms employing less than 100 people, in contrast to 74 percent of all exporters.

Liability insurance requirements were rated as by far the most burdensome of all the regulations, with 45 percent of firms rating it as having a very significant impact and another 32 percent rating it as having some impact. Firms rating these regulations as most burdensome closely reflected the group of all exporters in terms of age of business, size of business, industry and business type.

Although most regulations were not rated as having much impact on exporters operations, the quality of technical assistance available to help them comply with the regulations were given very poor scores. Not more than 8 percent of firms gave technical assistance for any of the nine regulation categories a score of excellent. In contrast, 23 percent of firms reported that technical assistance for liability insurance requirements was poor and 21 percent rated the technical assistance available for civil rights rules and laws as poor. (Table C-14)

Technical assistance for health and safety regulations (OSHA) was given the highest rating of the employment standard regulations, with 48 percent of exporters rating the assistance as good or excellent. This is a surprisingly good rating when considering that OSHA regulations were rated the second most burdensome of the nine listed regulations.

Exporting Issues

In order to better understand their plans and needs for exporting assistance, the exporters group was asked a set of questions specifically relating to their international trade experience and practices.

Government trade programs are typically intended to reduce barriers that small firms face when entering international markets. In order to better understand the seriousness of some of these barriers, exporters were asked to rate a list of 16 "obstacles" on a four point scale from "not a problem" to "serious

Table C-15 Exporting Obstacles

Obstacle	Number Of Respondents	Percent Rating Not Serious Problem	Rating Serious Problem
Market Research	185	33%	13%
Marketing/Advertising	184	33	11
Pricing	188	15	24
U.S.Legal Requirements			
Information	182	41	8
Compliance	181	40	7
Foreign Legal Requirements			
Information	181	23	14
Compliance	179	26	16
Financing	184	41	10
Shipping Information	183	38	4
Insurance	178	44	2
Language Differences	181	35	9
Cultural Differences	176	36	6
Staff Training	180	37	9
Currency Fluctuations	180	29	15
Availability of Hard Currency	181	45	8
Political Environment	180	38	9
Other	18	44	44

Table C-16 Destination of Exports for Small/Medium Firms

Country	Percent Currently Export To
Canada	79%
United Kingdom	43
Australia	33
Mexico	31
West Germany	31
Japan	30
France	29
Italy	23
Netherlands	23
Taiwan	23

problem." As presented in Table C-15, generally none of the 16 obstacles were widely rated as extremely problematic. However, a significant portion of exporters did report experiencing serious problems entering international markets. The obstacle most frequently rated as a "serious problem" was pricing issues. Twenty-four percent of the responding exporters gave it that rating. Nearly half, 45 and 44 percent respectively, of the exporters rated availability of hard currency and insurance as "not a problem." It is worth noting that the exporters group are primarily trading with Canada, Japan and the European Economic Community.

Very small firms, those with fewer than 20 employees, rated the barriers similarly as the group as a whole. However, a smaller proportion of very small firms reported that currency fluctuations and shipping information were "no problem."

When asked to rate the importance of eight potential sources for export information, no single source emerged as critically important. The source most frequently rated "very

Table C-17 Planned Changes in Staffing

Percent Planning To:	Decrease Significantly			Increase Significantly
Occupations	1	2	3	4
Management	0%	39%	55%	6%
Professional//Scientists/Engineer	1	25	63	11
Technical/Skilled	0	15	71	14
Clerical/Sales	2	44	48	6
Unskilled	9	33	48	10

important" was freight forwarder, with 24 percent giving it that rating. Interestingly, industry sources including other companies in the industry and industry associations ranked second. The Minnesota Trade Office ranked in the middle, fourth of the eight, with 28 percent rating it at least somewhat important as a source of information.

Satisfaction with these sources closely reflected their importance rating. The only sources of information that a majority of the group was satisfied with were freight forwarders, with 63 percent reporting that they were satisfied with that source of information. Again, the Minnesota Trade Office ranked fourth with 39 percent satisfied with it as an information source.

Not surprisingly, these small to medium-sized exporters were currently selling their products to countries that were either close geographically or English-speaking to a significant degree. A remarkable 79 percent exported to Canada, while 43 percent exported to the U.K. and 33 percent exported to Australia. Table C-16 presents the top 10 country destinations.

Business Plans for the 1990s

A major purpose of the project was to understand if and how Minnesota's business community is planning to change its operations in the 1990s in response to changes in national and world business conditions. Firms were questioned about their business plans for the next five years and were asked to identify issues they felt would be important to their business in the next five years.

Changes in Labor/Staffing

The vast majority of Minnesota's small and medium-sized exporters anticipate changes in staffing in the next five years. Only 25 percent of the responding exporters reported that they planned no changes in staffing over the next five years.

Of those planning changes, exporters most frequently reported plans to increase technical/skilled employees. A remarkable 85 percent of exporters who planned staffing changes, planned to increase employment of technical/skilled employees. Seventy-four percent reported plans to increase employment in the professionals, scientists and engineers group. Although management ranked highest in terms of importance to the company, a smaller proportion, 61 percent, reported that they planned to increase employment in this group.

Far fewer exporters reported plans to decrease employment. However, 41 percent reported that they would decrease employment in the unskilled group in the next five years and 46 percent reported plans to decrease employment of clericals somewhat over the next five years. Table C-17 presents exporters plans for staffing changes in the next five years.

When examining the characteristics of firms that plan to increase employment in the various occupational groups, few distinctions from the group of exporters as a whole

Table C-18 Importance of Personnel Issues to Firms Increasing Employment

Firms Increasing:	Lack of Appropriate Skills (Percent rating very important)	Employee Health Benefits (Percent rating very important)
Management	29%	39%
Professional/ Scientists/Engineer	26	44
Skilled/Technical	26	44
Clerical/Sales	26	41
Unskilled	25	41
All Exporters	21	51

emerge in terms of age distribution, firm type, industry roup, or size category. However, firms reporting that they plan to increase the employment in each of the occupational groups tended to be more concentrated in high technology industries than the group as a whole. For example, 65 percent of firms planning to increase employment in the clerical/sales and professional/scientists groups were in high technology industries, as compared to 52 percent of the group of exporters as a whole. Because this trend holds for all occupational groups, it may suggest a more positive employment outlook in general for firms in this industry group.

Not surprisingly, the firms that reported plans to increase employment in each of the occupational groups rated that group as more important to the organization than the group as a whole. For example, 75 percent of firms planning to significantly increase employment in the technical and skilled class report them to be very important to their current operations, while only 45 percent of the group as a whole rated them this highly. Surprisingly, only 57 percent of firms reporting plans to significantly increase clerical/sales employment and 31 percent of those planning to significantly increase employment of unskilled labor consider them to be very important to their current operations.

Firms that planned to increase employment in the five occupational groups did not appear to have either less or more difficulty recruiting or retaining staff than the groups of exporters as a whole. Few firms from the group as a whole or from those planning to increase employment reported significant difficulty retaining staff. However, a slightly higher proportion of firms planning to increase management and professional employment reported difficulty recruiting this group.

Two patterns emerge when examining the importance of personnel issues to the group of exporters planning to increase employment among the five occupational groups. A somewhat higher proportion of this group tended to rate "lack of appropriate skills" as very important and a lower share rated "employee health benefits" as very important. Perhaps this suggests that the need for the skills outweighs concerns about cost factors such as health benefits. Table C-18 presents responses to these two issues for the five occupational groups.

Changes in Labor/Capital

Clearly, the majority of small to medium-sized exporters are planning staffing changes. They typically plan to increase employment, especially among skilled and professional occupational groups. The relationship of capital investments to those changes is examined in the following analysis.

Only 25 percent of the small and medium-sized exporters group reported that they did not plan to change staffing over the next five years. Of these, a smaller share, 32 percent, reported using capital for any one of eight listed purposes, as compared to 40 percent of the group of exporters as a whole.

Those firms not planning employment changes, but which did use capital, used it for

Table C-19 New Product and R&D Investments for Firms Planning Staffing Changes

	Percent Planning to Introduce New Product	Percent Rating R&D Very Important In Five Years
Firms Planning No Staff Changes	63%	40%
Firms Planning to Increase Management	91	70
Professional/Scientists/ Engineers	95	71
Skilled/Technical	89	62
Clerical/Sales	90	65
Unskilled	88	56
All Exporters	83	57

similar purposes as the group as a whole. The most common use of capital was for working capital, followed by acquisition of equipment. Interestingly, firms not planning staffing changes were far less likely to use capital for R&D than the group as a whole. Eleven percent reported using capital for R&D activities, as opposed to 29 percent of the group as a whole.

Plans to introduce a new product also may have implications for both capital and labor. The relationship between plans for new products and staffing changes were also examined. Results are presented in Table C-19. Firms planning no changes in staffing are much less likely to plan to introduce a new product or service in the five years than the group of exporters as a whole, 63 percent and 83 percent, respectively.

In contrast, firms that report plans to increase employment are generally likely to have plans for new products as well: 91 percent of firms planning to increase management employment; 95 percent of firms planning to increase employment of professional/scientists/ engineers; and 90 percent of firms planning to increase clerical/sales staff plan to introduce a new product in the next five years, as compared to 83 percent of the group of exporters as a whole.

It is not surprising then, that firms that planned no change in staffing also placed less importance on R&D investments, and firms that planned to increase employment generally rated R&D as more important than the group as a whole. While 57 percent of all small and medium-sized exporters rated R&D investments as very important in the next five years, 40 percent of firms planning no change gave it that rating. Seventy percent of firms increasing management employment rated R&D as very important; 71 percent of firms with plans to increase employment in the professional/scientists group; and 65 percent of firms planning to increase clerical/ sales employment gave it that rating. Thus R&D activities appear to be related to employment growth for Minnesota's exporting firms.

Exporters' plans for changes in staffing were also examined with regard to the importance of four types of technologies to their business: automation equipment, communications equipment, equipment to improve quality/ productivity, and advanced materials. While investments in these technologies may increase the need for skilled labor groups, they may be substitutes for unskilled labor.

Firms that reported they planned no changes in staffing over the next five years reported that each of the four technologies would be less important to their business than the group as a whole. For example, only 26 percent of the firms planning no change in staffing rated equipment to improve quality/ productivity as very important to their business operations in the next five years. In

Table C-20 Importance of Technologies for Firms Increasing Employment (*percent rating very important*)

Firms Increasing:	Management	Professional/ Scientists/ Engineers	Technical/ Skilled	Unskilled/ Laborer	All Exporters
Technologies:					
Automation Equipment	53%	46%	50%	53%	49%
Communications Equip.	45	42	35	33	30
Quality/Productivity Equipment	48	56	55	50	45
Advanced Materials	34	35	35	37	34

contrast, 45 percent of the group as a whole gave it that rating.

Firms that reported plans to increase employment generally rated all four groups of technologies as more important in five years than the group of exporters as a whole, including firms planning to increase unskilled labor. Firms reporting plans to increase employment of managers and scientists/ professionals gave communication equipment especially high ratings in comparison to the group as a whole. Firms with plans to increase employment of technical/skilled and professional/scientific staff rated equipment and systems to improve quality/productivity as especially important. (Table C-20)

The trend suggests that firms planning increases in employment are more likely to use capital and invest in new products and technologies. Thus, capital investment does not appear to be a substitute for labor, but rather a compliment to labor.

Changes in Training

Exporters were also asked to rate the frequency that 14 training topics would be offered by their business in five years. In general, all topics increased in frequency from current offerings, ranging from 5 to 27 percentage points. The rating for training on engineering and scientific techniques increased the most, from 19 percent rating it as very important currently, to 46 percent rating it as very important in five years. The percent of firms rating strategic planning as very important increased from 22 percent currently to 47 percent reporting it would be very important in five years.

Table C-21 displays the importance training topics will be to the firms in five years. Similar to their rating of the importance of topics for their current operations, quality improvement and control techniques, manufacturing processes/equipment, and customer service training were ranked as the most important training topics to be covered in the next five years. Interestingly, training in office computer systems dropped from the fifth most important topic currently to a projected ninth most important topic in the next five years. Engineering techniques and communications skills moved up in relative importance.

Changes in Transportation

In examining potential changes in business operations for the 1990s, firms were asked about their plans to change transportation modes and about expected transportation problems in the next five years.

Of the five listed transportation modes the most significant changes were planned for use of rail and freight services. Fifty-nine percent of firms reported plans to change rail use, of these the majority plan to reduce use of the mode. Nearly 36 percent planned to decrease use significantly and another 18 percent planned to decrease use somewhat. In contrast, a majority of firms plan to increase use of freight services. Of the 63 percent of

Table C-21 Importance of Training Topics in the Next Five Years

	Percent Rating Very Frequently Offered	Percentage Point Increase From "Current" Rating
Quality Improvement/ Control	71%	24 pts.
Manufacturing Processes	61	20
Customer Service	58	18
Supervisory Skills	52	20
Strategic Planning	47	25
Engineering Techniques	46	27
Marketing/Sales Techniques	43	21
Communication Skills	36	22
Office Computer Skills	33	8
Basic Skills	26	19
International Skills	24	19
Clerical/Office Skills	17	5
Career Development	16	9
Foreign Language	6	6

Table C-22 Changes in Transportation Modes (*percent distribution*)

Mode	No Change	Decrease Significantly 1	2	3	Increase Significantly 4
Truck	54%	0%	16%	57%	27%
Air	41	1	13	66	20
Rail	41	36	18	41	5
Barge/Ship	36	13	13	63	13
Freight Services	37	2	11	56	32

firms anticipating changes in use of freight services, 32 percent reported plans to increase use significantly and another 56 said they expected to increase use somewhat.

The smallest proportion of firms reported plans to change use of trucking as a transportation mode, with 54 percent expecting no change over the next five years. Of those expecting change, 84 percent reported plans to increase use. Table C-22 presents plans for changes in transportation modes over the next five years.

These results are not surprising, given the satisfaction ratings for the various modes. (See Transportation, page 101) Only 10 percent of current rail users reported that they were very satisfied with current rail service. In contrast, one-third of truck, air and freight services users reported that they were very satisfied with the mode.

When examining firms that planned no changes in the use of eight listed transportation characteristics, no clear differences from the group of exporters as a whole emerge. More than 80 percent rate reliability, 70 percent rate cost, and 70 percent rate service quality as very important, as does the group of exporters as a whole. However, those planning significant changes do show marked differences from the group of exporters in their rating of the importance of the various characteristics. Firms expecting a significant increase in trucking rate speed and cost as significantly more important characteristics than the group as a whole. Firms planning to increase air transportation significantly rated speed, frequency, reliability and traceability as more important features

Table C-23 Future Transportation Problems (*Percent of Firms Rating Problem*)

	Not Severe	Very Severe
Reduction of Air Service Availability	14%	21%
Reduction in Air Service Quality	18	19
Airport Congestion	13	16
Lack of Rail Service	71	6
Deteriorating Roads/Bridges	18	29
Inadequate Shipping Services	14	37
Poor Road Access	23	20
Road Congestion	14	17
Lack of Mass Transit	57	2
Hazardous Waste Transportation	41	11
Increasing Costs	2	50
Reduction in Trucking Service Availability	8	47

than the group as a whole. Firms planning significantly increased use of freight service rated speed, cost, traceability and safety as more important characteristics than all exporters as a whole. Finally, those firms expecting to decrease use of rail significantly reported cost, speed and reliability as more important than the group of exporters as a whole.

Plans for changes in transportation also differ by the primary market of the firms. Not surprisingly, firms reporting no plans to change use of air transportation reported a higher share of their goods going to local markets than the groups as a whole. Similarly, firms reporting no plans to change their use of freight forwarding services reported a lower share of their sales going to international markets than the group as a whole.

Firms reporting plans to increase use of trucking significantly reported higher shares of their sales going to local markets and lower shares going to national markets than the group as a whole. The market for firms planning to increase use of freight service and air transportation significantly, and to decrease use of rail, closely reflected the group as whole.

Of 12 listed potential transportation problems, the problems firms most frequently rated as severely effecting their growth in the next five years were indicative of the importance placed on the related mode of transportation. Increasing transportation costs and reduction in trucking availability were rated as most severe, with nearly 50 percent of firms rating these problems as "very severe." More than one-third of firms (37 percent) rated inadequate shipping services as potentially having a very severe impact on their business in the next five years.

Lack of rail service and lack of mass transit were rated as least severe, with 71 percent and 57 percent respectively rating them as "not severe." Table C-23 presents exporters' rating of the 12 potential transportation problems.

Changes in Technology/R&D

Firms were also asked to report their plans for developing new products and services, conducting R&D and implementing new technologies over the next five years.

A remarkable 83 percent of firms reported plans to introduce a new service or product in the next five years. These firms closely reflected the group of all exporters in terms of firm age, business type, and number of employees. It is not surprising that firms planning to introduce a new product are slightly more concentrated in high technology industries than the group as a whole. Fifty-nine percent were classified in this sector as compared to 52 percent of all exporters. It is notable that nearly 68 percent of non-high

Table C-24 Importance of Technologies in Five Years

Technology	Percent Rating Very Important	Percentage Point Increase From "Current" Rating
Automation Equipment	49%	18 pts.
Communications Equipment	30	9
Equipment/Systems to Improve Quality/Productivity	45	13
Advanced Materials	34	12

tech exporters also plan to introduce a new service product in the next five years.

Fifty-seven percent of small and medium-sized exporters reported that R&D investments would be very important to their business operations in five years, up from 44 percent rating it as that important currently. Again, firms rating R&D as very important in five years were more likely to be in a high technology industry than the group as a whole. Sixty-two percent were classified in this sector as compared to 52 percent of all exporters. Firms that rated R&D as very important in five years were also slightly larger than the group as a whole. Thirty-two percent of these firms had more than 100 employees, while only 25 percent of the group as a whole employed more than 100 persons. A remarkable 97 percent of firms reporting that R&D investments would be very important to their business in the next five years reported that they planned to introduce a new product or service over that same time period.

Firms were also asked to rate the importance of four groups of technologies to their business now and in five years. (For a discussion of the current importance see R&D/New Technologies, page 102). Nearly half of the small and medium-sized exporters thought automation equipment (49 percent) and equipment or systems to improve productivity/quality (45 percent) would be very important to their business operations in the next five years. The proportion of firms rating automation equipment as very important in five years jumped by 18 percentage points, from its current importance rating. Table C-24 displays exporters' ratings of these four types of technologies.

Plans for Exporting

The sample of exporters was also asked two questions regarding their future exporting plans. First, they were asked to indicate the level of activity their company was taking to increase exports. Exporters also were asked to rate a list of 10 items frequently considered to be precursors to exporting.

Surprisingly, few firms reported a high level of activity on any of the 10 items, suggesting that the group was not aggressively pursuing increased exports. Table C-25 presents the responses to this question. The item most frequently rated as being done "a lot" was retaining foreign distributors or agents. The proportion of firms reporting that they did "a lot" was not significantly different from zero for seven of the 10 items: conducting market research; retaining an export management company; participating with an export trading company; attending workshops or seminars; and seeking a foreign counter-trade facilitator, joint venture or overseas investment opportunity.

Firms reporting that they were either doing some or a lot of an activity tended to be more concentrated in high technology industries than the groups as a whole. For example, 68 percent of firms indicating they were doing some visiting of foreign markets (a rating of three or four on the question) and 71 percent of firms reporting that they were retaining a foreign distributor (rating of 3 or 4) were in high technology industries, as compared to 52 percent of the group as a whole.

Table C-25 Activities to Increase Exports

Level of Activity	Percent Responding None	A Lot
Conducting Market Research	54%	3%
Visiting Foreign Markets	41	13
Retaining Export Management Company	74	2
Retaining Foreign Distributor	33	15
Participating with Export Trading Company	62	0
Attending Seminars/Workshops	50	3
Obtaining Foreign Leads	30	9
Seeking Counter Trade Facilitator	81	1
Seeking Joint Venture	62	3
Seeking Overseas Investment	73	3

Table C-26 Destination of Exports

Current		Interested In	
Canada	79%	USSR	31%
United Kingdom	43	West Germany	26
Australia	33	PRC	24
Mexico	31	Australia	24
West Germany	31	France	21
Japan	30	Mexico	21
France	29	Denmark	20
Italy	23	Belgium	19
Netherlands	23	Sweden	19
Taiwan	23	U.K.	19

Firms reporting that they were doing some or a lot of an activity also tended to be less concentrated in the smallest size class of fewer than 20 employees. For example, only 15 percent of the firms that reported they were visiting foreign markets employed less than 20, while 35 percent of the group as a whole were classified in this category. This tendency may suggest the importance of government as an aid to expanding exporting activity for very small firms in general.

As a additional indicator of exporters' future plans, the group was asked which countries they would be interested in exporting to. While top destinations for current exports are English-speaking, Western nations, two of the four top future destinations were non-Western nations that do not even use the Roman alphabet—the USSR and the People's Republic of China. Table C-26 presents the top 10 current destinations and the top 10 countries small and medium-sized exporters are interested in exporting to in the future.

Conclusion

Minnesota's small to medium-sized exporters are anticipating significant change in the 1990s. A vast majority plan staffing changes and to introduce a new product or service. At least half plan to change their transportation modes. Interestingly, they are undertaking little activity to increase their exports.

Those most likely to plan changes, and who are working most actively to expand their export markets, tend to be in high technology industries and somewhat larger than the group of exporters as a whole.

Business Attitudes Toward the Role of Government

Many business climate studies, including the *1990 Minnesota Enterprise Business Survey*, ask businesses to report on the impact of tax costs to their business operations. The Enterprise Survey is unique, however, because it also attempts to understand businesses' priorities for government services and recommendations for government spending changes.

Drawing from categories listed in the U.S. Department of Commerce publication *Government Finances*, exporters were asked to rate the importance of 19 government service categories to their business operations. Businesses were asked to rate each government program on a four point scale, with "4" indicating that the service was "very important" and "1" indicating that the service was "not important."

Importance of Government Services

Exporters clearly recognized the importance of some government services to their current business operations. For example, sixty-three percent rated elementary/secondary education as very important and 47 percent rated higher education as very important to their current business operations.

However, there was wide variation in their views about the importance of the various service groups. Public welfare and water transportation programs ranked lowest, with 43 percent and 64 percent of the exporters group respectively rating them as "not important." Table C-27 presents the importance ratings for the 19 categories.

When examining the importance of the various service groups by firm characteristics some interesting patterns emerge.

Education

In general, exporters considered education services to be the most important government activities. Surprisingly, high technology exporters did not rate education as more important than the group as a whole. For example, 56 percent of high tech firms rate primary education and 46 percent rate higher education as "very important," as compared to 63 and 47 percent of all exporters. Another surprise: firms reporting that they were capital-intensive rated education as more important than labor-intensive firms. Seventy-four percent of capital intensive firms rated primary education as very important, while only 55 percent of labor intensive firms rated primary education that highly.

Social Services

While the social service categories in general received the lowest ratings in terms of importance to current business operations, larger exporters rated them higher than smaller firms. For example, only 34 percent of exporters employing 100 or more workers rated public welfare as "not important" to their business, while 43 percent of the group as a whole gave it that rating. Similarly, only 11 percent of firms employing 100 or more workers rated employment security programs as "not important," but 21 percent of all exporters gave it that rating.

Transportation

Highway transportation was among the most highly rated government service. Thirty-four percent of exporters rated it as "very important." In sharp contrast, water transportation services received among the lowest ratings, with 64 percent rating it not important and only 11 percent rating it even somewhat important (a score of 3 or 4 on the four point scale). With few exceptions, these patterns are consistent when examining ratings by industry groups, size class or labor intensity. Exporters of non-durable goods rated water transportation even lower than the group as a whole with 74 percent rating it "not important."

Small firms, those with less than 20 employees, rated air transportation as less important than the total group of exporters. Only 16 percent of small firms rated it as "very important" a while 35 percent, rated it as "not important."

Presumably air, and for bulk shipments, water transportation, are required for international

Table C-27 Importance of Government Services

	Percent Reporting Not Important			Percent Reporting Very Important
Score	1	2	3	4
Education				
Primary/Secondary	4%	5%	28%	63%
Higher Educations	5	15	33	47
Libraries	18	28	34	20
Social Services				
Public Welfare	43	34	16	7
Hospitals	13	27	45	14
Health	10	20	49	21
Employment Security	21	37	31	10
Transportation				
Highway	6	15	45	34
Air Transportation	18	23	36	23
Water Transportation	64	25	9	3
Public Safety				
Police Protection	5	22	43	29
Fire Protection	5	16	43	37
Corrections	22	38	26	14
Protective Regulations	27	43	23	7
Environment and Housing				
Natural Resources	17	28	36	19
Parks & Recreation	18	33	38	11
Housing & Community Development	23	40	28	9
Sewerage	12	35	40	14
Other Sanitation	15	36	38	11

trade. Consequently, these mediocre to poor importance ratings for air and water transportation were somewhat surprising for the exporters group.

Public Safety

Police and fire protection rated among the most valued government services, ranking fifth and third, respectively, of the 19 categories. High importance ratings were given by firms in all employment size groups. Conversely, corrections and protective regulations were rated as among the least important services. Small firms, employing less than 20, apparently value these functions the least among the size groups. Nearly 39 percent of small firms rated protective regulations as "not important," as compared to 27 percent of the total exporters group; and 31 percent rated corrections as "not important" as compared to only 22 percent of the group as a whole.

Environment and Housing

The five groups of government services listed in this area received among the poorest ratings. Less than 20 percent rated any of these government programs "very important," although more than half rated natural resources, parks/recreation, and sewerage as at least somewhat important, with a score of 3 or 4.

Interestingly, firms that were branches of U.S. companies rated all of these services as somewhat more important than did independents, headquarters of multi-location firms, or branches of foreign companies. Although the numbers are small, not one of the 17 firms in the foreign branch category

rated any of the these five groups as very important.

When examining importance ratings by industry group, firms in the durable goods group rated sewerage as less important than either high technology or nondurable goods manufacturers. Firms in the nondurable goods industry rated "other sanitation" services as more important than did high technology or durable goods manufacturers. This finding is not surprising because many high technology firms, such as computer manufacturers; and nondurable goods firms, such as meat packers, use large amounts of water in their production processes and dispose of waste water through sewer systems.

Firms in the largest size categories, those employing 100 or more workers, rated both natural resource programs and park/recreation activities as somewhat more important than smaller exporters. For example, 60 percent of larger firms rated natural resources as somewhat important, while only 47 percent of firms employing less than 20 workers gave it that rating.

Recommendations for Government Spending

In addition to asking business which government programs and services were most important to their current operations, businesses were asked to give recommendations for changes in spending. Specifically, firms were asked to rate spending in the 19 service categories on a four point scale, where a score of 4 meant "spend more" and a score of 1 meant "spend less." As a reference, businesses were given Minnesota and United States expenditures per capita for each category, reported in the U.S. Department of Commerce publication, *Government Finances*.

Although small to medium-sized exporters recommended reduced spending in 13 of the 19 service categories, they support increased spending on programs of greatest importance to their businesses. More than half of the surveyed firms recommended that spending be increased somewhat (with a score of 3 or 4) in six of the 19 categories including primary education, higher education, highways, police and fire protection and natural resources. These recommendations were somewhat surprising given that Minnesota already spends from 11 percent to 47 percent more per capita than the national average in four of the areas. Table C-28 presents exporters' recommendations for government spending.

Several areas emerged as exporters' top candidates for reduced spending. Sixty-three percent of exporters recommended that the state "spend less" (the lowest possible score) on public welfare, 49 percent said to "spend less" on water transportation and 45 percent suggested that the state "spend less" on employment security. It is important to note that these were also the areas of least importance to exporters' current business operations.

When examining recommendations for government spending by firm characteristics some interesting patterns emerge:

Education

As with the importance of education, firms in high technology industries did not recommend spending more on primary/secondary educational programs as often as other exporters. Only 14 percent of high technology firms in the exporters group recommended to spend more on primary/secondary education, while 26 percent of other exporting manufacturers gave educational spending a score of 4.

Firms that described themselves as capital-intensive ranked spending on primary/secondary education as more important than more labor-intensive firms. Nearly one-third of capital-intensive firms recommended to spend more on primary/secondary education, while only 17 percent of labor-intensive firms rated primary/secondary education spending that highly.

Similar patterns emerged when examining preferences for spending in higher education. Exporters in high technology industries did not recommend spending more on higher education as frequently as other manufacturers. Firms describing themselves as capital-intensive rated higher education

Table C-28 Government Spending Recommendations

	Percent Recommending Spend Somewhat More	Percent Recommending Spend Somewhat Less
Education		
Elementary/Secondary Education	63%	37%
Higher Education	55	46
Libraries	40	60
Social Services		
Public Welfare	7	93
Hospitals	25	75
Health	41	60
Employment Security	16	84
Transportation		
Highway	58	42
Air Transportation	39	61
Water Transportation	10	90
Public Safety		
Police Protection	56	44
Fire Protection	53	47
Corrections	34	66
Protective Regulations	18	82
Environment & Housing		
Natural Resources	51	49
Parks/Recreation	24	76
Housing & Community Development	24	76
Sewerage	36	74
Other Sanitation	37	63

spending more highly than labor-intensive firms.

It is significant that a higher proportion of young firms (those five years old or younger) recommended to "spend more" on higher education than firms in the other age groups. Very young firms also rated library spending higher than firms in other age groups. Twenty-seven percent of young firms recommended spending more (a score of four) while only 7 percent of the group of exporters as a whole gave library spending that rating.

Social Services

The categories of social services programs received the lowest spending scores. The ratings for public welfare, hospitals and employment security did not differ significantly by size of firm. However, small firms rated health spending more intensely than larger firms. Fifteen percent of firms employing less than 20 workers recommended "spending more" on health services as compared to only 6 percent of the group as a whole. However, the proportion of the smallest exporters that recommended increasing spending somewhat (a score of 3 or 4), was 40 percent, very similar to the other size groups.

Transportation

Highway investments received among the highest ratings of the 19 categories, with 10 percent giving it the highest spending rating, "spend more," and a majority recommending spending be increased at least somewhat. In sharp contrast, 49 percent wanted to "spend less" on water transportation. More than half of the exporters group recommended spending at least somewhat less on air and water transportation. This is surprising given the

importance of these modes to international trade.

Manufacturers of nondurable goods were more likely to recommend spending more on highways than either firms in high technology industries or other durable goods industries. Sixty-three percent of nondurable goods producing firms recommended increasing spending as least somewhat, while only 54 and 53 percent, respectively, of high technology and durable goods manufacturers gave highway spending that rating. A lower proportion of small firms, those employing less than 20 workers, wanted to increase spending on highways than the group as a whole; 50 percent as compared to 58 percent of all exporters.

Not surprisingly, a slightly higher proportion of high technology firms wanted to increase air transportation spending at least somewhat than the group as a whole, although only 43 percent recommended increasing spending. A higher proportion of larger firms, 48 percent, also supported increased spending on air transportation than the group as a whole.

The strong recommendation to reduce expenditures on water transportation was reflected equally across all size and industry groups.

Public Safety

Fire and police protection were among the highest ranking government services in terms of both importance and spending, with more than half of the exporters group supporting increased funding. Conversely, more than 60 percent of exporters supported decreased funding for corrections and protective regulation. These patterns did not vary by size class or industry group.

Environment and Housing

Investment in natural resources was a high priority of the exporters group—more than half support increased spending. Firms in the nondurable goods sector are even more likely to support increased spending, with 62 percent rating spending as a 3 or 4.

The other government programs and activities in this category received low ratings, with generally high proportions recommending decreased spending. A higher proportion of large firms, employing 100 or more employees, supported decreased government spending for parks and recreation programs—76 percent as compared to 61 percent of the group as a whole. This is surprising because the large firms tended to rate these services as somewhat more important than firms in the small-size classes.

A smaller proportion of independent firms supported cuts in housing and community development programs, although 61 percent recommended spending less. As with parks and recreation, a higher share of firms in durable goods producing industries recommended spending less on housing and community development programs than the group as a whole. Eighty-four percent of durable goods exporters recommended spending cuts for these programs as opposed to 77 percent of the group as a whole.

In contrast, a lower proportion of durable goods manufacturers recommended cutting sewerage services. Although 54 percent of this group supported spending cuts, 64 percent of the group of exporters as a whole recommended spending less on sewerage. This is significant given that these firms rate the importance of sewerage services lower than firms in the other industry groups. In contrast, 72 percent of firms employing less than 20 workers recommended spending cuts for sewerage programs, as compared to 64 percent of the group as whole.

Government Spending and Problem Areas

In understanding exporters' demand for government services, especially recommendations for government spending, satisfaction/difficulty in three areas of business operations were examined: recruiting and retaining staff, labor training and transportation modes. The goal of this analysis was to determine whether or not problems in areas related to government services resulted in higher demands for government spending in those areas. That is, was government viewed as a solution to some problems?

Table C-29 Spending Ratings for Firms With Recruiting Difficulty

	Percent Recommending "Spend More" (Score 4)	
	Primary/Secondary Education	Higher Education
Firms with Difficulty Recruiting:		
Management	29%	26%
Professionals/Scientists/Engineers	25	21
Skilled Technical	30	24
Firms with Difficulty Retaining:		
Management	29	20
Professional/Scientists/Engineers	25	20
Skilled/Technical	19	19
Total Group	19	14

Staffing Needs

Businesses reporting serious difficultly recruiting staff, especially management and professional staff, were somewhat more likely to recommend that government "spend more" on education. This was especially true for higher education. Table C-29 presents the education spending ratings of firms that find recruiting each of the occupational groups "difficult" (a score of 4).

Although the pattern is less pronounced, firms with trouble retaining staff were also somewhat more likely to support increased spending on primary/secondary and higher education than the group as a whole. Few firms reported significant, serious difficulty retaining staff. Table C-29 reports the results for firms rating difficulty in retaining staff either a 3 or 4.

Training Needs

Surprisingly, firms that rated higher education institutions as "very important" sources of formal training for their businesses are not more likely to support spending more on these institutions than the group as a whole. For example, 17 percent of firms that rate university/colleges as a "very important" source of formal training recommended to "spend more" on higher education, as compared to 14 percent of the group as a whole. However, firms relying on primary/secondary institutions for basic skills training were more likely to support increased spending on primary/secondary education. In fact, 26 percent of firms that rated primary/secondary educational institutions as a "very important" source of formal training wanted to "spend more" on primary/secondary education, somewhat higher than the 19 percent of the group as a whole that gave primary/secondary education spending that rating.

Firms that were very satisfied with primary/secondary education as a source of formal training tended to be more likely than the group of exporters to support increased spending in this area. Twenty-three percent of firms satisfied with primary/secondary education for formal training recommended spending more, in comparison to 19 percent of the group as whole. In sharp contrast, firms that were dissatisfied with college/university as a formal training source were more likely to support increased spending for higher education institutions. Twenty-four percent of firms that rated higher education institutions at least somewhat unsatisfactory (with a score of 1 or 2) supported spending more on higher education, while only 14 percent of the group as a whole gave it that rating.

Transportation Needs

Firms generally support increased government spending on their primary mode of transportation. Sixty-one percent of firms that use trucking as their primary mode of

transportation support increased spending on highways as compared to 51 percent of firms using other modes as their primary mode of transportation. Similarly, 56 percent of firms that use air services as their primary mode of transportation support increased spending on air services, while only 32 of other firms supported increased government spending on air transportation.

Level of satisfaction with the primary mode did not apparently affect spending preferences. Although firms that were dissatisfied with trucking as a mode of transportation were somewhat more likely than the group as a whole to support decreased highway spending. Of firms that were dissatisfied with truck transportation, 57 percent supported decreasing highway spending while only 42 percent of the group as a whole recommended spending less.

Government Spending and Business Plans for Changes in Operations

To further examine business attitudes toward the role of government, the effect of businesses' plans for changes in operations in support of government spending was analyzed. The purpose was to assess whether or not businesses who were changing their operations were more likely to support government activity in the area of planned change. Four areas were specifically evaluated: planned changes in staffing, the future importance of various personnel issues, plans for changes in transportation modes and technological investments.

Plans for Staffing Changes

The three occupational groups businesses most frequently reported plans to increase were: management, professionals/scientists, and skilled/technical workers. As discussed earlier, these groups also require higher levels of education. As a result, these firms' preferences for government spending in education were examined.

Surprisingly, firms with plans to increase management, professional/scientific and skilled/technical staff did not demonstrate significantly higher levels of support for government spending on primary/secondary and higher education than the group as a whole. For example, 69 percent and 61 percent of firms planning to increase professional/scientific staff wanted to increase government spending in primary/secondary and higher education, respectively. In comparison, 63 percent and 55 percent of the group as a whole supported increased spending in these areas.

Plans for Transportation Changes

More than 80 percent of firms planning changes in transportation reported plans to increase use of truck, air, and freight services transportation. More than 75 percent of these firms reported plans to increase use of barge/ship transportation. These firms' recommendations for government spending on transportation were examined to assess whether or not plans for increased use of these services resulted in higher spending preferences.

In fact, about the same proportion of firms that were planning to increase use of truck, barge/ship, and freight services recommended increased spending on those systems as the group as a whole. As displayed in Table C-30, 53 percent of firms that plan to increase use of truck transportation want to spend more on highways as compared to 58 percent of the group as a whole.

In contrast, a higher proportion of firms planning to increase use of air transportation support wanted increased government spending on air service than the group as a whole. More than 50 percent of firms planning to increase their use of air transportation recommend increased government spending, while only 39 percent of the group as a whole support increased spending in this area.

Firms that identified critical problems with transportation systems in the next five years were more likely to support increased spending on transportation systems than the group as a whole.

Of 12 transportation problems exporters were asked to rate, cost increases and reduction in trucking availability were most often rated as

Table C-30 Recommendations for Government Spending on Transportation by Firms Planning Increased Use

	Percent Recommending Increased Spending On		
	Highways	Air	Water
Firms Planning to Increase Use of:			
Trucking	53%	N/A	N/A
Air	N/A	50%	N/A
Freight Services	52	36	10%
Barge/Ship	N/A	N/A	10
All Exporters	58	39	10

"severe" in the next five years. Firms rating these problems as severe were somewhat more likely than the group as a whole to support increased funding of highways. For example, 64 percent of firms that rated reduction of trucking services as a severe problem in five years recommended increased spending on highways. In comparison, 58 percent of the group as a whole recommended increased highway spending.

Similarly, higher proportions of the exporters that felt deteriorating roads and inadequate shipping services would be severe problems in the next five years supported increased spending on highways than the group of all exporters. Seventy-five percent of firms reporting that deteriorating roads would be a severe problem recommended increased highway spending and 62 percent of firms rating inadequate shipping services as a severe problem recommended increased government spending on highways.

In addition, a higher proportion of firms that anticipated severe air service problems in the next five years also supported increased government spending on air transportation. Sixty-six percent of firms that felt that reduction of air service availability would be a severe problem in five years supported increased government spending on air transportation. Sixty percent of exporters that felt that reduced air service quality would be a severe problem in the next five years also supported increased government spending on air transportation. In contrast, only 39 percent of the group as a whole recommended increased government spending on air transportation.

Technological and Product Change

The government spending preferences, especially education spending preferences, of firms that planned to introduce new products or that reported that R&D and technological investments would be very important in the next five years were also examined. Specifically, firms highly involved in research and product development were anticipated to be more likely to want increased government spending on education, especially higher education, than the group as a whole.

A higher proportion of firms that reported that R&D and four new technologies would be "very important" to their business in five years did tend to support increased government spending on education. As presented in Table C-31, 61 percent of firms that rate R&D investments as very important in five years recommended increased government spending on higher education as compared to 55 percent of all exporters.

Similarly, firms that reported each of four new technologies would be very important to their business in the next five years were also more likely to support increased spending on education than the group as a whole. For example, 65 percent of firms that rated composite materials as very important, and 66 percent of firms of firms that rate communication equipment as very important, supported increased spending on higher

Table C-31 Spending Recommendation of Firms Planning to Introduce New Product or Technologies

Firms Rating Very Important:	Percent Recommending to Increase Spending on Primary/Secondary Education	Higher Education	Libraries
R&D	67%	61%	44%
Automation Equipment	67	56	44
Communication Systems	73	66	50
Quality/Productivity Systems	72	62	46
Composite Materials	72	65	46
Firms with Plans to Introduce a New Product or Service	60	55	41
All Exporters	63	55	40

education, as compared to 55 percent of all exporters.

Firms that reported plans to introduce a new product within five years were not significantly more likely to recommend increased spending for education than the group as a whole. For example, 60 percent of firms that planned to introduce a new product or service in the next five years supported increased spending on primary/secondary education, while 63 percent of all exporters recommended increased funding in this area.

Conclusion

While recommending reduced spending in 13 of 19 government service categories, small to medium-sized exporters did support increased spending for those government services and programs that were most important to their business operations: education, fire and police protection, highway transportation and natural resources.

In fact, firms that had special needs for government services, such as educational institutions for formal training and highways for truck transportation, were more likely than the group as a whole to support increased spending in those areas. Firms that identified problem areas related to government services, such as airport congestion or deteriorating roads, also were more likely to support increased government spending. Thus, while not supporting broad government expansion, the exporters group did appear to see government as the legitimate solution to certain specific problems.

Summary and Conclusions

The *1990 Minnesota Enterprise Survey of Business* was conducted to assess the views and opinions of Minnesota businesses about doing business in the state and about their plans for the future. Five business groups, reflecting the main business constituents of the Department of Trade and Economic Development, were surveyed. Included in the survey were small and medium-sized exporters—the principle clients of the Minnesota Trade Office.

Views of Current Conditions

Small to medium-sized exporters reported significant difficulty recruiting personnel, especially among the occupational groups rated most important to their businesses: management, professionals/scientists, and skilled/technical workers. Roughly one-fifth of exporters report extreme difficulty, and at least 60 percent reported some difficulty recruiting these groups. Skill shortages and personal taxes are the most important reasons reported for these difficulties.

In contrast, small to medium-sized exporters reported much less of a problem retaining staff. Less than one-third reported any significant difficulty retaining employees.

Small to medium-sized exporters reported a high level of satisfaction with energy and transportation infrastructures. Nearly 90 percent were satisfied with the reliability and availability of their energy service and 50 percent were satisfied with the cost.

Similarly, more than 80 percent of exporters using truck air or freight services for transportation the primary transportation modes for exporting reported that they were satisfied with the systems. Exporters were only dissatisfied with rail and barge transportation—and these were the primary modes for less than 10 percent of the group.

Most exporters were able to secure capital resources without severe difficulty. Nearly two-thirds reported seeking capital in the last five years. Of those, more than half reported little difficulty securing capital. However, a significant group reported severe difficulty. These tended to be smaller and younger and to rely more heavily on venture capital than the group of exporters as a whole.

In the area of human capital investments, nearly three-quarters of the exporters group provided formal training and three-quarters of these have increased their training activities in the past five years. The topics most frequently taught are: manufacturing processes, quality improvement and control and customer service. The most common reason given for providing training was quality/productivity improvement.

More than half, 55 percent, of the group of exporters reported that taxes and regulations had a very significant impact on their business. The most burdensome tax or cost by far was workers' compensation.

In comparison, pollution control and employment standard regulations had a far smaller impact on businesses with no more than one-fifth of exporters reporting that any single regulation had a very significant impact on their business. The one exception to this pattern was liability insurance. Nearly half, 45 percent, rated the impact on their business operations as severe.

None of the technical assistance programs available to help businesses comply with regulations received high quality ratings. The technical assistance for OSHA regulations received the highest ratings of the employment standard regulations, with nearly half rating it as good or excellent. This is especially notable given that OSHA regulations were rated the second most burdensome of the nine listed categories of regulations.

Plans for the 1990s

Exporters report that the 1990s will be a time of change in virtually every aspect of their business operations.

In the next five years, three-quarters of exporters plan to change their staffing. The occupational groups that exporters most frequently report plans to increase are the most highly skilled occupational groups: management, professionals/scientists, and technical/skilled staff. This increased demand for skilled labor may result in skill shortages. Nearly 70 percent of exporters report that skill shortages will be an important issue to their business in the next five years.

Approximately half of the exporters surveyed planned changes in transportation systems in the next five years. Exporters most frequently reported plans to increase use of freight services. A majority plan to reduce use of rail for transportation.

More than 80 percent of exporters report plans to introduce a new product or service in the next five years. Not surprisingly, R&D will be increasingly important to their operations. Fifty-seven percent of exporters said that R&D activities will be very important to their businesses in the next five years, up from 44 percent rating it as that important currently.

International Trade Activities

Although the sample was structured to focus on small to medium-sized exporters, the group was surprisingly advanced in its trading activities. Thirty percent reported that more than 10 percent of sales were in international markets and nearly 50 percent reported exporting for more than 10 years.

No widespread obstacles to exporting were identified by the group. A significant subgroup did experience some severe problems, especially in pricing goods for overseas markets and in meeting legal requirements of the foreign country.

Exporters said they most frequently received their exporting information from freight forwarders or from other firms in their industry. The group did not, however, report a high level of satisfaction with any information source. The only source that a majority rated as even somewhat satisfactory were freight forwarders.

Given exporters plans for changes in so many areas, it was surprising to find so few undertaking activities to increase exports. A majority of the exporters reported their level of activity as "none" for eight of 10 listed steps to increase exports. The two steps indicating any activity were "visiting foreign markets" and "obtaining trade leads."

The exporters in the survey were typically exporting to Western, especially English-speaking nations. As a result, it was surprising to find that two of the four countries they expressed interest in entering were the USSR and the PRC.

Role of Government

Although recommending decreased government spending in most areas, Minnesota's small to medium-sized exporters recommended increased government spending for programs of greatest importance to their business operations. Those programs were: elementary education, higher education, highways, fire and police protection and natural resources. These programs represented 42 percent of the state's FY 1988 budget, according to the U.S. Department of Commerce publication, *Government Finances*.

The largest proportion of firms, 63 percent, recommended increasing spending on elementary and secondary education. This is not surprising given its importance to business; 91 percent rate it as important or very important to their business. Yet, there is a high level of dissatisfaction with the current system. When asked to rate their satisfaction with primary/secondary education for basic skills training, a majority of exporters reported that they were dissatisfied. In comparison, only one-third of the group reported that they were dissatisfied with the university/college or vocational/technical system for training.

Small and medium-sized exporters with special needs for services are even more likely to support increased spending on government programs. For example, a higher share of firms rating R&D investments as very important to their businesses supported increased spending on higher education than the group as a whole. A majority of firms planning to increase use of air transportation recommended increased government spending on airports and services.

Thus, although the group clearly did not support broad expansion of government activities, it did encourage government investments that were of tangible benefit to their business or that addressed specific problems of concern to them.

Endnotes

1. Miesenbock, Kurt J., "Small Businesses and Exporting: A Literature Review," *International Small Business Journal*, Vol. 6, No. 2, January/March 1988, pp. 42-61.

2. Sharkey, T. W., J.-S. Lim and K. T. Kim, "Export Development and Perceived Export Barriers: An Empirical Analysis of Small Firms," *Management International Review*, Vol. 29, No. 2, 2nd Quarter 1989, pp. 33-40.

3. Cavusgil, S. Tamer, "Organizational Characteristics Associated with Export Activity," *Journal of Management Sciences*, Vol. 21, No. 1, 1984, pp. 3-22.

   Cavusgil, S. Tamer, "On the Internationalization Process of Firms," *European Research*, Vol. 8, Nov. 1980, pp. 273-281.

   Czinkota, Michael R. and Johnson, Welley J., "Segmenting U.S. Firms for Export Development" *Journal of Business Research*, Vol. 9, No. 4, 1981, pp. 353-368.

   National Federation of Independent Business, "Small Business in Export Markets," Feb. 1988.

   Kejia, Ben L. and Jagdeep Chhokar, "Factors Inhibiting Export Performance of Firms: an Empirical Investigation," *Management International Review*, Vol. 26, No. 4, 1986, pp. 33-43.

   Vozikis, George S. and Timothy Mescon, "Small Exporters and Stages of Development: An Empirical Study," *American Journal of Small Business*, Summer, 1985, pp. 49-64.

   O'Rourke, A. Desmond, "Differences in Exporting Practices, Attitudes and Problems by Size of Firm," *American Journal of Small Business*, Vol. 9, Winter, 1988, pp. 25-29.

   Skarkey, et.al, ibid.

   DeNoble, Alex F., Richard M. Castaldi and Donald M. Moliver, "Export Intermediumn Small Business Perceptions of Services and Performance," *Journal of Small Business Management*, Vol. 27, April, 1989, pp. 33-41.

   Seely, Richard L. and Harvey J. Iglarsh, "The Internationalization Needs of the Small Firm Engaged in International Dealings" *American Journal of Small Business*, Vol. 7, January 1983, pp. 24-29.

4. Cavusgil, S. Tamer, ibid.
   Czinkota, Michael R., ibid.
   Kedia, Ben L., ibid.
   Sharkey, ibid.
   O'Rourke, ibid.
   DeNoble, ibid.

5. O'Rourke, ibid.
   Sharkey, ibid.

6. Kathawala, Yumus, Richard Judd, Mattew Monipallil and Melinda Weinrich, "Exporting Practices and Problems of Illinois Firms," *Journal of Small Business Management*, Vol. 27, January, 1989, pp. 53-59.

7. Howard, Donald G. and Irene M. Herreman, "Sources of Assistance for Small Business Exporters: Advice from Successful Firms," *Journal of Small Business Management*, July, 1988, pp. 49-54.

   U.S. Senate Committee on Small Business, "Survey of Findings on Obstacles to Exporting Faced by Small Businesses," July 30, 1982.
   O'Rourke, op. cit.
   Kathawala, op. cit.

8. Kathawala, op. cit.

9. Reid, Stan, "Information Acquisition and Export Entry Decisions in Small Firms," *Journal of Business Research*, Vol. 12, June, 1984, pp. 141-157.
   O'Rourke, op. cit.
   Kathawala, op. cit.

10. Johnson, Carol, "Minnesota's Exporters: Who, What, Where and How," Department of Trade and Economic Development, March, 1989, pp. 5-11.

11. ibid.

12. ibid.

D High Technology Companies

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Introduction

Throughout the 1970s and 1980s, high technology was singled out as a vibrant industry, important to state and local economies. No doubt, high technology will continue to be regarded as a dynamic and strategically important industry group in the 1990s.

High technology is thought to precipitate structural changes in local economies through the creation of backward and forward linkages and new firm spinoffs, according to a May 1987 paper written by Glasmeier. Some studies suggest high technology manufacturers offer several other distinct advantages. They tend to grow faster and, except for the very youngest (i.e. less than five years), they are the manufacturing enterprises least likely to fail (Birch, November 1988). High technology sectors reportedly yield increases in productivity and product innovation as well.

Additionally, the importance of high technology reflects the importance of manufacturing in general because the majority of high technology firms are manufacturers. Manufacturing is a driving force in any economy, with manufactured goods typically being a state's largest source of export income. This income stimulates production of other goods and services.

Superior wages are often cited as yet another reason why the development of high technology is desirable. In Minnesota, the annual average wage in 1988 was $21,476, with manufacturing accounting for an average wage of $28,590 per year. The average wage of Minnesota's high technology industry was nearly $31,000 per year, about 8 percent higher than the manufacturing average.

Most importantly, high technology provides the advanced tools and new production processes that help drive the rest of the economy. The largest impact on employment will come as applications of new high technology products and manufacturing technologies create new opportunities for basic industries and services (Office of Technology Assessment Report, July 1984).

Minnesota's High Technology Base

Similar businesses within an industry group, including high technology, tend to cluster together. Much research has been conducted on this agglomeration process and several factors have emerged as key to the agglomeration of the high technology industry. These factors include development of product markets, production methods as well as new firm creation via spin-offs (Glasmeier, June 1987).

Minnesota has an existing high technology industrial base that is considered pivotal to agglomeration. Given the state's relative strength in the high technology area, this industry takes on increasing importance and visibility as an avenue for future job growth opportunities. Table D-1 presents current employment and establishment data for high technology sectors in Minnesota.

Overall, the share of state employment in high technology industries is 17 percent above the national average, with aggregate high tech employment accounting for about 8 percent of Minnesota's total covered employment. These statistics are not inconsequential, especially when high technology is viewed as a driver of innovation and productivity gains in other industries.

Because of its potential importance to the economy, the Minnesota Department of Trade and Economic Development (DTED) targets high technology industries for business expansion activities. In addition, DTED's Committee on Science and Technology is charged with identifying policies that will help high technology industries flourish in Minnesota.

A Definition of High Technology

High technology means many things to many people. Some claim it to be the main engine of growth promising job creation, while others assert it is little more than a minor component of the overall economy. Government planners view it as a means to encourage emerging growth industries and combat unemployment. Industry views it as

Table D-1 Employment, Wages, Units and Location Quotients of High Technology Sectors

SIC Code	Number of Establishments	Minnesota Employment	Employment Location Quotient	Average Wages
28	239	9,533	0.48	$30,442
291	9	970	0.42	41,031
348	14	11,265	7.87	35,437
353	100	4,420	1.04	27,149
357	118	41,417	4.73	37,192
361	21	588	0.31	22,109
362	54	3,188	0.94	24,780
363	5	947	0.37	20,380
364	23	2,531	0.68	24,299
365	23	839	0.53	28,367
366	17	2,043	0.40	21,929
367	170	16,757	1.44	22,462
369	41	1,971	0.62	22,425
372	16	885	0.07	34,915
381	6	2,960	0.50	32,061
382	92	15,474	2.53	33,094
384	135	10,571	2.41	26,743
385	35	2,233	3.01	18,227
489	60	697	1.40	21,808
737	980	14,093	1.13	29,717
873	332	5,957	0.63	35,555
8711	534	6,653	0.64	23,268
	Total 3,024	Total 155,992	Average 1.17	Average $30,857

Total Private and Public Covered Employment

Units	Employment	Average Wages
113,718	1,963,201	$21,476

SOURCE: Unpublished Employment and Wages Data, U.S. Department of Labor, 1988.

new products and labor-saving production processes. Politicians view it as the promise of rejuvenating the United States' competitive edge. And academia views high technology as an esoteric form of research and development (Markusen, et. al., 1986).

Table D-2 lists the appropriate Standard Industrial Classification (SIC) codes included in the definition as well as a description of the industry. Industries included in the definition of high technology are chemicals and allied products, petroleum refining, ordnance and accessories, construction and related machinery, computer and office equipment, electric distribution equipment, electric industrial apparatus, household appliances, electric lighting and wiring equipment, household audio and video equipment, communications equipment, electronic components and accessories, miscellaneous electrical equipment and supplies, aircraft and parts, search and navigation equipment, measuring and controlling devices, medical instruments and supplies, ophthalmic goods, communications services, computer and data processing services, as well as research, development and testing services.

Through its Office of Science and Technology, DTED defines high technology industries as economic activities with an above average share of the following factors: research and development (R&D) expenditures as a percentage of total sales, and employment in scientific, engineering, and technical occupations relative to the total

Table D-2 A Definition of the High Technology Industry

SIC	Description
28	Chemicals & Allied Products
291	Petroleum Refining
348	Ordnance & Accessories
353	Construction & Related Machinery
357	Computer & Office Equipment
361	Electric Distribution Equipment
362	Electric Industrial Apparatus
363	Household Appliances
364	Electric Lighting & Wiring Equipment
365	Household Audio & Video Equipment
366	Communications Equipment
367	Electronic Components & Accessories
369	Miscellaneous Electrical Equipment & Supplies
372	Aircraft & Parts
381	Search & Navigation Equipment
382	Measuring & Controlling Devices
384	Medical Instruments & Supplies
385	Ophthalmic Goods
489	Communication Services
737	Computer & Data Processing Services
8711	Engineering Services
873	Research, Development & Testing Services

workforce. Table D-2 above lists the sectors meeting these criteria along with their 1987-based SIC codes. Some examples of firms in Minnesota that would be classified as high technology include: Honeywell (SIC 382), Cray Research (SIC 357), IBM (SIC 357), Medtronic (SIC 384), and FMC Corporation (SIC 348).

Methodology

Three basic questions were asked in this survey of high technology firms in Minnesota: (a) Are businesses generally satisfied with key operating factors which determine their successes? (b) Are these firms contemplating changes in response to the challenges of the next decade? (c) Is there a role for state government within the economic environment defined by Minnesota businesses in the next decade?

Approximately 85 percent of the high technology firms in Minnesota were manufacturers. Given this high percentage, only high technology manufacturing firms were surveyed. The population of high technology firms was drawn from the 1989 Directory of Manufacturers, with high technology firms identified by the corresponding SIC codes.

Approximately 1,213 high technology firms located in Minnesota were included in the sampling frame. By controlling for industry category, a stratified sampling technique generated an optimal sample of 228 firms. Historically, however, response rates of sampling surveys are typically low, hovering more or less around 50 percent. Thus, survey questionnaires were mailed out to 456 firms (or twice the optimal sample size) of which 223 responses were judged as usable, representing a sampling response rate of 49 percent.

In interpreting the results in this survey, one could attach a 95 percent confidence level that sampling errors would be no more than plus or minus 7 percentage points. There are other biases of course that might be introduced in the sampling due to the wording of the question and other difficulties inherent in research.

Organization

This paper is organized as follows: The first section summarizes the basic characteristics of

the sample of high technology firms in Minnesota. The second section presents business satisfaction with key operating factors. The third section presents anticipated business changes in the next decade. The fourth section introduces business perceptions on how government plays a role in the economic environment of the 1990s. The last section summarizes the main points of the study.

Characteristics of the Sample

A profile of the sample of high technology firms in Minnesota was constructed based on the survey responses. Exploratory questions were asked pertaining to company type, kind of product, number of years in business, number of Minnesota workers employed, annual revenues, location of markets, export plans for the next five years, and plans to introduce a new product in the next five years. Below is a summary of the survey responses.

Type of Company

Nearly three-fourths of the survey respondents indicated that they were independents. About 11 percent mentioned that they were branches of U.S.-based companies, while 4 percent were branches of foreign-based companies. About 10 percent of the respondents were U.S. headquarters of a multi-location company.

Kind of Product

As mentioned in an earlier section, the sampling frame was stratified according to the distribution of sample proportions by industry. Almost one-third of the survey respondents represented high technology firms in SIC 36 (electronic equipment). An equal proportion represented high technology firms in SIC 38 (scientific instruments).

Number of Years in Business

At least three-fourths of the survey respondents have been in business for at least 11 years. About one-half have been in business for at least 25 years.

Only 8 percent of the survey respondents have been in operation for at most five years, while 16 percent have been in business between six and 10 years.

Employment of Minnesota Workers

Most of the survey respondents represented high technology firms which employed fewer than 20 Minnesota workers. At least 75 percent of the respondents indicated that their workforce was fewer than 100 employees.

Annual Revenues

Less than one-third of the survey respondents indicated that their firms had earned less than 1 million dollars in 1989. About 42 percent of the respondents claimed that their firms generated between $1 million and $25 million. Only 15 percent of the respondents indicated an annual revenue of more than $25 million.

Markets for Product

At least one-half of the survey respondents sold their products in the national market. One-fifth reported that they sold their output locally. Less than 5 percent of the respondents sold their products abroad.

Plans for Export in the Next Five Years

When asked if they planned to export abroad within the next five years, 77 percent of the survey respondents indicated negatively.

Plans for New Products in the Next Five Years

At least 80 percent of the survey respondents indicated that they planned to introduce a new product within the next five years.

Satisfaction With Operating Factors

This section examines how high technology companies in Minnesota have evaluated critically the role of factors of production in their business operations. The importance of a particular factor in the entire business schema generally determines the extent to which the entrepreneur or manager is satisfied with the factor performance. In this section, the critical role of labor, capital access, energy, transportation, technology, R&D investments, taxes, regulations and technical assistance to private businesses are examined.

Table D-3 Importance of Labor Groups

Labor Group	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
Management	221	3%	7%	27%	63%
Professionals/Scientists/Engineers	202	17	11	29	43
Technical/Skilled Workers	213	6	9	43	42
Clerical/Sales Workers	213	5	27	39	29
Unskilled Workers	208	35	34	20	12

Table D-4 Difficulty in Recruiting Employees

Labor Group	Number of Respondents	Percent Rating: Easy 1	2	3	Difficult 4
Management	203	12%	23%	41%	23%
Professionals/Scientists/Engineers	175	9	23	47	21
Technical/Skilled Workers	197	11	36	38	15
Clerical/Sales Workers	200	26	40	27	8
Unskilled Workers	186	54	33	11	2

Labor

Labor issues that were crucial to business operations usually involved recruiting and retaining employees, personnel issues and formal training. Survey respondents were asked to assess the importance of each labor issue as well as their satisfaction with policies and procedures that addressed the issues.

Difficulty in Recruiting and Retaining Staff

Five labor groups were identified and ranked including: (a) management, (b) professionals, scientists and engineers, (c) technical and skilled workers, (d) clerical and sales workers, and (e) unskilled workers. Table D-3 illustrates the ranking of the important labor groups.

Management was by far the most important labor group, followed by professional, scientists and engineers, and then technical and skilled workers. Unskilled workers were considered the least important. About 35 percent of the respondents who rated unskilled workers reported the group as not important in their business operations.

Given the importance of labor issues to business operations, the survey respondents were asked to report if they had experienced any difficulty in recruiting workers. Most of the respondents indicated that it was at least somewhat difficult to recruit personnel for all labor groups except unskilled workers. According to Table D-4, the most difficult labor groups to recruit included professionals, scientists, engineers, management, technical and skilled workers.

About 23 percent of the survey respondents reported that it was difficult to recruit personnel for management positions, while about 21 percent indicated that professionals, scientists and engineers were the most difficult to recruit. Only 15 percent indicated technical and skilled workers were difficult to recruit.

The survey respondents were also asked to rate the level of difficulty in retaining employees. In general, as illustrated in Table D-5, survey respondents had little difficulty retaining employees in most of the occupational groups.

Table D-5 Difficulty in Retaining Employees

Labor Group	Number of Respondents	Percent Rating: Easy 1	2	3	Difficult 4
Management	200	22%	46%	27%	6%
Professionals/Scientists/Engineers	173	13	47	30	10
Technical/Skilled Workers	196	18	44	30	8
Clerical/Sales Workers	197	27	50	19	4
Unskilled Workers	184	38	40	15	8

Table D-6 Reasons Behind Difficulty in Recruiting

Reasons	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
Cost of Labor	151	5%	21%	44%	31%
Lack of Skills	155	13	29	28	30
Labor Shortage	146	23	36	31	10
Personal Taxes	149	17	23	31	30
Climate/Weather	146	36	32	20	12

Management, professionals, scientists, engineers, technical and skilled workers were the labor groups that Minnesota high technology firms reported to be the most important in their business operations. These occupational groups were also the most difficult to recruit. However, management, professionals, scientists and engineers were quite easy to retain, according to the survey data. Sixty-eight percent of the survey respondents assessed retaining management as both easy and somewhat easy. Sixty percent rated retaining professionals, scientists and engineers in the same category.

Survey respondents cited reasons for the level of difficulty experienced in recruiting their workers. Among the reasons presented to them were: (a) cost of labor, (b) lack of skills, (c) labor shortage, (d) personal taxes, and (e) climate and weather conditions. Table D-6 shows that 75 percent of the respondents indicated cost of labor was a primary factor. Sixty-one percent mentioned personal taxes. Fifty-eight percent cited lack of skills as an important reason.

Given the weather conditions in Minnesota, each survey respondent was asked about it being a potential disincentive to relocating in Minnesota. Thirty-six percent of the respondents believed that Minnesota climate was not a significant problem in retaining their employees.

The nature of the difficulty in recruiting was examined among the most important labor groups in the random sample. Lack of skills among potential workers was the motivating factor behind the difficulty in recruiting professionals, scientists, engineers, technical and skilled workers. However, the same reason seemed rather insignificant in explaining the difficulty in recruiting people for management positions. Concerning relatively lower-skilled workers in the sample, survey respondents mentioned labor shortages as the primary source of difficulty in recruiting clerical, sales and unskilled workers.

Similarly, survey respondents were asked what reasons explained the level of difficulty in retaining employees. Seventy-nine percent of

Table D-7 Reasons Behind Difficulty in Retaining

Reasons	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
Cost of Labor	105	2%	19%	46%	33%
Lack of Skills	103	12	38	31	19
Labor Shortage	98	22	41	28	9
Personal Taxes	99	20	28	21	30
Climate/Weather	96	42	36	17	5

Table D-8 Major Personnel Issues

Reasons	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
Rising Labor Costs	215	2%	15%	35%	47%
Lack of Appropriate Skills	210	11	29	37	23
Declining Labor Supply	207	22	43	23	12
Drug/AIDS Testing	207	45	35	16	4
Employee Health Benefits	211	6	12	32	50
Employee Parking/Commuting	205	65	25	10	0
Day Care	206	54	33	10	3
Organized Labor Issues	206	60	25	10	5
Work Force Diversity	205	36	42	17	5
Retirement/Pension	210	19	35	34	12
Alternative Work Schedules	205	35	35	25	6

the respondents pointed to the rising costs of labor as at least an important factor (see Table D-7). In fact, 33 percent indicated that it was a very important reason behind the difficulty in retaining their workers. About 50 percent reported cumulatively that lack of skills was also at least an important factor.

Almost one-third of the survey respondents, while noting that personal taxes were a deterrent in retaining their employees, also reported that it was a very important factor indeed. Again, 42 percent of those who cited Minnesota weather as a factor did not believe that it was an important factor at all.

Among relatively lower-skilled workers in the random sample, survey respondents mentioned labor shortages as the primary source of difficulty in retaining clerical, sales and unskilled workers.

Some Major Personnel Issues

Table D-8 lists 11 major personnel issues that high technology firms in Minnesota faced today and will likely face in the near future. These issues are: (a) rising labor costs, (b) lack of appropriate skills, (c) declining labor supply, (d) drug and AIDS testing, (e) employee health benefits, (f) employee parking and commuting, (g) day care, (h) organized labor issues, (i) workforce diversity, (j) retirement and pension, and (k) alternative work schedule. Survey respondents were asked to rate the importance of these various personnel issues in their business operations.

About 50 percent of the survey respondents indicated that employee health benefits were a very important personnel issue. Also, among the respondents who believed that rising labor costs was a significant personnel

Table D-9 Level of Formal Training Today Compared to Five Years Ago

Category	Number of Respondents	Percent Rating
Less 1	5	3%
Same 2	37	23
More 3	86	54
Much More 4	32	20
TOTAL	160	100%

issue, 47 percent reported that it was a very important personnel issue.

Equally interesting were the personnel issues that were rated as not important by survey respondents. Sixty-five percent of the respondents indicated that employee parking and commuting were not important issues. In the same manner, 60 percent did not view organized labor issues as important.

Fifty-four percent of the survey respondents, who assessed the importance of day care in their business operations, rated the issue as not important. Indeed, this perception was an interesting result since extensive discussions on day care cost and availability permeated not only the Minnesota workplace but the nation's as well. By analyzing the profiles of survey respondents (i.e. individuals who actually filled out the survey questionnaires), ample evidence suggested that a significant self-selection bias existed in this particular result. In short, respondents might have displayed a rather nonchalant attitude toward day care as a workplace issue. Had the selection of survey respondents been stratified (according to, say, degrees of sentiment on day care as an issue), the proportion of high technology firms in Minnesota that viewed day care as an important issue would be quite larger, reflecting the general opinion in the entire population.

Are the major personnel issues critical for some specific labor groups? According to the survey data, the importance of personnel issues did not vary across occupational groups. Major personnel issues that were perceived as critically vital were as important to employees across occupational groups.

Training

Survey respondents were asked about their human capital investments through formal training. A series of questions on sources as well as types of formal training was posed to them.

The results showed that high technology firms in Minnesota used a significant degree of formal training in order to enhance their workers' skills. As shown in Table D-9, 74 percent of the survey respondents increased the level of formal training compared to five years ago. Only 3 percent had provided less formal training compared to five years ago. About one-fourth of the respondents who were providing formal training maintained the same level of formal training.

Survey respondents who rated management as the most important labor group provided more formal training than the rest of the sample. In addition, a majority of respondents who found it difficult to retain professionals, scientists and engineers provided more formal training today as opposed to five years ago.

Types of Formal Training

Questions on training topics covered in formal training were posed to the survey respondents. The selected topics covered the following areas: (a) manufacturing, (b) marketing and sales, (c) administrative, (d) managerial, and (e) general topics.

Table D-10 indicates that high technology firms in Minnesota valued highly personnel training in the manufacturing area. Nearly one-half of the survey respondents reported that they often provided formal training for

Table D-10 Frequency of Topics Covered in Formal Training

Topic	Number of Respondents	Percent Rating: Never 1	2	3	Often 4
Manufacturing					
Processes & Equipment	133	7%	21%	31%	41%
Engineering & Scientific Technology	123	11	33	33	24
Quality Improvement & Control	133	5	10	38	47
Marketing & Sales					
Customer Service	136	5	18	37	40
International Skills	114	43	33	18	6
Foreign Languages	117	74	20	4	2
Marketing & Sales Techniques	130	8	23	37	31
Administrative					
Clerical & Office Skills	127	14	30	40	16
Computer Skills for Administration	126	6	19	49	26
Managerial					
Strategic Planning	129	11	31	33	26
Supervisor & Leadership Techniques	133	7	18	37	38
General					
Basic Skills	125	56	22	14	8
Communication Skills	131	12	28	43	17
Career Development	125	29	38	23	10
Interpersonal Skills	127	16	30	39	15

quality improvement and control. More than 40 percent provided formal training for processes and equipment. In the area of marketing and sales, 40 percent listed customer service as a frequently covered training program. Thirty-eight percent indicated they offered more training in supervisory and leadership training for managers.

Proficiency in foreign languages, basic skills and international skills stood out as areas that were typically never covered in training programs. Interestingly, nearly one-third of the respondents indicated that they never provided formal training programs for career development.

Survey respondents, who experienced significant difficulty in retaining management, technical and skilled labor, provided formal training more often than the high technology group as a whole. Also, respondents who provided more training for skill enhancement in process and equipment training as well as quality improvement and control, found less difficulty in retaining management, technical and skilled workers.

Reasons for Training

What motivated high technology firms to provide more formal training for their workers? The list of possible reasons provided to those surveyed included: (a) to meet increased technical complexity, (b) to teach company procedures, (c) to correct basic skills deficit, (d) to encourage career advancement, (e) to improve productivity and quality, (f) to manage employee turnover, (g) to reduce absenteeism, and (h) to increase workplace safety.

About 60 percent of the survey respondents rated improvement in quality and productivity as the most prominent reason for training company workers. Regardless of labor groups and type of business, such a reason was a prime business concern. On this issue, the survey data showed no clear differences in the response among different labor groups. The emphasis on quality and productivity improvement, both as a training topic and a reason for training, might have suggested that the stress on quality improvement was indeed taking root at least among high technology firms in Minnesota.

Table D-11 Importance of Various Sources of Formal Training

Sources	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
In-house	142	3%	7%	39%	51%
Apprenticeship & Internship for Licensure	121	50	23	17	9
Consultant & Commercial Course	122	34	35	28	3
Vocational & Technical Education	128	16	26	34	24
Community College	121	28	33	31	8
University & College	126	19	22	39	20
Primary & Secondary Institutions	118	18	21	28	33

Sources of Training

Seven possible sources of formal training were presented to survey respondents: (a) in-house, (b) apprenticeship and internship for licensure, (c) consultant and commercial course, (d) vocational and technical education, (e) community college, (f) university and college, and (g) primary and secondary institution. The business survey asked survey respondents to assess the most likely avenue in which their formal training programs were facilitated within their business operations.

Table D-11 shows that high technology firms in Minnesota relied on their internal training programs in order to enhance skill formation among workers. About 51 percent of the survey respondents, who utilized in-house training programs in their businesses, rated it as very important. In contrast, only 3 percent indicated a consultant or a commercial course as a very important source.

Thirty-three percent reported that basic skills training was another very important source of formal training, while 24 percent reported vocational and technical education was an important source of formal training. Surprisingly, only 20 percent of the respondents, who relied on university or college training, rated it as very important as a source of formal training.

Satisfaction with Formal Training

There was clearly a direct association with importance of a training program and survey respondents' satisfaction with that particular training program. The more important a training program had been to the success of a business operation, the more satisfaction survey respondents expressed with the training program. Likewise, training programs that were rated as unimportant generated less enthusiasm among survey respondents.

Capital Access

Access to capital plays a crucial role in business growth. Capital availability enables business firms to proceed with their efforts toward innovation, acquisition of plants and machineries and hiring of complementary skilled workers. Some studies however have reported that because of the inherent risk involved in the high technology industry, firms could face difficulty seeking liquid capital funds, thus hampering business growth.

Questions relating to sources of working capital, difficulty in securing working capital and uses of capital were presented to survey respondents. The paragraph below summarizes their responses to various questions.

Table D-12 Difficulty in Securing Capital

Difficulty	Number of Respondents	Percent Rating
1 Low	43	30%
2	42	29
3	32	22
4 High	27	19
TOTAL	144	100%

Difficulty in Securing Capital

More than 60 percent of survey respondents reported that they had sought working capital in the past five years. Table D-12 shows that almost one-third of the respondents indicated that they experienced little difficulty in obtaining financing from capital markets. About one-half experienced at least some difficulty. Less than one-fifth indicated serious difficulty in obtaining capital.

Compared to recently established businesses, older establishments in the industry experienced less difficulty in securing working capital. At least 35 percent of the survey respondents, who secured capital in the past five years, had been in business for at least 25 years. Of these respondents, only 6 percent had experienced a high level of difficulty in obtaining capital. Of those respondents who had been in business less than 25 years and sought working capital during the last five years, at least 20 percent experienced a high level of difficulty in obtaining that capital.

Bigger firms in the sample experienced less difficulty in securing working capital than smaller firms. That is, firms employing more workers found it relatively easy to borrow capital funds than firms employing fewer workers. This was another interesting finding in the survey data.

Common types of loan collateral that backed up business loans were examined. The level of difficulty in securing a loan did not vary by types of collateral used. A secured interest in hard assets, followed by inventory and accounts receivable, were the most common types of loan collateral. Between 30 percent and 40 percent of the survey respondents had utilized each type of loan collateral.

Not surprisingly, survey respondents with a debt-to-equity ratio of at least 2:1 were more likely to experience a high level of difficulty in securing capital. Less than 10 percent had a ratio exceeding 4:1. Just over one-half of the survey respondents had a debt-to-equity ratio of less than 1:1. Respondents with a ratio of less than 1:1 were more likely to encounter a low level of difficulty in securing capital.

Another glimpse at the relatively low-debt load among high technology firms in Minnesota was given by the response to the number of secured creditors listed by survey respondents. More than one-half of the respondents have one secured creditor. Cumulatively, at least 75 percent have at most two secured creditors. About 7 percent of the respondents indicated that they have more than six secured creditors.

Sources of Difficulty in Access to Capital

Twelve potential barriers toward obtaining capital were presented to survey respondents: (a) cost, (b) collateral requirements, (c) lending limits, (d) cash flow requirements, (e) knowing where to go, (f) local availability, (g) risk of project, (h) discrimination, (i) amount and timing of return required by investors, (j) business control required by equity investors, (k) lack of market for public offering, and (l) cost of offering. With each of these barriers, respondents were asked to assess its

Table D-13 Significance of Barriers Toward Obtaining Working Capital

Types	Number of Respondents	Percent Rating Low 1	2	3	High 4
Cost	99	19%	24%	34%	22%
Collateral & Offsetting Deposit Requirements	103	16	22	24	37
Lending Limits	95	25	27	27	20
Cash Flow Requirements	93	14	28	35	23
Knowing Where to Go	91	47	24	14	14
Local Availability	91	42	18	21	20
Risk of Project	90	39	23	21	17
Discrimination	84	82	14	2	2
Amount & Timing of Return Required by Investors	80	46	25	19	10
Business Control Required by Equity Investors	85	41	20	25	14
Lack of Market for Public Offering	70	66	17	10	7
Cost of Offering	66	62	12	14	12

significance in the difficulty of securing capital. Table D-13 summarizes the results.

About one-third of the survey respondents, who pointed to collateral requirements as a barrier in obtaining capital, rated it as a very serious barrier in capital access. Other significant sources of difficulty mentioned were cost and cash flow requirements.

About 80 percent of survey respondents, who reported that discrimination was a likely barrier, indicated that it did not pose a barrier in obtaining working capital. Sixty percent of the respondents reported that there was no absence of available lenders in the capital markets. Similarly, 65 percent of the respondents indicated that cost of the offerings did not pose a serious barrier in obtaining working capital.

Among the survey respondents who had sought capital in the past five years, 17 percent indicated that the listed barriers did not hamper their capital acquisition. When grouped according to number of years in business and number of Minnesota employees, firms that experienced less difficulty in acquiring capital were quite established in their business operations and employed more workers on the average.

The survey data further indicated that the level of difficulty in obtaining capital was directly associated with the seriousness of the barriers toward obtaining capital. Survey respondents experiencing high difficulty in obtaining capital were more likely to rate the barriers higher than those experiencing less difficulty.

Uses of Capital

Lenders of capital evaluate the risk of business projects depending on the nature of business activities to be financed. Thus, risky ventures encounter significantly more difficulty in securing financing than less risky ventures. In order to understand the magnitudes of the risk they are taking when they lend their capital funds, lenders usually ask questions on how loan proceeds are to be utilized by borrowers. The intended use of the loan proceeds explains some of the difficulty which high technology firms in Minnesota had experienced in securing capital.

Among the uses of capital that survey respondents were asked to identify in this business survey were: (a) to accumulate inventory, (b) to acquire and improve land, (c) to acquire and improve buildings, (d) to acquire new equipment, (e) to invest in R&D, (f) to extinguish existing debt, (g) to refinance existing debt, and (h) to spend as working capital.

Capital raised by high technology firms in Minnesota were most frequently used for working capital purposes (see Table D-14). About 23 percent of the survey respondents

Table D-14 Uses of Capital

Uses	Number of* Respondents	Percent Rating
Inventory	74	18%
Acquire or Improve Land	18	4
Acquire or Improve Buildings	50	12
Acquire New Equipment	85	21
R&D Expenses	46	11
Extinguish Existing Debt	18	4
Refinance Existing Debt	28	7
Working Capital	93	23
TOTAL	412	100%

*Total number of respondents is more than the sample size since some survey respondents listed more than one category.

intended to use the funds as working capital. About 21 percent reported that capital was used to acquire new equipment. About 18 percent indicated that the capital raised was mainly to purchase additional inventory.

Four percent of the survey responses show that loan proceeds were used to retire existing debts; not surprisingly, these respondents experienced serious difficulty in acquiring loans from the lenders. About 12 percent intended to use the loans to acquire or to improve lands. However, these respondents experienced less difficulty in borrowing working capital.

Sources of loans were identified as: (a) stock offerings, (b) venture capital, (c) personal equity, (d) retained earnings, (e) bond sale, (f) commercial paper, (g) commercial loan, and (h) government loan. According to Table D-15, about 69 percent of the survey respondents who relied on personal equity were at least satisfied with it as their major source of capital. Sixty-six percent of those who relied on commercial loans expressed a similar degree of satisfaction. Fifty-five percent who depended on retained earnings were at least satisfied with it.

Government loans provided the least degree of satisfaction. Sixty-five percent of the survey respondents who assessed government loans, as a source of capital, rated it poorly. Commercial paper, a financial instrument issued by investment bankers in order to meet short-term cash needs of financiers and entrepreneurs, was rated poorly also. More than one-half of the respondents who relied on commercial paper expressed low satisfaction.

In addition, 56 percent of the respondents were dissatisfied with venture capital. A number of entrepreneurs in the random sample have expressed their disappointment with Minnesota venture capitalists who were described as not risky enough to meet the needs of business expansions.

Stock offerings, as a form of raising loans, were not popular either. Only 8 percent of the respondents were highly satisfied with it; on the other hand, 42 percent were extremely dissatisfied with the idea of using stocks to raise business loans.

During the last five years, survey respondents had secured more working capital from institutional lenders who were located within Minnesota than from those outside of the state.

In sum, while most high technology firms in Minnesota found it easier to secure capital, a significant number experienced difficulty. Significant collateral and deposit requirements, imposed by institutional lenders on borrowers, hampered easy access to working capital. Borrowers avoided sources of

Table D-15 Satisfaction with Various Sources of Loans

Types	Number of Respondents	Percent Rating Low 1	2	3	High 4
Stock Offering	38	42%	24%	26%	8%
Venture Capital	45	56	13	20	11
Personal Equity	65	6	25	38	31
Retained Earnings	64	19	27	28	27
Bond Sale	32	50	9	31	9
Commercial Paper	32	56	16	25	3
Commercial Loan	100	13	21	32	34
Government Loan	37	65	11	11	14
Other	28	71	11	7	11

Table D-16 Energy Sources

Sources	Heating Number of Respondents	Heating Percent Rating	Processing Number of Respondents	Processing Percent Rating
Electricity	29	18%	95	76%
Natural Gas	100	63	18	14
Fuel Oil	8	5	1	1
Propane	19	12	9	7
Coal	0	0	0	0
Own Source	1	1	2	2
Other	1	1	0	0
TOTAL	158	100%	125	100%

loans which tied up their financial resources. Instead, borrowing from their internal resources, such as personal equity and retained earnings, rather than from institutional lenders, drew the most satisfaction among the survey respondents.

High technology firms facing barriers were relatively new in the business and employed a smaller workforce. Moreover, high technology firms seeking venture capital expressed extreme dissatisfaction with risk assessments underlying the supply of venture capital within Minnesota. Frequently, these borrowers had to tap the venture capital suppliers located outside the state.

Energy

Energy plays a significant role in production processes among high technology industries in Minnesota. Heating and processing depend significantly on various energy sources such as electricity, natural gas, fuel oil, propane and coal.

Each survey respondent was asked to assess how important each of the energy sources was to their own business operations. In addition, respondents were asked to assess their satisfaction with important characteristics of energy sources.

Electricity and natural gas were the dominant sources of energy processing and heating, respectively. According to Table D-16, 63 percent of the survey respondents indicated

Table D-17 Importance of Energy and Heating Service

Criteria	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
Cost	133	2%	8%	33%	57%
Reliability	132	2	2	22	74
Sufficient Availability	131	2	5	28	66

Table D-18 Satisfaction with Energy and Heating

Criteria	Number of Respondents	Percent Rating: Not Satisfied 1	2	3	Very Satisfied 4
Cost	129	11%	32%	40%	18%
Reliability	128	6	10	40	44
Sufficient Availability	129	3	7	40	50

that natural gas was the leading source of heating energy.

Meanwhile, 76 percent of the survey respondents cited electricity as the primary source of energy processing.

The sample of high technology firms in Minnesota listed cost, reliability and availability as important factors in rating the importance of energy. According to Table D-17, reliability of a particular energy source was a crucial characteristic, followed by availability and then by cost.

Survey respondents were very satisfied with the reliability and availability of their energy service, according to Table D-18. One-half of the survey respondents, who reported sufficient availability as a criterion, reported they were very satisfied. Nearly one-half indicated that they were very satisfied with reliability of their energy source.

Although 40 percent of the respondents were satisfied with the cost of energy, only 18 percent were very satisfied. In fact, a significant proportion expressed less satisfaction with energy costs.

Transportation

Transportation of products is an essential component of a business operation for high technology firms in Minnesota. In fact, 63 percent of the survey respondents reported transportation of products as very important in the operation of their businesses. Only 10 percent indicated it is not important at all.

Primary Mode

At least one-half of the survey respondents considered trucking as the primary mode of transportation. One-fifth indicated freight services, and nearly the same proportion listed air services. Barge and shipping were the least used transportation facilities among high technology firms in Minnesota.

The sample generally expressed satisfaction with their primary mode of transportation (Table D-19). About 57 percent of the survey respondents were satisfied with trucking; another 35 percent were very satisfied with it. Similarly, 52 percent were satisfied with air transportation; another 39 percent stated they were very satisfied. Lastly, 52 percent were

Table D-19 Primary Modes of Transportation

Mode	Number of Respondents	Percent Rating: Not Satisfied 1	2	3	Very Satisfied 4
Truck	117	1%	7%	57%	35%
Air	38	3	5	52	39
Rail	14	40	30	20	10
Barge/Ship	7	25	25	42	8
Freight	44	5	12	52	31

Table D-20 Importance of Transportation Characteristics

Characteristic	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
Speed	188	1%	8%	35%	56%
Cost	188	1	6	24	69
Frequency	171	5	11	40	44
Reliability	183	1	1	25	74
Traceability	177	6	7	36	51
Safety	176	5	15	33	47
Quality of Service	177	2	3	29	66
Preferred Mode Unavailable	89	32	20	25	24

satisfied with freight services; another 31 percent reported they were very satisfied.

Only a few expressed dissatisfaction with any of the primary modes of product transportation. A significant number of survey respondents who relied on rail or water transportation—the least utilized modes of transportation—expressed dissatisfaction with their transportation modes. Forty percent of the survey respondents were not totally satisfied with rail services. Twenty-five percent were dissatisfied with barge and shipping in transporting their products.

Determinants of Satisfaction with Primary Mode

Survey respondents' satisfaction with various transportation facilities depended on how they rated certain criteria related to transportation characteristics. Among the criteria listed in the survey questionnaire were: (a) speed, (b) cost, (c) frequency, (d) reliability, (e) traceability, (f) safety, (g) quality of service, and (h) availability of preferred mode.

According to Table D-20, almost all of the criteria listed in the survey questionnaire were rated as very important by survey respondents, regardless of the primary mode of transportation. Seventy-four percent indicated reliability was very important; 69 percent reported cost was very important; and 66 percent considered quality of service as very important.

Other criteria rated as very important by respondents were speed, traceability, safety, and frequency. On the other hand, nearly one-third of the respondents who assessed the unavailability of their preferred mode of transportation reported it was not important to their business operations.

Table D-21 shows that speed, safety, quality of service, frequency and reliability were the dominant transportation characteristics which

Table D-21 Satisfaction with Transportation Characteristics

Characteristics	Number of Respondents	Percent Rating: Not Satisfied 1	2	3	Very Satisfied 4
Speed	175	2%	13%	63%	22%
Cost	176	9	40	42	9
Frequency	158	2	16	59	23
Reliability	172	3	14	58	25
Traceability	167	1	20	53	26
Safety	165	2	12	60	26
Quality of Service	164	3	16	59	22
Preferred Mode Unavailable	69	6	20	49	25

provided satisfaction to the survey respondents. Cost of transportation offered a relatively least source of extreme satisfaction.

In general, survey respondents indicated general satisfaction with the listed transportation characteristics. Sixty-three percent of the respondents who rated speed reported that they were satisfied; another 22 percent were very satisfied. Respondents rated the safety criterion in a similar fashion. While 42 percent of respondents indicated they were satisfied with cost of transportation, another 40 percent reported they were less than satisfied. As a matter of fact, only 9 percent were very satisfied with the cost criterion.

Did the importance of transportation of products vary by characteristics of high technology firms? A closer look at the survey data showed that transportation was important for all survey respondents regardless of employment size, firm age and type of establishments. In addition, it did not differ among respondents who sold to local, regional, national or international markets.

Business Travel

Business travel, as opposed to transportation of products, was also an important component of business operation among the sample. Sixty-three percent of survey respondents indicated air travel was the primary mode of business travel, while 37 percent listed automobile. However, respondents were satisfied with automobile transportation more than air travel. Eighty-one percent of the survey respondents who relied on automobile for transportation were at least satisfied with it. Only 5 percent of those who were dependent on air transportation were at least satisfied with it as their medium of business travel.

R&D Investments

Research and development efforts today stimulate business firms to adopt innovations which keep them one step ahead of their competitors. The degree of competition is no doubt fierce in the high technology arena where the time lag between scientific ideas and commercially feasible discoveries might have been reduced significantly. This section examines some determinants of R&D efforts among high technology firms in Minnesota today.

As presented in Table D-22, nearly three-fourths of survey respondents reported that investments in R&D were at least important in their business operations. Particularly, 45 percent considered R&D investments as very important. Less than one-fifth reported that R&D investments were not important at all.

Importance of R&D Investments and Characteristics of Firms

Age of firms had no discernible influence on preference for R&D investments. According

Table D-22 Importance of R&D Investments Today

Category	Number of Respondents	Percent Rating
1 Not Important	39	18%
2	26	12
3	56	26
4 Important	98	45
Total	219	100%

Table D-23 Importance of R&D Investments and Age of Firms

	Importance of R&D Investments Percent Rating			
	Not Important			Very Important
Number of Years	1	2	3	4
Less than 5 years	12%	12%	24%	53%
5-10	14	8	19	56
11-25	19	14	24	40
More than 25 years	18	10	29	41

to Table D-23, 53 percent of the high technology firms operating for less than five years rated R&D investments as very important to the success of their business operations. The percentage of firms expressing the same assessment was even higher for firms that had been in business for five to 10 years.

Even among high technology firms that were in business for quite a number of years, R&D investments were rated as very important. Forty percent of the survey respondents who had been in business from between 11 years and 25 years rated R&D investments as very important. Similarly, 41 percent who had been in business for more than 25 years reported the same assessments.

Larger firms valued R&D investments more than smaller firms. According to Table D-24, 64 percent of high technology firms employing more than 500 workers rated R&D investments as very important, in contrast to 9 percent that rated the investments as unimportant. Among firms employing between 100 and 500 workers, 56 percent rated R&D investments as very important. Similarly, only 9 percent reported that R&D investments were not important to their business operations.

Importance of R&D investments among high technology firms with relatively fewer employees was not rated in the same manner as those firms hiring more workers. Among firms with 20 to 99 employees, 47 percent reported that R&D investments were very important while 15 percent reported otherwise. Among firms with less than 20 workers, 34 percent assessed R&D investments as very important while 23 percent reported otherwise.

Importance of R&D investments were similarly rated by high technology firms regardless of types of company (Table D-25).

Fifty-eight percent of high technology firms described as non-independents rated R&D investments as very important to their business operations. Only 5 percent reported otherwise. Among independent companies, 40 percent reported R&D investments as very

Table D-24 Importance of R&D Investments and Size of Firms

	Importance of R&D Investments Percent Rating			
Employment Size	Not Important 1	2	3	Very Important 4
Fewer than 20 workers	23%	13%	27%	34%
20-99	15	13	25	47
100-500	9	9	24	56
More than 500 workers	9	9	18	64

Table D-25 Importance of R&D Investments and Types of Company

	Importance of R&D Investments Percent Rating			
Types of Company	Not Important 1	2	3	Very Important 4
Independent	21%	12%	26%	40%
Others	5	11	22	58

important while 21 percent rated the efforts as unimportant.

As presented in Table D-26, 82 percent of survey respondents relied on their in-house research staff in conducting R&D investments. Few respondents hired human resources from outside institutions such as professional consultants or academic experts.

Only 2 percent of the survey respondents indicated having sub-contracts with the federal government.

Importance of Technology

There is no doubt that technology plays an important role in the production processes of high technology firms. Four important categories of technology were presented to survey respondents: (a) automation, (b) communication of information, (c) quality and productivity improvement, and (d) advanced materials. Each respondent was asked to rate the order of importance of each technology.

Table D-27 indicates that 30 percent of the survey respondents who relied on equipment and systems designed to improve quality and productivity, rated such types of technology as very important. In addition, about 27 percent rated production automation as very important to their business operations.

Similarly, 27 percent of the survey respondents who assessed the importance of advanced materials rated it as a very important technology.

Employment size was positively associated with the importance of certain types of technology, according to the survey data. That is, firms that rated certain types of technology as more important than others employed more workers on the average.

The survey data also showed that high technology firms that rated the listed technology as important to business success were also more likely to rate current R&D investments as concurrently important.

Table D-26 Primary Method of Conducting R&D

Method	Number of Respondents	Percent Rating
In-House	141	82%
Venture with:		
Other Firms	22	13
Academic Institutions	7	4
Federal Government	3	2
TOTAL	173	100%

Table D-27 Importance of Various Types of Technology Today

Technology	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
Equipment Increasing Production Automation	208	16%	27%	29%	27%
Equipment for Communication of Information	206	12	29	38	20
Other Equipment to Improve Quality	204	11	20	39	30
Advanced Materials	203	15	25	33	27

Impact of Taxes and Regulations

In general, business firms dislike taxes and regulations. High technology firms in Minnesota are no exception. Taxes levied on their products and factors of production as well as regulations on their business operations are internalized when entrepreneurs calculate their bottom line figures. Consequently, the impacts of more taxes and regulations are computed in the form of higher business costs and reduced profits.

Survey respondents were asked how they viewed taxes and regulations. Table D-28 illustrates that more than one-half of the survey respondents assessed state taxes and regulations as having a very significant impact on their business operating costs. Cumulatively, nine out of 10 survey respondents reported that taxes and regulations significantly affected their business operations. Only 5 percent indicated that these fiscal measures had no impact at all.

The perception that state taxes and business regulations affected business operations was nearly universal among the sample of high technology firms in Minnesota. In dissecting this near unanimous business antagonism toward taxes and regulations, tax impact ratings were compared according to firm characteristics such as firm size, firm age, and type of business. The analysis revealed no significant differences among the ratings.

Rank of Taxes

In Table D-29, survey respondents who indicated that taxes were significant in their business decisions were asked to rank the impact of eight specific taxes: (a) workers' compensation, (b) unemployment insurance, (c) corporate income taxes, (d) sales taxes, (e) commercial and industrial taxes, (f) R&D tax credit, (g) personal income taxes, and (h) residential property taxes. Not surprisingly, survey respondents rated workers' compensation as having the biggest impact on their businesses. Unemployment insurance

Table D-28 Impact of Taxes and Regulations on Business Costs

Impact	Number of Respondents	Percent Rating
1 None	10	5%
2	15	7
3	75	35
4 Very Significant	117	54
TOTAL	217	100%

Table D-29 Rankings for State and Local Taxes

Taxes	Rank
Workers' Compensation	1
Unemployment Insurance	2
Corporation Income Taxes	3
Commercial & Industrial Taxes	4
Personal Income Taxes	5
Residential Property Taxes	7
Sales Taxes	6
R&D Tax Credit	8

taxes and corporate income taxes trailed next in significance. Personal income taxes ranked fifth, followed by sales taxes and residential property taxes. The R&D tax credit ranked last in importance.

Impact of Regulations

Survey respondents were also asked to rate the impact of regulations relating to the general areas of pollution control and employment. As a public policy, pollution control is quite an important effort, especially in computer-related industries where waste disposal is a significant aspect of business operations.

Under the topic of pollution control, respondents were asked to distinguish the impacts of regulations on air pollution, water pollution, toxic and solid wastes. Under the topic of employment regulations, respondents were asked to rate the impacts of regulations on hiring practices, hours and wages, civil rights, Occupational Safety and Health Administration (OSHA) standards and liability insurance.

The impacts of regulations were evenly dispersed between no impact at all to a very significant impact for all including OSHA regulations and liability insurance requirements. As shown in Table D-30, nearly one-half of the survey respondents reported that liability insurance had a very significant impact. Cumulatively, eight out of 10 respondents reported that liability insurance had at least a significant impact on their business operations. The recent steep escalation in monetary awards granted as settlements in liability disputes had put both insured and insurers at a defensive stance. Business firms needed a relief especially when huge insurance premiums unnecessarily bloated business expenses, consequentially reducing profit margins. As a result, a significant number of businesses opted for self-insurance which unfortunately increased the probability of exposure to financial disaster during liability disputes.

More than one-third of the survey

Table D-30 Impact of Regulations

Regulations	Number of Respondents	Percent Rating: No Impact 1	2	3	Very Significant Impact 4
Pollution Control					
Air Pollution	165	33%	24%	21%	22%
Water Pollution	172	30	23	20	27
Toxic Waste	176	28	19	24	29
Solid Waste	171	23	23	26	28
Employment					
Hiring/Selection Practices	201	20	39	24	16
Hours & Wages	201	25	38	23	13
Civil Rights	200	38	41	16	6
OSHA Standards	201	11	25	26	37
Liability Insurance	198	6	15	33	46

respondents considered OSHA rules as very seriously affecting their business operations. Cumulatively, 63 percent agreed that such restrictions had at least a significant effect on their financial success.

Regulations on waste disposal also significantly influenced survey respondents' ability to survive in the business world. In both toxic and solid waste categories, about 53 percent of the respondents reported that government regulations affected their operations significantly.

On the other hand, 38 percent rated civil rights as having no significant impact on their business operations. With the exception of liability insurance and OSHA regulations, an average of nearly one-third of the survey respondents reported that regulations on pollution control and employment had no impact on their business operations.

Technical Assistance

Survey respondents also evaluated the effectiveness of government-sponsored technical assistance designed to help businesses comply with government regulations. The survey data showed that technical assistance for all regulations were rated by respondents rather anemically. According to Table D-31, less than one-fifth of the respondents viewed technical assistance as excellent. On the other hand, less than one-fifth of the respondents rated the quality of technical assistance poorly with the exception of technical assistance toward compliance with liability insurance. In this particular area, 21 percent of the respondents reported that government efforts to relieve businesses of undue burdens caused by liability insurance were inadequate. While an average of 37 percent of respondents reported the quality of technical assistance to be adequate, a higher average of 42 percent indicated a mark just above the poor rating.

Furthermore, survey respondents indicated that as taxes and regulations became more significant in their business operations, government technical assistance to businesses became less helpful. This was a clear assessment, especially among respondents who were critical on the impact of liability insurance regulation. Interestingly, respondents assessed technical assistance available for compliance with OSHA regulations as relatively higher, although the regulations had significant impact on businesses. More than 50 percent of the high technology firms in Minnesota rated technical assistance to comply with OSHA regulations as good or excellent.

Table D-31 Quality of Technical Assistance

Regulations	Number of Respondents	Percent Rating: Poor 1	2	3	Excellent 4
Pollution Control					
Air Pollution	97	9%	43%	38%	9%
Water Pollution	104	9	41	39	11
Toxic Waste	111	14	37	38	11
Solid Waste	109	13	39	39	10
Employment					
Hiring/Selection Practices	143	9	47	34	10
Hours & Wages	133	9	48	35	8
Civil Rights	109	12	47	37	5
OSHA Standards	155	12	37	37	14
Liability Insurance	163	21	36	33	10

Table D-32 Planned Changes in Staffing

Labor Group	Number of Respondents	Percent Rating: Decrease Significantly 1	2	3	Increase Significantly 4
Management	119	3%	29%	61%	7%
Professionals/Scientists/Engineers	117	4	17	61	19
Technical/Skilled Workers	133	2	14	65	20
Clerical/Sales Workers	121	2	41	55	3
Unskilled	114	14	39	40	6

Business Changes in the 1990s

In response to the dissatisfaction expressed by high technology firms in Minnesota toward availability and quality of labor as well as capital access, businesses have devised strategies to cope with changes which must be implemented in order to deal with the increasing competitiveness in the marketplace. This section examines business strategies that have been or are being implemented to deal with business changes in the early 1990s.

Labor

Business strategies designed to cope with planned changes in labor composition must meet the challenges posed by key entrepreneurial developments. Two important business decisions appeared to drive new business strategies in dealing with labor: (a) planned introduction of new products, and (b) planned adoption of enhanced technology. This section examines the manner in which these two factors are expected to alter the composition of the workforce among high technology firms in Minnesota.

Planned Changes In Staffing

Survey respondents were asked whether they planned changes in staffing in the next five years. Table D-32 shows that a majority of high technology firms in Minnesota planned staff changes in the next five years. The decision to alter staffing patterns affected all occupational groups. Among management, professionals, scientists, engineers, technical and skilled workers, staffing was more often expected to increase rather than decrease. Also, survey respondents planned to make the largest increases among these occupational groups. Sixty-five percent reported that they

would hire more technical and unskilled people within five years. Sixty-one percent indicated more hiring of professionals, scientists and engineers. Another 61 percent reported more demand for personnel in management positions should be expected.

A significant percentage of the survey respondents predicted increases in labor demand even among clerical, sales and unskilled labor. Fifty-five percent of the respondents reported more hiring of clerical and sales workers in five years. Forty percent predicted additional employment of relatively unskilled workers.

Furthermore, a significant percentage of survey respondents planned to decrease employment of clerical, sales and unskilled workers in the next five years. Forty-one percent of the survey respondents indicated that a reduction in employment of clerical and sales people in their business establishments should be expected. Thirty-nine percent reported a similar demise in the use of unskilled labor. This pattern of increased employment of high-skilled workers and decreased employment of low-skilled workers will likely result in more demand for quality training of the labor force in high technology firms in Minnesota.

A significant proportion of the survey respondents who planned to increase the number of workers were recently established in their businesses. In addition, they employed more people on the average.

As mentioned earlier, the three labor groups considered more important by survey respondents were: (a) management, (b) professionals, scientists and engineers, and (c) technical and skilled workers. Respondents who were planning to increase staffing in any one of these labor groups were also inclined to rate these same labor groups as more important. This was especially the case with professionals, scientists and engineers.

In addition, more hiring of key personnel in the future may be attributed to the current difficulty experienced in retaining these employees. Among survey respondents who planned to increase the number of professionals, scientists, engineers and unskilled labor in five years, they experienced somewhat more difficulty in retaining these labor groups at the time of the business survey.

Importance of Major Personnel Issues in the Next Five Years

Similar to their ratings of current importance of personnel issues, survey respondents anticipated that cost-related personnel issues would be very important within the next five years. Rising labor costs, employee health benefits as well as retirement and pension benefits were expected to be very important. Table D-33 illustrates that 63 percent of the respondents reported that employee health benefits would be a very important issue. About 56 percent who reported rising labor costs would be a major issue in five years rated it as very important, while 34 percent rated lack of appropriate skills in a similar manner.

Again, the 43 percent of the survey respondents who reported that day care would not be very important in five years should be interpreted with extreme care. As discussed previously, a significant self-selection bias might have skewed the survey response for this particular question.

Staffing Pattern and Importance of Technology

Survey respondents were asked to rate the importance of the following technology in five years: (a) equipment increasing production automation, (b) systems for communication of information, (c) other systems to improve quality and production, and (d) advanced materials to improve product. As presented in Table D-34, about one-tenth of survey respondents rated each of these different types of technology as unimportant in five years. Otherwise, most of the respondents reported that these types of technology would play crucial roles in their business operations in the next five years. About three-fourths of the respondents predicted that each of these different types of technology would be important or very important in five years.

Table D-33 Major Personnel Issues in Five Years

Reasons	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
Rising labor costs	202	2%	10%	32%	56%
Lack of appropriate skills	197	9	23	35	34
Declining labor supply	198	16	31	33	20
Drug/AIDS testing	198	32	34	22	13
Employee health benefits	202	4	11	21	63
Employee parking/commuting	195	59	24	15	1
Day care	198	43	29	19	9
Organized labor issues	197	50	28	14	7
Work force diversity	197	31	38	21	9
Retirement/pension	200	10	21	47	22
Alternative work schedules	194	28	30	29	12

Table D-34 Importance of Technology in Five Years

Technology	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
Equipment to raise production automation	201	10%	13%	32%	45%
Equipment for communication of information	200	7	19	39	35
Equipment to improve quality and productivity	197	6	14	35	45
Advanced materials	198	11	16	34	39

No significant relationship existed between the number of employees in management positions and importance of technology in five years. However, the number of professionals, scientists, engineers, technical and skilled workers varied directly with the perceived importance of technology in five years. That is, the more important a particular technology would likely be, the greater the demand for professionals, scientists, engineers, technical and skilled workers.

Changes in Staffing and Introduction of New Products

High technology firms that considered R&D investments as most important in the next five years were also likely to plan staff increases within the same period. On the other hand, firms for whom R&D investments were less important during the same period were more likely to plan staff decreases within the same period. According to the survey data, as more investments in R&D would be anticipated in order to develop new products or to improve current production processes, staff increases complementary to technology enhancement would likely grow in the early 1990s.

Similar to R&D investments, survey respondents who were not planning any changes in the staffing pattern were less likely to introduce a new product in the next five years. Just slightly over one-fourth of the respondents indicated that they did not plan to alter their staffing pattern. Also, less than one-fifth percent of the high technology firms

Table D-35 Importance of Training Topics in Five Years

Topic	Number of Respondents	Percent Rating: Not Important 1	2	3	Very Important 4
Manufacturing					
Processes & Equipment	141	4%	10%	31%	56%
Engineering & Scientific Technology	133	6	13	38	44
Quality Improvement & Control	141	4	7	22	67
Marketing & Sales					
Customer Service	146	1%	9%	28%	61%
International Skills	121	29	23	28	20
Foreign Languages	120	55	26	14	5
Marketing & Sales Techniques	136	7	10	33	51
Administrative					
Clerical & Office Skills	135	8	25	45	22
Computer Skills for Administration	136	2	13	44	40
Managerial					
Strategic Planning	138	3	14	33	50
Supervisor & Leadership Techniques	137	4	8	33	55
General					
Basic Skills	133	26	22	27	26
Communication Skills	136	2	12	42	43
Career Development	133	12	38	38	20

in Minnesota did not plan to introduce a new product.

Changes in Training

In response to perceived skill deficiencies that pervade the labor market today, high technology businesses in Minnesota have devised strategies to improve their human capital. Rather than relying on various institutional learning centers, firms looked upon their internal training programs in order to provide efficient avenues to improve workers' skills. This section examines the general nature of business strategies designed to improve skill formation.

As described earlier, the 14 training topics listed in the survey questionnaire were categorized under five groups: (a) manufacturing, (b) marketing and sales, (c) administration, (d) managerial, and (e) general areas. Survey respondents were asked to indicate which topics were significantly important to them.

In manufacturing, training for quality improvement and control was judged the most important training topic in the next five years – 67 percent of the survey respondents said so (Table D-35). This was followed by training in processes and equipment where 56 percent of the respondents rated it as very important. In marketing and sales, 61 percent of the respondents reported that training for customer service would be a very important training topic. About 51 percent reported that training in order to acquire better marketing and sales techniques would be a very important topic. In managerial, training in order to acquire better supervisory and leadership techniques was reported to be the most important topic; 55 percent of the respondents agreed. Exactly one-half reported that training in strategic planning would be a very important topic in five years.

Several topics drew a lack of interest among most survey respondents. Fifty-five percent of the respondents who gave their assessments on the value of acquiring foreign languages rated the topic as unimportant. Similarly, 29 percent indicated that acquiring international skills was not important either. About 26 percent rated acquiring basic skills as not important in their business operations.

Table D-36 Changes in Transportation Modes in Five Years

Mode	Number of Respondents	Percent Rating: Decrease Significantly 1	2	3	Increase Significantly 4
Truck	111	4%	18%	46%	32%
Air	155	7	10	55	29
Rail	148	31	22	25	22
Barge & Ship	150	16	23	50	12
Freight	148	4	6	55	35

Transportation

Nearly two-thirds of high technology firms in Minnesota agreed that transportation of products has played a crucial component in their business operations. Basically, these businesses have relied on the nation's highway infrastructures for transporting their products. Thus, the quality of the highway infrastructures—in addition to cost and reliability—was indeed important to these firms.

This section examines businesses' planned changes in primary transportation modes and their determinants as well as emerging transportation issues in the 1990s.

Planned Changes in Transportation Mode

Expected increases in the utilization of a high technology firm's primary mode of transportation were related to survey respondents' degree of satisfaction. For example, more frequent use of air and freight services—rather than rail, barge or shipping—was associated with higher levels of satisfaction with these transportation services.

Among transportation modes where changes were expected in the next five years, 90 percent of the survey respondents reported at least an increase in the use of freight services (Table D-36). Eighty-four percent projected at least an increase in the use of air services. Seventy-eight percent indicated a rise in trucking services. Thirty-one percent reported that the use of rail services was expected to decrease significantly in the next five years. Also, 16 percent predicted a decline on reliance in barge and shipping.

Determinants of Changes in Transportation Mode

In assessing the effectiveness of their transportation modes, the survey respondents agreed that reliability, cost and quality of service were the most important transportation characteristics. For those respondents who planned to increase the frequency in using their main transportation mode, their general satisfaction with these transportation characteristics stimulated the decision to increase frequency in using these various transportations. For those respondents who planned to shift away from their primary transportation mode, dissatisfaction with the primary mode's transportation characteristics essentially drove them to seek for alternative transportation modes.

Emerging Transportation Issues

Twelve transportation issues that would likely emerge in the next five years were presented to survey respondents. These issues include: (a) reduction of air services, (b) reduction in quality of air services, (c) airport congestion, (d) lack of rail service, (e) deteriorating roads and bridges, (f) inadequate shipping services, (g) poor road access, (h) road congestion, (i) lack of mass transit, (j) transport of hazardous materials, (k) increasing costs, and (l) reduction in trucking service. Each respondent was asked to identify which of the emerging issues concerned them most.

Essentially, transportation issues that directly affected business costs were rated most

Table D-37 Importance of R&D Investments in Five Years

Importance	Number of Respondents	Percent Rating
1 Not Important	16	8%
2	16	8
3	48	24
4 Very Important	122	60
TOTAL	202	100%

severely. As expected, the increasing cost of transportation was considered by far the most severe inhibitor of business growth in the next five years.

As stated earlier, a significant number of the survey respondents relied on air transportation as their primary mode of business travel. While they are generally satisfied with the convenience of air travel, respondents pointed out that some issues related to air travel might likely emerge in the next five years. As the nation's airport infrastructure nears maturity and population increases, respondents raised important issues such as reduction in air services, reduction in quality of air services and airport congestion.

Important Technology and R&D Investments

The drive to improve production processes results in adoption of better technology. Innovations are achieved through investments in research and development. In the high technology industry, seeking better technology through more R&D efforts is often presumed. This section examines how high technology firms in Minnesota plan to tackle efforts toward adopting better technology in the near future.

As presented in Table D-37, 60 percent of the survey respondents indicated R&D investments would be very important to their business operations in the next five years. (In Table D-23, 45 percent of the survey respondents rated R&D investments as currently very important to their business operations.) Cumulatively, eight out of 10 high technology firms in Minnesota reported that R&D investments would at least be important in the near future. Only 8 percent reported R&D investments would not be important.

Also, among survey respondents who reported that R&D investments were more likely to be important in the next five years, the survey data revealed that a higher share of their gross sales were generated from national and international markets rather than local markets.

Essentially, R&D investments sought to advance existing technology. The survey results showed a positive relationship between importance of R&D investments and importance of the various types of technology. Particularly, firms rating R&D investments as very important in five years were particularly more likely to rate advanced materials as an important technology during the same period.

A Role for Government

It is common for businesses to first look at the private sector for solutions to obstacles in their profit making paths. This is understandable. Using the price system as an appropriate signal in order to attain efficient allocation of scarce resources, the linkages of markets—both product and factor markets—make it possible for firms to implement business decisions in pursuit of their interests. However, there are cases when markets fail in their designated roles; business firms are forced to seek elsewhere for remedies to their economic obstacles. Through its various institutions, government can thus play an

Table D-38 Important Government Services

Services	Number of Respondents	Not Important 1	2	3	Very Important 4
Education					
Primary/Secondary	200	8%	4%	31%	57%
Higher	202	6	10	31	52
Libraries	197	12	31	35	22
Social Services					
Public Welfare	199	45	32	15	8
Hospitals	199	16	26	34	24
Health	199	12	20	41	28
Employment Security	197	21	41	29	9
Transportation					
Highway	200	9	22	34	35
Air	198	18	26	29	27
Water	195	64	22	11	4
Public Safety					
Police	200	9	27	40	25
Fire	200	6	23	39	32
Corrections	194	28	37	20	15
Protective Regulations	195	29	40	23	9
Environment & Housing					
Natural Resources	198	22	28	28	22
Parks & Recreation	199	25	32	28	16
Housing & Community Development	199	29	37	24	11
Sewerage	198	17	31	35	17
Other Sanitation	191	18	39	27	16

important role in providing a solution to what ails the market.

Perception of Importance of Government Services

Education was easily recognized the most important service that state and local governments could provide, according to the sample of high technology firms in Minnesota (Table D-38). About 57 percent of the survey respondents viewed government services in providing primary and secondary education as very important. About 52 percent reported that government's role in fostering higher education was also very important. Other government services of importance to survey respondents included fire safety, police protection, health services, highway and air transportation.

Among the fiscal services that Minnesota high technology firms rated as not important to their business operations were water transportation and public welfare. Sixty-four percent of the survey respondents reported that water transportation was not important at all, while close to one-half rated public welfare as unimportant. The low rating given to public support for water transportation was not surprising since only 3 percent of the sample of high technology firms in Minnesota had used it as a primary mode to transport their products.

Other government services rated significantly as less important included: employment security, protective regulations, corrections, housing and community development, parks and recreations, sewerage and libraries.

Determinants of Importance of Government in Education

The delivery of government services in primary and secondary education as well as higher education was rated highly by the sample. Regardless of employment categories, survey respondents placed more importance

Table D-39 Importance of Government in Higher Education and Size of Firms

	Percent Rating			
	Not Important			Very Important
Employment Size	1	2	3	4
Fewer than 20 workers	8%	12%	33%	48%
20-99	9	9	33	48
100-499	0	10	26	65
More than 500 workers	0	0	27	73

Table D-40 Importance of Government in Elementary and Secondary Education and Size of Firms

	Percent Rating			
	Not Important			Very Important
Employment Size	1	2	3	4
Fewer than 20 workers	10%	3%	29%	58%
20-99	8	5	28	59
100-499	3	3	42	52
More than 500 workers	0	18	36	45

on the government's role in higher education (Table D-39).

Nearly three-fourths of survey respondents employing more than 500 workers assessed government as very important in fostering higher education. Sixty-five percent of the respondents with between 100 and 500 employees expressed the same opinion. Among firms employing between 20 and 99 workers, nearly one-half of the respondents reported that government had a very important role in the delivery of higher education. The same proportion of the respondents with fewer than 20 workers agreed.

The survey data also showed that plans to introduce a new product in the near future affected a survey respondent's perception of the importance of government in education programs. Firms planning to introduce a new product gave government's participation in the delivery of higher education especially high marks. As a matter of fact, more than 50 percent of the respondents planning to introduce a new product reported that government was very important in fostering higher education. Among those respondents who were not planning to introduce a new product, only 32 percent shared the same assessment.

Regardless of employment sizes, high technology firms similarly reported that government had a very important role in the delivery of elementary and secondary education (Table D-40). Fifty-eight percent of survey respondents with fewer than 20 workers reported the opinion, while 10 percent indicated that government had no important role. Among respondents with between 20 and 99 employees, 59 percent rated government as a very important agent in the delivery of elementary and secondary education; only 8 percent thought otherwise.

The assessment that government had a very important role to play in elementary and secondary education was no different among larger firms. Forty-five percent of the survey respondents with more than 500 workers

Table D-41 Importance of Government in Health Services and Size of Firms

	Percent Rating			
	Not Important			Very Important
Employment Size	1	2	3	4
Fewer than 20 workers	14%	18%	37%	31%
20-99	13	20	37	29
100-499	0	27	57	17
More than 500 workers	9	18	45	27

reported that opinion. Among respondents employing between 100 and 500 workers, 52 percent expressed the same opinion.

The perception that government was important in the basic delivery of education services was also related to the rating of the importance of R&D investments in the next five years. That is, high technology firms in Minnesota that planned to emphasize more R&D efforts in the future preferred more government participation in the delivery of primary and secondary education. More than two-thirds of survey respondents who reported that R&D efforts would be at least somewhat important in the next five years rated government expenditures in primary and secondary education as important. Again, firms rating R&D efforts and investments as important in the future gave higher ratings of importance to the role of government in higher education.

Determinants of Importance of Government in Health Services

There is an important role for government in maintaining efficient delivery of health services to its citizens, according to high technology firms in Minnesota. Table D-41 reveals that firms employing more workers expressed strongly the opinion than firms employing fewer workers. About 57 percent of the survey respondents representing firms with between 100 and 500 workers indicated that government had an important role to play in the delivery of health services; another 17 percent reported that government had a very important role in that area. Forty-five percent of the respondents representing firms employing more than 500 workers echoed an important place for government; another 27 percent reported a very important role for government.

Among firms employing fewer workers, 37 percent of the survey respondents employing between 20 and 99 reported that government had an important role in the delivery of health services; 13 percent reported the contrary opinion. Similarly, 37 percent of the respondents employing fewer than 20 workers rated government as important in health services; 14 percent expressed the contrary opinion.

Determinants of Importance of Government in Transportation

Ratings on the importance of government in air transportation varied systematically by employment sizes. Survey respondents representing bigger firms assessed the government's role in air travel as more important than respondents representing smaller firms. Table D-42 illustrates that 45 percent of the respondents employing more than 500 workers viewed the government as very important in sustaining air transportation infrastructures. About one-third representing firms employing between 100 and 500 workers rated air transportation expenditures similarly.

Thirty-one percent of the survey respondents employing between 20 to 99 workers assessed a very important role for government in maintenance of air transportation. On the other hand, only 18 percent of respondents

Table D-42 Importance of Government in Air Transportation and Size of Firms

	Percent Rating			
	Not Important			Very Important
Employment Size	1	2	3	4
Fewer than 20 workers	27%	31%	23%	18%
20-99	15	25	29	31
100-500	10	20	37	33
More than 500 workers	0	18	36	45

Table D-43 Importance of Government in Highway Transportation and Size of Firms

	Percent Rating			
	Not Important			Very Important
Employment Size	1	2	3	4
Fewer than 20 workers	14%	18%	30%	38%
20-99	7	23	37	33
100-500	7	30	33	30
More than 500 workers	0	36	27	36

from firms with fewer than 20 workers expressed the same opinion. A majority of that group were less enthusiastic about government participation in proper maintenance of air transportation infrastructures.

Survey respondents' attitudes toward government participation in the maintenance of the nation's highway infrastructures were quite different however. In all of the employment categories, respondents agreed that government had at least an important role in maintaining a viable highway system (Table D-43).

In general, at least 60 percent of the survey respondents in each employment group reported that government was at least important in proper maintenance of the nation's highway system.

Determinants of Importance of Government in Public Safety

High technology firms gave more importance to government's role in providing public safety services, particularly in the area of fire safety and police protection. As presented in Table D-44, 46 percent of the survey respondents representing firms employing fewer than 20 workers assessed government as having at least an important role in providing fire services. On the other hand, another 35 percent in this particular group reported that government had a very important role.

Among employers with between 20 and 99 workers, 35 percent of the respondents noted that government had an important role, while another 28 percent reported that government had a very important role. And among businesses with between 100 and 500 workers, 37 percent reported that government had an important role, while another 30 percent reported that government had a very important role.

As presented in Table D-45, the government's role in maintaining law and order received good marks especially among high technology firms with a relatively fewer number of

Table D-44 Importance of Government in Fire Services and Size of Firms

	Percent Rating			
	Not Important			Very Important
Employment Size	1	2	3	4
Fewer than 20 workers	6%	13%	46%	35%
20-99	4	33	35	28
100-500	10	23	37	30
More than 500 workers	9	36	27	27

Table D-45 Importance of Government in Police Protection and Size of Firms

	Percent Rating			
	Not Important			Very Important
Employment Size	1	2	3	4
Fewer than 20 workers	10%	16%	46%	28%
20-99	8	35	36	21
100-500	10	27	43	20
More than 500 workers	9	45	27	18

employees. Forty-six percent of the survey respondents representing firms employing fewer than 20 workers agreed that government had an important role in police protection, while another 28 percent reported that government's role in police protection is very important. Among firms with 20 to 100 workers, 36 percent reported that government had an important role, while another 35 percent had less than an enthusiastic assessment. However, in that group about one-fifth reported that there is a very important role for government in police protection.

The assessment varied among relatively larger high technology firms. While 43 percent of firms employing between 100 and 500 workers reported that government is indeed important in police protection; 45 percent of firms employing more than 500 workers reported a less than important role for government. In each group, about one-fifth of the survey respondents agreed that there is a very important place for government in the maintenance of peace and order.

Attitudes Toward Government Spending

In relation to the success of their businesses in Minnesota, the sample focused collectively on 13 areas where government spending in Minnesota was perceived to be too high. The perception was quite distinct in three government programs: (a) public welfare, (b) water transportation, and (c) employment security (Table D-46). Sixty-four percent of the survey respondents preferred less government spending on public welfare. Fifty-two percent expressed a similar sentiment on water transportation, and 38 percent reported that less should be spent on employment security.

Most of the high technology firms in Minnesota agreed that it is prudent to maintain current levels of government expenditures in at least most of the identified spending areas. There were specific areas, however, where a significant number of survey respondents, though not the majority, indicated that more government spending might be warranted. These areas included: (a)

Table D-46 Spending Preferences Acceptable to Survey Respondents

Services	Number of Respondents	Percent Rating: Spend Less 1	2	3	Spend More 4
Education					
Primary Education	194	10%	33%	37%	21%
Higher Education	194	11	32	39	18
Libraries	188	12	46	35	8
Social Services					
Public Welfare	187	64	27	6	3
Hospitals	186	22	48	24	7
Health	188	16	35	39	18
Employment Security	190	38	38	18	2
Transportation					
Highway	190	12	34	38	16
Air	188	20	43	26	11
Water	182	52	57	10	2
Public Safety					
Police	191	8	38	41	13
Fire	192	8	35	41	15
Corrections	187	20	44	29	7
Protective Regulations	186	32	48	17	3
Environment & Housing					
Natural Resources	187	14	46	28	12
Parks & Recreations	188	19	45	24	12
Housing & Community Development	188	27	49	18	6
Sewerage	187	14	48	31	8
Other Sanitation	179	15	49	29	8

primary and secondary education, (b) higher education, (c) health, (d) highway and air transportation, and (e) police and fire protection. Nearly one-fifth of the respondents in each category reported that they were willing to accept more government spending in these vital areas of concern.

Spending Preferences in Education

In general, only a few of the survey respondents agreed that government should spend less on education—both in the elementary and secondary as well as higher education. Most of the respondents agreed that government should at least maintain current levels of government spending in education. Table D-47 illustrates that 40 percent of high technology firms with more than 500 workers reported that government should at least maintain the present levels of expenditures allocated toward elementary and secondary education. About 20 percent recommended that government should actually spend more.

Among firms with 100 to 500 employees, about 60 percent reported that government should at least maintain current spending levels. The assessment was even stronger among firms with between 20 and 99 workers and those with fewer than 20 workers where 70 percent and 68 percent, respectively, had agreed to the level of government spending in elementary and secondary education. In each of these groups, less than one-fourth of the respondents recommended that government should spend more.

Table D-48 presents essentially a similar spending preference for higher education which high technology firms in Minnesota could tolerate. About 60 percent of the firms with more than 500 workers recommended that government should at least maintain current expenditures toward higher education. Another 30 percent reported that government

Table D-47 Spending Preferences in Primary and Secondary Education and Size of Firms

	Percent Rating			
	Spend Less			Spend More
Employment Size	1	2	3	4
Fewer than 20 workers	12%	30%	38%	20%
20-99	8	37	37	18
100-500	13	23	37	27
More than 500 workers	0	40	40	20

Table D-48 Spending Preferences in Higher Education and Size of Firms

	Percent Rating			
	Spend Less			Spend More
Employment Size	1	2	3	4
Fewer than 20 workers	16%	26%	45%	13%
20-99	10	38	33	19
100-500	7	30	43	20
More than 500 workers	10	40	30	30

should increase current levels of government spending.

Among firms with between 100 and 500 workers, 73 percent recommended that government should at least maintain current levels of spending; 71 percent of firms with between 20 and 99 workers agreed; and, 71 percent of firms with fewer than 20 workers expressed a similar opinion. In each of these groups, less than one-fifth of the respondents recommended that government should spend more.

A significantly higher percentage of survey respondents who recently established their businesses recommended more government spending in higher education. Forty-eight percent indicated that they welcome somewhat more government spending in higher education, while 24 percent agreed that more government spending in higher education was warranted. Among those firms that have been in business for at least 10 years, 36 percent of the respondents favored somewhat more government spending in higher education; 16 percent expressly favored more spending.

According to the survey data, high technology firms that experienced difficulty in recruiting professionals, scientists and engineers were more likely to support increased government spending in higher education. Thirty-five percent of the survey respondents experiencing extreme difficulty in recruiting these workers expressed support for somewhat more spending in higher education; another 35 percent expressed strong support for more spending. Among respondents who expressed less difficulty in recruitment, 31 percent chose to support more spending in higher education.

Similarly, survey respondents who experienced difficulty in retaining employees in management positions were more likely to prefer an increase in spending for primary and secondary education. Nearly one-half of the respondents preferred somewhat more spending, while another 26 percent preferred more spending. On the other hand, 32 percent of the respondents who experienced less difficulty in retaining management people chose somewhat more spending in primary and secondary education.

Table D-49 Spending Preferences in Health Services and Size of Firms

	Percent Rating			
	Spend Less			Spend More
Employment Size	1	2	3	4
Fewer than 20 workers	13%	26%	26%	13%
20-99	13	29	41	9
100-500	15	35	35	3
More than 500 workers	18	45	18	0

Table D-50 Spending Preferences in Highway Transportation and Size of Firms

	Percent Rating			
	Spend Less			Spend More
Employment Size	1	2	3	4
Fewer than 20 workers	12%	23%	34%	10%
20-99	9	27	35	20
100-500	9	47	18	12
More than 500 workers	9	27	55	0

Survey results also indicated that about one-fifth of the survey respondents who were planning to introduce a new product preferred more government spending on primary and secondary education, while only 10 percent preferred less. Among respondents who were not planning to introduce a new product, 13 percent preferred more government spending while 3 percent preferred less.

Spending Preferences in Health Services

A majority of the high technology firms in Minnesota recommended that government should at least maintain current levels of government spending in health services. As presented in Table D-49, 63 percent of survey respondents representing firms with more than 500 workers shared that opinion. Among firms with between 100 and 500 workers, 70 percent agreed. The survey data were no different among the relatively smaller firms: 70 percent of firms with between 20 and 99 workers and 52 percent of firms with fewer than 20 workers recommended that government should at least maintain current levels in government expenditures in health services.

In each of these groups, note that the percentage of survey respondents who preferred more government spending health services is much less than the percentage of respondents who preferred to reduce government expenditures in health services.

Spending Preferences in Transportation

Most of the survey respondents agreed that government spending on highway transportation should at least be maintained at current levels, according to Table D-50. Among firms with fewer than 20 workers, 57 percent of the respondents expressed the same opinion. About 12 percent recommended less government spending, while another 10 percent recommended more spending. Among firms with between 20 and 99 workers, 62 percent reported that government should maintain at least current levels in government spending; another 20 percent preferred more government spending while 9 percent preferred less.

Table D-51 Spending Preferences in Air Transportation and Size of Firms

	Percent Rating			
	Spend Less			Spend More
Employment Size	1	2	3	4
Fewer than 20 workers	25%	46%	22%	7%
20-99	19	46	22	13
100-500	17	34	31	17
More than 500 workers	10	40	50	0

Among firms with between 100 and 500 workers, 65 percent recommended that government should maintain the status quo in expenditures on highway transportation; 12 percent reported they preferred more spending, while 9 percent reported otherwise. Among firms with more than 500 workers, 82 percent recommended maintenance of current levels of government spending in highway transportation; only 9 percent preferred less.

These results suggest that high technology firms that were using the highway system to transport their products recommended more government spending for proper maintenance of highways and feeder roads.

Survey respondents who perceived deteriorating roads and bridges as a serious problem wanted more government spending in transportation; 33 percent of the survey respondents stated that opinion. Forty-six percent preferred maintenance of current levels of spending. Among the respondents who did not share this view, 21 percent reported that government spending on highway services was not important and hence they preferred less government spending.

Survey respondents who rated other road-related transportation problems such as poor road access, road congestion, and lack of mass transit as serious problems also preferred more government spending on transportation.

Most of the survey respondents also agreed that government spending on air transportation should be maintained at current levels. According to Table D-51, 90 percent of firms with more than 500 employees recommended current levels of government spending in the maintenance of air transportation; 10 percent preferred less. About 75 percent of firms with between 100 and 500 employees reported that they preferred the current spending pattern; 17 percent preferred less spending, while another 17 percent preferred more spending.

Among firms with between 20 and 99 employees, 68 percent of the survey respondents recommended that government should maintain current levels of spending; 19 percent opposed the idea and actually preferred less spending, while 13 preferred more spending. Almost a similar pattern described the distribution among firms with fewer than 20 workers.

Again, firms using air transportation as their primary mode preferred more government spending on air transportation. This is especially true for those respondents who reported that spending on air transportation was directly related to the severity of air-related transportation issues.

Among survey respondents who viewed reduced air service availability a severe problem, 50 percent preferred more government spending on air transportation. Twenty percent preferred somewhat more spending. Among the survey respondents who considered reduced air service quality a severe problem, 43 percent preferred more government spending while 14 percent preferred less. And among the respondents who found airport congestion a severe problem, 46 percent preferred more government spending while 23 percent preferred less.

Table D-52 Spending Preferences in Fire Safety and Size of Firms

	Percent Rating			
	Spend Less			Spend More
Employment Size	1	2	3	4
Less than 20 workers	7%	23%	37%	13%
20-99	4	42	35	11
100-500	15	32	21	18
More than 500 workers	9	9	55	9

Table D-53 Spending Preferences in Police Protection and Size of Firms

	Percent Rating			
	Spend Less			Spend More
Employment Size	1	2	3	4
Fewer than 20 workers	9%	26%	37%	10%
20-99	3	43	38	9
100-500	15	32	24	15
More than 500 workers	9	27	27	8

Spending Preferences in Fire and Police Protection

A majority of the survey respondents recommended that government expenditures in police and fire protection should be at least maintained at current levels. According to Table D-52, 60 percent of the firms with fewer than 20 workers shared the opinion; 13 percent preferred more spending while 7 percent preferred less. Among firms with 20 to 99 workers, 77 percent recommended at least a current level of spending; 11 percent preferred more, while only 4 percent preferred less.

Among firms employing between 100 and 500 workers, 53 percent recommended that government spending in fire safety should be maintained at current levels; 18 percent recommended more spending while 15 percent recommended less. Among firms with more than 500 workers, 64 percent recommended that current levels of government spending should be at least maintained; 9 percent recommended more while 9 percent preferred less.

Similarly, a majority of the survey respondents recommended that current levels of government spending for police protection should be maintained. According to Table D-53, 63 percent of firms employing fewer than 20 workers agreed that current levels of government spending for police protection should be maintained; 10 percent argued for more while 9 percent recommended less. Among firms with between 20 and 99 workers, 81 percent stated that current government spending should be maintained; 9 percent preferred more spending in contrast to 3 percent who opted for a cut.

Among firms with between 100 and 500 workers, 56 percent agreed that current spending should at least be maintained; 15 percent argued for more while another 15 percent recommended a reduction in government spending for police protection. Lastly, 54 percent of firms employing more than 500 workers preferred at least a continuance of current levels of spending.

Conclusion

Survey respondents pointed out that management and highly-trained technical workers such as engineers, professionals, scientists and other skilled workers, were not difficult to retain. However, they were somewhat difficult to recruit. Clearly, this is a reflection of a competitive labor market among these occupational groups. Recruitment difficulty might be explained by potential employees choosing among the array of potential employers based on their salary, perk and benefit levels. Once the decision to work for a specific firm is made, employees are not likely to jump ship soon and move to other firms. The likely variance around the sum of wages and benefits among the different firms in the industry may be so small—by virtue of the competitiveness in the labor market—that employee retention becomes an insignificant business dilemma.

Scarcity of specific skills in the labor market is perceived to be a problem especially in the near future. Such skill shortages are currently addressed by each survey respondent via their in-house training programs. Indeed, most of the firms put a high premium on their internal programs. These training programs emphasize topics on quality control and improvement, processes and equipment, marketing and sales techniques, supervisor and leadership techniques as well as strategic planning. Direct beneficiaries are workers with deficiencies in specific skills that individual firms require in their business operations.

More than 60 percent of the random sample sought capital during the past five years and a majority of them were quite successful. The data revealed that most of the borrowers—with low debt-to-equity ratios—relied essentially on their personal equity and retained earnings, besides commercial loans, as popular sources of loans.

Less than one-half of the survey respondents experienced some difficulty in securing capital. Unique risk assessments exercised by lenders in the capital market as well as significant debt burdens accumulated by borrowers mainly explained the difficulty in securing capital. Survey respondents who experienced difficulty in securing venture capital cited the propensity of Minnesota venture capitalists to finance less risky projects. Thus, these entrepreneurs relied on venture capitalists from outside of the state.

Most of the capital raised is used as working capital. The acquisition of new equipment as well as inventory are popular means of applying acquired working capital. Surprisingly, nearly one-third of the sample used capital for research and development purposes.

In general, survey respondents are satisfied with Minnesota's infrastructure for energy and transportation. Natural gas is the dominant source for heating, while electricity is the prime source of energy for processing. In assessing the importance of such energy sources, the respondents examined cost, reliability, and availability as reliable characteristics. They are generally satisfied with these supply characteristics.

Trucking is the primary mode of transportation, according to most of the survey respondents. Barge and shipping as well as rail services are the least used means of transportation among high technology firms in Minnesota.

In assessing the importance of various transportation characteristics, survey respondents listed cost, reliability and availability as prime characteristics. Based on these factors, they are generally satisfied with their primary modes of transportation.

While most of the survey respondents adhered to the importance of R&D investments, independent firms that employed fewer workers did not rely on it as much as independent firms with a larger workforce. Of those firms which relied on R&D for innovations, they depended on their R&D staff primarily in conducting research. As expected, companies that emphasized technology in their business operations (as in the case with high technology firms) put a lot of stress on R&D investments.

There is no doubt that taxes and regulations

are two economic issues that drew a lot of ire from the business community in Minnesota. The response from the sample of high technology firms is no exception. Survey respondents were asked to rank the impact of taxes and regulations on their business operations. Top on the list is workers' compensation, followed by unemployment insurance taxes and corporate income taxes, respectively. Other significant deterrents to business often cited by respondents were OSHA regulations as well as liability insurance. In general, high technology firms are divided on their opinion on the quality of government-sponsored technical assistance designed to relieve them of unnecessary burdens of complying with government regulations.

Likely changes in the business environment during the early 1990s will affect certain decision areas like labor, training for skill enhancement, capital access, transportation, technology and the role of government in the Minnesota marketplace.

As a group, high technology firms in Minnesota projected expansion in the employment of certain skill areas, particularly management, professionals, scientists, engineers as well as other technical and skilled workers. However, such optimism is tempered by perceived shortages of appropriate skills. Currently, the sample of high technology firms in Minnesota reported difficulty in recruiting workers in the above categories.

As a result, firms sought their internal training programs in order to train workers to acquire skills unique in their production operations. A majority of the random sample revealed that businesses seemed to be successful in fulfilling this specific training role. Still, these firms pointed to the primary and secondary education institutions as the basic provider of raw skills training.

The growing importance of technology such as automation, communication of information as well as advanced materials implied the growing importance of skilled workers to complement such advances in technology. The capacity of colleges and universities to supply well-trained technicians depends significantly on the efficacy of primary and secondary institutions to supply college students who are well-trained in critical thinking. Hidden among the responses seemed to be the notion that part of the anticipated problem in supply of skilled workers is due to systemic deficiencies in the delivery of primary and secondary education. There is no major emphasis on enhancing problem-solving skills at that level of education. Thus, more than one-half of the respondents rated primary and secondary education institutions as unsatisfactory in providing basic skills training.

Only a small percentage of the survey respondents reported that there will be major changes in their transportation facilities. As indicated, most of them are currently satisfied with the cost, reliability, and quality of their major transportation facilities.

Transportation issues that will likely emerge in the next five years are related to highway transportation. The maintenance of the highway and feeder road infrastructure definitely registered as a primary concern. This is not surprising at all since most of the survey respondents rely on the highway system for their basic transportation. In the same manner, respondents who indicated air services as their primary means of transportation, particularly on business travel, expressed their concerns on certain air-related issues like airport congestion and reduction in air service availability and quality. There is no doubt that significant transportation issues are more likely to emerge from more specific concerns which business companies tend to emphasize.

Firms' decisions to introduce a new product within five years stimulate future emphasis on R&D in business operations. Most of the survey respondents agreed that the introduction of a new product would be part of their medium-term forecasts and that innovations in products and processes through R&D would play a significant part in their business plans. However, financial limitations placed on business operations dampened potential business success. Although most of the high technology firms indicated that there

was no significant problem in securing capital, there is a gnawing perception—validated by a significant number of entrepreneurs in the random sample—that indeed some Minnesota capital lenders, represented by venture capitalists, were not risky enough to meet the needs of business expansions.

In areas where businesses perceive economic difficulties, they look at the private sector initially for solutions. This is manifested in examples of how businesses in general deal with shortages in key inputs like labor supply and capital access. However, there is evidence which supports the hypothesis that the marketplace is critically limited to dealing a solution to important problems faced by the business world. An example is the perceived shortages in labor. Currently labor shortages, as defined more closely by members of the high technology firms in Minnesota, do not refer generally to quantity, but rather to quality in problem-solving skills. True, universities can supply a sufficient number of technicians and managers in order to meet the demand in the labor market. But the inability of some of these workers to solve problems in an analytical manner draws criticisms from businesspeople. This is indeed a potentially serious problem.

In response to increasing globalization of the marketplace, as well as intensive competition within, there may be a fundamental shift in worker-manager relationships on the plant floor. Confronted with opportunities to solve problems on the plant floor, managers then made exclusively important decisions. Now, workers organized in teams are increasingly involved in solving problems in the workplace.

This is a business problem that labor markets may solve in the long run; entrepreneurs will simply hire workers with the required analytical skills. But if the educational institutions fail in their role to train students to be analytical, then this specific skill shortage will simply drive wage rates upward, thus raising the cost of production in the process.

In areas where markets have clearly played out their role and business problems that arise are unsolvable through market interactions, a role for government participation is justified. In dealing with specific skill shortages, increases in the social benefit can be achieved by a public policy that seeks to alter the school environment, directly or indirectly, in order to address and correct the problem of skill shortages. In dealing with difficulties experienced by entrepreneurs in securing working capital, government may use the "infant-industry" justification or similar incentives to aid business start-ups and expansions in securing capital. In dealing with difficulties experienced by chief executive officers in complying with fiscal policy measures, relief to businesses in the form of positive legislation especially in key areas like workers' compensation and liability insurance is indeed helpful. Thus the benefits to Minnesota, as a whole society, are measured in the form of higher income and employment.

There are key infrastructures crucial to the success of anticipated business changes in the early 1990s which the public sector can efficiently provide. Maintenance of roads, bridges, airports and technical support services are identified by the survey respondents from the high technology industry to be the domain of the government. Larger firms, in particular, emphasized an important role for government in maintenance of the nation's airports and their support services. In addition, police protection and fire services are important government services that government must pay increased attention to in order to complement private sector efforts to pursue business changes in the near future.

Lastly, most of the survey respondents recommended that government should at least maintain current levels of government expenditures in these fiscal areas. In anticipation of structural business changes in the near future, there is a small but significant percentage in the random sample that recommended more government spending in the fiscal areas described above.

References

Barkley, D., "The Decentralization of High Technology Manufacturing to Nonmetropolitan Areas", unpublished manuscript, Department of Agricultural Economics, University of Arizona, no date.

Birch, David, "Prematurely Gray?," *INC.*, November 1988.

Brown, D., "States, Technology, and Jobs," *Technology Review*, May/June 1989.

Daniels, T. and M. Lapping, "The Rural Crisis and What to Do About It: An Alternative Perspective," *Economic Development Quarterly*, November 1988.

Glasmier, A., "Factors Governing the Development of High Technology Industry Agglomerations: A Tale of Three Cities," *Regional Studies*, Volume 22, Number 4, May 1987.

"The Japanese Technopolis Programme," *International Journal of Urban and Research*, June 1987.

Inman, B. and D. Burton, "Technology and Competitiveness: The New Policy Frontier," *Foreign Affairs*, no date.

Markusen, A., Hall, P. and A. Glasmier, *High Tech America*, Boston: Allen & Unwin, 1986.

MIT Commission on Industrial Productivity, *Made in America*, 1986.

Office of Technology Assessment, "Technology, Innovation and Regional Economic Development," OTA-STI-238, Washington D.C., July 1984.

Rees, J., "Industrial Innovation: Linking New Production Methods and Regional Growth Rates," *Commentary*, Spring 1986.

Sabel, C. Herrigel et al., "How to Keep Mature Industries Innovative," *Technology Review*, April 1987.

E

Large Companies

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Introduction

Minnesota is a choice location for corporate headquarters, their branches and subsidiaries in the nation. Using a list of 1,000 top companies identified by *Business Week* for 1990, *State Policy Reports* ranked Minnesota fourth among states in major corporate headquarters per million residents, surpassed only by Connecticut, Delaware and New York[1]. Thirty-four Fortune 500 companies choose to locate their headquarters here, far exceeding the norm for a state of this size.[2] Many privately-owned companies in the state have achieved industry leadership status, such as Cargill Inc., Carlson Companies and West Publishing Co.[3] There are also sizable operations in the state by large multinational companies, such as IBM Corp., Unisys Corp., Onan Corp., Dow Chemical Co., Imperial Chemical Industries PLC, Pfizer Inc. and USX Corp. More than 90 percent of major U.S. industries are represented in Minnesota.[4]

A recent study on the location of corporate headquarters in the United States praised the Minneapolis-St. Paul Metropolitan Area for its exemplary growth in the number and composition of corporate headquarters:

> ***"The Minneapolis-St. Paul area is the nation's biggest over-achiever, from a corporate headquarters perspective. Its 2.6 percent share of these administrative offices of large companies is more than double its 1.1 percent population share. Almost all of the area's locally based companies are home grown. They are well distributed across almost all economic sectors, with manufacturing claiming 45 percent of the total. It is over-represented in food processing, paper and three technology based industries—computers, electronics and instruments. Its economy is based on the grain grown on the surrounding plains and on the innovators grown locally." (M. Ross Boyle, "Corporate Headquarters," Commentary, Winter 1990.)***

Supportive businesses such as accounting, banking and finance, advertising, printing and publishing, and air transportation flourish in this environment. They supply the needs for goods and services by corporate headquarters, their branches and subsidiaries, and their employees and families. The local printing and publishing industry ascribes a large part of its growth to a concentration of corporate headquarters in the state.[5]

In addition, higher incomes and generous fringe benefits for corporate personnel create demands for upscale consumer goods and shopping centers, superior health services, prestigious educational institutions and quality recreational activities.[6] Indeed, the availability of these services in an urban setting and support for a high quality of life and clean environment are important attributes that attract and retain professionals in our state.

Large firms are sources of spinoffs and start-ups that enhance intrapreneurships.[7] Martin Marietta was cited as a prime example of a large company that served as a wellspring for laser company spinoffs in Orlando.[8] Austin and Colorado Springs are other cities noted

for value-added spinoffs and new business ventures by existing firms.[9] Further, small business start-ups and entrepreneurial activities are encouraged by the expansion of established firms, as in the case in Route 128 of Massachusetts and Silicon Valley of California.[10] Hence, large firms could enhance both intrapreneural (company spinoffs) and entrepreneurial (small business start-ups) activities in the local area.[11] SRI International best described these growth interdependencies among allied companies in its study of emerging industrial clusters in Florida.[12]

Importance of Large Firms in Minnesota

In 1986, there were 6,800 corporate offices or headquarters in Minnesota, 18,800 branches and subsidiaries of large firms and 87,500 independent businesses.[13] While there are three independent businesses for every corporate entity in the state, corporations provide 62 percent of all non-farm jobs.[14] One of every six non-farm jobs in Minnesota is involved with corporate headquarters either as part of management, technical support, research and development, legal service, accounting or other corporate function. Another 45 percent of non-farm jobs is provided by operating branches and subsidiaries of large firms. We define these large firms as those having 500 employees or more in all their branches and subsidiaries. In contrast, independent companies are predominantly small with less than 100 employees, often in a single location. In 1986, these independent firms accounted for about 38 percent of total non-farm jobs.

Large firms dominated job creation during the economic recovery period 1982 through 1986, particularly in the metropolitan area. New business formation and expansion by corporate branches created 323,000 new jobs or two-thirds of all new jobs in the metropolitan area.[15] However, large firms were not as active at new job creation in Greater Minnesota. Rather, retrenchment by large manufacturers outside the metropolitan area has cut deeply into total non-farm employment. This disparity in job creation for non-metropolitan areas was evident nationwide, where non-metropolitan employment grew by only four percent between 1980 and 1986, equivalent to one-third the rate for metropolitan areas.[16] After 1986, new manufacturing jobs started to spread outside of the Minneapolis-St. Paul Metropolitan Area.[17]

Concentration of Large Firms and Their Branches in the Metropolitan Area

The seven counties of the Minneapolis-St. Paul Metropolitan Area contain one-half of the state's population and 63 percent of all non-farm jobs.[18] Large corporations also concentrate in the metropolitan area, where there are 228,000 headquarter personnel compared to 57,000 in Greater Minnesota.[19] The workforce of corporate branches and subsidiaries reach 563,000 in the Metropolitan area, compared to 214,000 in Greater Minnesota.[20] Hence, there are almost three employees in corporate headquarters and branches in the metropolitan area for every corporate employee in Greater Minnesota.

Industry Profile of Large Firms in Minnesota

Large firms are dominant in manufacturing where they provide three of every four jobs (Table E-1). Compared to the nation, Minnesota has less dependence on traditional durable goods manufacturing such as transportation equipment and electrical machinery, in favor of computers and non-electrical machinery, food and kindred products and printing and publishing. Lately, the trend has been toward high technology products and medical devices. Even the large computer industry is shedding mainframe manufactures in favor of minicomputers, work stations, personal computers and peripherals.[21] For multinational companies such as 3M Co., high technology figures prominently in new product development, and they connect with local computer and medical companies.[22]

Similarly, large companies are over-represented in wholesale trade, retail trade, finance, insurance and real estate, and services which are the traditional domain of small businesses. Several home-based retail

Table E-1 Industry Distribution of Nonfarm Employment in Minnesota by Small Independent Companies and Large Firms, 1986

Industry Group	Independents (Number of jobs)	Large Firms
Agricultural Services	10,186	3,024
Mining	526	10,868
Construction	55,676	31,387
Manufacturing	103,429	330,120
Transportation, Communication and Utilities	25,997	73,941
Wholesale Trade	58,947	63,400
Retail Trade	149,961	202,596
Finance, Insurance, Real Estate	37,286	109,159
Services	214,756	246,173
Total	656,764	1,070,668

Source: U.S. Small Business Administration, "USELM Microdata Files," *Minnesota, 1982-86*, Washington D.C., August 1988.

Table E-2 Industry Concentration of Large Firms in Minnesota and the U.S., 1986.

Industry Group (percent of total jobs)	U.S.	Minnesota
Agricultural Services	*	*
Mining	2%	1%
Construction	2	3
Manufacturing	33	31
Transportation, Communication and Utilities	10	7
Wholesale Trade	4	6
Retail Trade	15	19
Finance, Insurance, Real Estate	8	10
Services	26	23
Total	100%	100%

* Less than 1%.

Source: U.S. Small Business Administration, "USELM Microdata Files," *Minnesota, 1982-86*, Washington D.C., August 1988.

chains such as Dayton Hudson Corp. have expanded rapidly, while national wholesale and retail chains are penetrating the local market. Health services is also a large and prominent industry in Minnesota; and there occurred consolidation and mergers among hospitals, health insurance and health care providers during the 1980s.

Industry Concentration of Large Firms in Minnesota and the United States

Similar to their national counterparts, large firms in Minnesota provide most jobs in manufacturing, services and retail trade (Table E-2).

Table E-3 Industry Concentration of 100 Leading Publicly Owned, Private and Regional Corporations with Large Presence in Minnesota, 1989.

Industry Group	Publicly Owned Establishments	Employees	Private Establishments	Employees	Regional Establishments	Employees
			(Total employment, worldwide)			
Agricultural Services						
Mining						
Construction			12	11,870		
Manufacturing	64	399,981	36	47,807	61	95,405
Transportation, Communication and Utilities	7	15,423	8	7,825	7	11,854
Wholesale Trade	2	11,039	8	58,165	1	700
Retail Trade	6	192,432	22	27,196	11	31,326
Finance, Insurance, Real Estate	13	51,011	4	1,945	6	7,332
Services	8	10,291	10	65,102	14	9,730
Total	100	680,177	100	219,910	100	156,347

Source: *Corporate Report Minnesota*, (Several Issues-June 1990, April 1990, December 1988) Minneapolis, MN.

The Largest Private and Public Companies in Minnesota

The publication *Corporate Report Minnesota* annually compiles a list of the largest private and public companies in Minnesota, and non-Minnesota based companies that are prominent in the state's economy.[23] The largest publicly owned companies based in Minnesota are concentrated in manufacturing (Table E-3), led by 3M Co., Honeywell Inc., General Mills, Inc., Control Data Corp. and Geo. Hormel & Co. The St. Paul Companies, Norwest Corp. and First Bank System Inc. are dominant companies in finance, insurance and real estate. Dayton Hudson Corp., Super Value Stores Inc. and Best Buy Company Inc. are parent companies of retail chains.

Among privately held companies, the largest are Cargill Inc., Carlson Companies Inc., Holiday Companies, Andersen Corp., National Car Rental Systems Inc. and Red Owl Stores Inc. Regional corporations with large presence in the state are Pillsbury Co. (Minnesota company recently acquired by Grand Metropolitan PLC), Unisys Corp., IBM Corp., US West Communications, and Fingerhut Corp.

Issues Facing Large Firms

David Birch (1979) outlined several differences in business issues and concerns between small businesses and large firms.[24] Meeting payroll, paying taxes, complying with regulations and obtaining venture capital are foremost problems for small businesses. Since most small businesses are entrepreneurial, they have an urgent need for training in management, marketing, accounting and tax reporting. Revenues for small companies are typically small and uncertain, and there is a high proportion of unskilled labor so that mandated increases in minimum wage rates, unemployment compensation insurance, health insurance and occupational safety regulations could be disastrous for them.

On the other hand, large firms require and pay for a highly productive labor force, both in terms of skills and dependability. The prevalence of institutions of higher learning, and Minnesota's quality of life attributes attract a pool of highly skilled workers. These often take precedence over minimum wage,

payroll tax and corporate income tax concerns. Differences in the rates of state personal income taxes and property taxes are pivotal to these firms only in so far as they discourage professionals from moving into their area of operations.

Other specific needs of large firms are air transportation for executives, sales people and specialized materials and documents; communication services; road, rail, barge and brokerage facilities; inexpensive power for manufacturing; business and professional support services; and amicable relations with labor unions.[25] Further, corporate headquarters tend to be pushed out of their current location, rather than attracted to some new location.[26] For example, it was mentioned that several moves in recent years from Manhattan to suburban New York and other locations are due to "push factors" such as the high cost of operating in Manhattan, the congestion created by putting many people in a small space, and the difficulty of getting key employees to move to New York.[27]

Objective of the Study

In the 1990s, the aging population and labor force, increased use of natural resources and its impact on the environment, and increasing world competition will cause drastic changes in markets, products and technology. As in the past, successful businesses are those that anticipate and prepare for changes in the marketplace and their operating environment. During the 1980s, U.S. manufacturers dealt with low product quality, labor shortages, decline in quality of education and increasing participation of women and minorities in the labor force. These trends are expected to intensify during the 1990s.[28] In turn, government needs a clear understanding of future business plans and requirements in order to sustain a conducive business climate. We conducted a survey of Minnesota businesses for this purpose.

This study addresses the importance to Minnesota businesses of the availability and cost of labor, skill levels and training of workers, taxes and regulations, capital accessibility and usage, energy and transportation, technology and research and development. We investigated the current and future impacts of these factors on successful business operations in the state.

This paper presents the survey results for the group of large firms. There are four other papers that report on small to medium-size companies, Greater Minnesota manufacturers, high technology firms and small to medium-size exporters.

Overview

In the following section, we describe our sample of large firms to complete Chapter 1, Introduction. We proceed to analyze responses to our survey in Chapter II, Analysis and Findings. There are three sections in Chapter II: (1) Analysis of current issues and conditions, (2) Business changes for the 1990s and (3) Role of government. We conclude this part of our study in Chapter III, Conclusions and Summary.

Description of Large Firm Sample

We compiled a list of large companies in the state using the list of the largest companies published by *Corporate Report Minnesota,* augmented by annual publications of the *Minnesota Directory of Manufactures, Bradstreet Business Directory* and other sources. We drew a sample of 314 companies from this list, and each company was sent a letter and two weeks later, a questionnaire. A total of 162 questionnaires were returned, of which 150 were usable. Seven of the unusable questionnaires were returned by the U.S. Postal Service as undeliverable, while five of the returned questionnaires were incomplete. Hence, we achieved a response rate of 50 percent, based on 155 returned questionnaires from 307 successful mailings.

The respondents to our survey were distributed among industries roughly in similar proportion as the population of large firms in the state. Most of the samples were engaged in manufacturing, finance, insurance and real estate, services, and retail trade (Table E-4). About three-fourths of the samples were located in the metropolitan area, which was similar to the 1986

Table E-4 Industry Distribution of Survey Samples

Industry Group	(Number of samples) Metropolitan Area	Greater Minnesota
Agricultural Services	-	-
Mining	-	-
Construction	2	1
Manufacturing	58	30
Food & Kindred Products	8	4
Textile Mill Products	-	-
Apparel, other Textile	1	2
Lumber and Wood Products	1	1
Furniture and Fixtures	-	1
Paper and Allied Products	1	4
Printing and Publishing	5	1
Chemicals and Allied Products	4	-
Petroleum and Coal Products	1	-
Rubber and Misc. Plastics	2	1
Leather and Leather Products	1	1
Stone, Clay and Glass	-	1
Primary Metal Products	1	-
Fabricated Metal Products	6	2
Nonelectrical Machinery	7	3
Electrical Machinery	7	6
Transportation Equipment	4	1
Instruments and Related Products	8	1
Miscellaneous Manufacturing	1	1
Transportation, Communication, Utilities	4	-
Wholesale Trade	4	1
Retail Trade	11	-
Finance, Insurance and Real Estate	20	1
Services	15	3
Personal Services	1	-
Business Services	3	1
Health Services	6	1
Legal Services	1	-
Miscellaneous Services	4	1
Total Samples	114	36

Table E-5 Type of Organization of Large Firm Sample

Firm Type	Number	Percent
Independent Company	52	35%
Headquarters	47	31
Branch/Division/Subsidiary	43	29
Branch of Foreign Company	8	5
Total	150	100%

distribution of employment by large firms in the state.

Type of Organization

About 35 percent of respondents are large independent companies, while 60 percent are headquarters or branch/division/subsidiary of U.S. companies (Table E-5). Eight respondents, or 5 percent, are branch operations of foreign-owned companies.

Table E-6 Age Distribution of Large Firm Sample

	Number	Percent
Below 5 years	2	1%
5-10 years	8	5
10-25 years	22	15
Over 25 years	112	75
Not reported	6	4
Total	150	100%

Table E-7 Major Product/Service Groups of Large Firm Sample

Product/Service	Number	Percent
High Technology	42	28%
Durable Goods Manufacturing	25	17
Nondurable Goods Manufacturing	27	18
Trade, Services, Other	56	37
Total	150	100%

Age of Respondent Companies

Large companies in Minnesota are typically established entities with many branches and subsidiaries. Three-fourths of respondents have been in business for more than 25 years, and the median age is 50 years (Table E-6). Only two respondents are less than five years old, and 10 respondents are less than 10 years old.

Major Product/Service Groups

When classified into four major product groups, more than one-fourth of the respondents produced high technology products and services (Table E-7). Manufacturing firms comprised one-third of the respondents, distributed about evenly among durable and non-durable goods manufacturers. Services, trade and other businesses comprised slightly more than one-third of the respondents.

Annual Revenues

More than one-half of the large firm sample reported annual revenues in excess of $100 million (Table E-8). One-fifth of the sample reported revenues between $25 million and $99 million, while only 9 percent reported annual revenues below $25 million.

Local, National and Export Markets

When survey respondents were grouped into quartiles based on their sales to various product markets, three-fourths of the respondents sold less than 33 percent of their product to the local market (Table E-9). The first quartile of firms sold less than 1 percent to the local market, while the next quartile of firms sold less than 10 percent locally. Likewise, these companies did not ship large quantities to the regional market.

Large firms tended to concentrate in national markets, with three-fourths of the respondents indicating shipments of more than 25 percent of their output nationally. One-half of all respondents shipped more than 60 percent of output to national markets. The upper quartile of firms shipped three-fourths of their output nationally.

On the other hand, three-fourths of the respondents exported less than 13 percent of

Table E-8 Annual Revenues of Large Firm Sample

Annual Revenues	Number	Percent
Less than $25 million	14	9%
$25 million-$99 million	33	22
$100 million-$250 million	32	21
Over $250 million	55	37
Not Reported	16	11
Total	150	100%

Table E-9 Proportion of Total Sales to Local, Regional, National and Export Markets, by Quartile of Large Firm Sample

	Local	Regional	National	International
First Quartile	0%-1%	-	0%-24%	-
Second Quartile	2-9	0-10%	25-59	0-2
Third Quartile	10-32	11-25	60-75	3-12
Fourth Quartile	33-100	25-100	76-100	13-100

Table E-10 Labor/Capital Intensiveness of Large Firm Sample

Labor/Capital Intensiveness	Percent of Respondents
1 Labor Intensive	29%
2 Labor Bias	29
3 Capital Bias	31
4 Capital Intensive	7
Not Reported	4
Total	100%

their output. About one-half of the respondents sold less than 3 percent of output directly to foreign markets. We caution, however, that exporting companies in this group were large and their volume of exports greatly exceeded those of many small and medium-size exporting companies.

Labor Intensity

Our survey inquired about the labor or capital intensiveness of the companies, but the results for large firms showed a surprising bias toward labor intensiveness (Table E-10). Since more than one-half of the respondents were large manufacturers, we consider suspect this distribution of responses in favor of labor intensiveness. The responses could have been based on the size of their labor force and their own perception of labor intensiveness, rather than the actual ratio of labor-to-capital in their operations. Hence, this distribution of respondents according to labor intensity could be unreliable.

Analysis and Findings

In this chapter, we grouped the responses to our survey into three main topics:

A. Importance and satisfaction of Minnesota businesses with current operating factors;
B. Business changes for the 1990s; and
C. Role of government.

Under each topic, we discuss labor availability and cost, worker training, taxes and regulations, capital accessibility and usage, energy and transportation, technology, and research and development investments. Emphasis on these issues varied according to their importance to the large firm group and the quality of survey responses.

Evaluation of Statistical Properties of the Responses

Generally, we desist from further analysis where there is a large number of nonresponses, or there is a fairly even distribution of responses such that there is no concurrence on the issue. This even or uniform distribution of responses subject our findings to a high probability that random variation alone could have caused the observed responses.[29]

In this study, we presented results that could be described as having a high probability of occurrence outside of random events. Also, we excluded nonrespondents in estimating proportions and percentages because we allowed our samples to skip sections and issues in the questionnaire that were not important to them. We did not adjust for rounding errors so that some percentages may not add exactly to 100 percent.

In evaluating the statistical significance of the responses, we apply the binomial distribution as an approximation to a normal distribution of the responses.[30] We justify this method with a sample size greater than 25 firms, and 5 responses or more per category that otherwise could have introduced skewness in the distribution of responses.[31] We evaluated the proportion of respondents answering each category as a random variable that was distributed close to normal. For example, we attached statistical significance to a response rate greater than 32 percent on questions that required one answer from four possible answers; the latter equivalent to a 25 percent chance of random occurrence. This random, 25 percent chance of occurrence could range from 18 percent to 32 percent about 95 percent of the time during repeated sampling.[32] Thus, sample proportions outside this range has a small chance of occurrence purely due to random events.

Similarly, we use the binomial distribution in comparing responses to various factors. The standard error of sample proportion depends on the size of the proportion and the sample size, which facilitates calculation of ranges for statistically significant differences among responses.[33] We could attach a 95 percent confidence level on differences greater than 12-17 percent between responses.[34]

In this survey, we allowed mostly four levels of responses on each question, with Level 1 denoting the lowest value such as Not Important, and Level 4 denoting the highest value such as Very Important. The middle categories, Level 2 and Level 3 represent the less emphatic responses. However, we observed that most responses tend to cluster in the middle of the levels. The respondents seemed to avoid the extremely low (Level 1) or high (Level 4) values on the range of responses, except in cases where they revealed very strong feelings about the issue. Hence, there could be a bias of responses towards the middle levels. This meant that there could be greater than 25 percent probability on the middle levels due to random events alone, so that we needed to raise farther the level of responses that we consider to be statistically significant. We assumed that a 40 percent response indicated a deliberate choice for the middle levels rather than due to random events alone. Conversely, a response rate close to 25 percent on the extreme ranges could be statistically significant. Finally, we concentrated on the percentages at both ends of the response range, noting that the respondents used these categories to express very strong opinions on the issues.

Table E-11 Importance of Various Occupational Groups to Large Firms

Occupational Groups	Not Important 1	2	3	Very Important 4	Total
	(Percent of respondents)				
Management	-	2%	19%	79%	100%
Professionals/Scientists/Engineers	14	11	25	50	100
Technical/Skilled	3	8	41	48	100
Clerical/Sales	3	17	38	42	100
Unskilled	22	38	21	19	100

Importance and Satisfaction of Minnesota Businesses with Current Operating Factors

In this section, we discuss our respondents' view of the importance of current operating factors to the success of their businesses such as labor availability, quality and cost, worker training, taxes and regulations, capital accessibility and usage, energy and transportation, technology, and research and development investments. We present also their level of satisfaction with these factors in Minnesota since these factors determine in large measure, the business climate in the state.

Labor Availability and Cost

Large firms compete mostly in national markets where the lowest cost producer gains market share at the expense of other producers. Labor is a single large cost item in production, reaching one-third of production cost for most manufacturers.[35] However, there is less opportunity for economies of scale in the use of labor compared to capital, other than the substitution of capital for labor or improvements in labor productivity itself. Minimizing on labor cost is easier accomplished by locating and accessing quality labor. Indeed, companies expanding or relocating their operations look for a high quality and diligent labor force.[36]

We asked questions about the importance of various occupational groups to our respondents' business operations, and this varied according to product or service provided, stage of production and size of operations. We asked about the levels of difficulty recruiting and retaining these occupational groups, and the personnel issues that are important to the companies, such as rising labor cost, health benefits and declining labor supply. Combined with labor training in the next section, this section identifies the specific labor issues that are important to large firms in Minnesota, some of which are influenced by public policy and spending. We correlate the importance of these issues with public spending on education and other government functions in the Impact of Taxes and Regulations section.

Importance of Various Occupational Groups

Corporate headquarters, subsidiaries and branches of large corporations in Minnesota employ a disproportionately large number of management personnel, professionals and technical/skilled workers, compared with clerical/sales and unskilled workers.[37] Production, assembly, shipping and other marketing functions are dispersed to various product (national) markets, while corporate administrative functions and research and development are concentrated in the state.

The large firms in our survey attached the highest importance on management personnel among various occupational groups (Table E-11). Seventy-nine percent, or four of every five respondents, considered management as very important to their businesses. Professionals and technical/skilled workers ranked next in importance, with about one-half of the respondents indicating these groups to be very important. Clerical/sales occupational groups were also considered very important by 42 percent of respondents. In

Table E-12 Level of Difficulty Recruiting Various Occupational Groups by Large Firms

Occupational Groups	Number of Respondents	Easy to Recruit 1	2	3	Difficult 4
		(Percent of respondents)			
Management	148	9%	32%	41%	18%
Professionals/Scientists/Engineers	125	2	30	53	16
Technical/Skilled	137	4	45	33	18
Clerical/Sales	142	18	53	24	5
Unskilled	125	47	38	13	2

Table E-13 Level of Difficulty Retaining Various Occupational Groups by Large Firms

Occupational Groups	Number of Respondents	Easy to Recruit 1	2	3	Difficult 4
		(Percent of respondents)			
Management	141	22%	55%	21%	2%
Professionals/Scientist/Engineers	119	9	57	29	4
Technical/ Skilled	129	15	53	26	7
Clerical/Sales	136	24	49	21	5
Unskilled	119	34	39	21	7

contrast, 60 percent of respondents indicated unskilled labor as generally unimportant.

Difficulty of Recruitment

Whereas the large firm respondents attached high importance to management, professional and technical/skilled employees, more than one-half of them experienced difficulty recruiting for these labor groups (Table E-12). Conversely, most companies found it easy to recruit clerical/sales and unskilled workers.

Retention of Personnel

Retention of personnel did not appear to be a problem with most large firms in our survey (Table E-13). For the very important management class, 77 percent of respondents indicated relative ease of retention. There were a fair number of non-respondents for the professional and technical occupational groups, but two-thirds of those that responded stated relative ease of employee retention.

Reasons for Recruitment Difficulty

About one-half of the respondents expressed some difficulty in recruiting (scores of 3 and 4) (Table E-14). For those experiencing difficulty recruiting managers, professionals and technical/skilled personnel, personal taxes appeared to be the most important limiting factor, followed by labor shortage and lack of skills. Cost of labor ranked next in importance, while climate/weather did not appear to be an important factor to most companies. This implies that personal taxes and cost of labor contributed most to difficulty recruiting managers, professionals and technical personnel into the state; that there could be inadequate local supply of personnel possessing these skills; and that cold winters did not rank highly as a reason for hiring difficulty.

For the few companies reporting difficulty recruiting clerical/sales and unskilled labor, the reasons for hiring difficulty received about equal importance, except for climate/weather which remained relatively unimportant. More companies cited labor cost and personal taxes as unimportant to hiring unskilled labor, which implies that prevailing hourly wage

Table E-14 Reasons for Recruitment Difficulty by Large Firms

	Difficult to Recruit (Scores of 3 and 4)				
	Management	Professionals	Technical	Clerk	Unskilled
	(Number of respondents)				
Reason for Difficulty	87	86	70	41	19
Cost of Labor					
Not Important	31	29	23	8	14
Important	43	40	34	23	4
Lack of Skills					
Not Important	30	24	19	10	5
Important	42	48	41	21	14
Labor Shortage					
Not Important	28	26	19	6	-
Important	45	45	38	25	19
Personal Taxes					
Not Important	22	20	21	13	10
Important	57	55	42	21	8
Climate-Weather					
Not Important	40	33	33	22	10
Important	35	39	27	10	8

rates were not serious impediments to recruiting unskilled labor in the state. Labor shortage and lack of skills were more important reasons for those few companies that reported difficulty hiring unskilled labor. This is not surprising because low wages for unskilled labor limit the size of the pool to the local community and render them immobile, compared to high wages for professionals that attract candidates from other states.

Differences in Recruiting Difficulty Among Various Types of Companies

Difficulty recruiting for various occupations could differ among companies depending on the age and size of company, ownership, or primary product. Prospective employees would prefer job stability and high wages and benefits commonly offered by established companies. However, there were very few respondents in our sample of large firms that were less than 10 years old or employed less than 100 so that we could not infer any relationship between recruitment difficulty and age or size of company. Also, independents and corporate entities had almost similar proportions of respondents that experienced difficulty in recruiting management, professionals and technical personnel. A larger proportion of foreign-owned companies stated some difficulty in recruiting, but this may not be meaningful because there were very few samples of these companies in the survey.

A larger proportion of high technology companies and those engaged in durable goods manufacturing expressed difficulty recruiting professionals and management personnel, compared to companies in services and other businesses (Table E-15). Although 79 percent of respondents belonging to the high technology group stated some difficulty recruiting professionals, only seven companies out of 38 respondents, or 18 percent, expressed great difficulty. This pattern appears to hold for other types of companies and occupational groups, so that problems recruiting personnel may not be as serious as these tabulations imply.

Importance of Personnel Issues

Provision of health benefits was an overriding issue to most large firms (Table E-16). About 90 percent of those companies that considered the various occupations to be important were concerned with employee health benefits. Rising labor costs and lack of skills were also major issues, particularly for

Table E-15 Proportion of Large Firm Respondents Expressing Recruiting Difficulty by Type of Company

Type of Company	Number of Firms	Management	Professionals	Technical	Clerk	Unskilled
		Difficult to Recruit (Scores 3 and 4) (Percent of respondents)				
Ownership of Company						
Independents	52	57%	72%	53%	33%	24%
Headquarters	47	60	73	60	33	10
U.S. Branch	43	55	60	39	22	14
Foreign Owned	8	88	63	43	13	-
Primary Product						
High Technology	42	63	79	45	35	8
Durable Mfg.	25	60	85	60	20	17
Nondurable Mfg.	27	63	64	52	8	-
Services, Other	56	53	55	50	39	29
		Great Difficulty Recruiting (Level 4)				
Ownership of Company						
Independents	52	25	15	28	6	7
Headquarters	47	4	18	15	2	-
U.S. Branch	43	21	17	11	7	-
Foreign Owned	8	25	-	14	-	-
Primary Product						
High Technology	42	12	18	14	5	3
Durable Mfg.	25	24	5	8	4	-
Nondurable Mfg.	27	44	20	24	-	-
Services, Other	56	5	17	24	8	5

those companies that employ a large number of unskilled labor. Anticipation of the aging of the population (and workforce) was revealed in the expressed importance of declining labor supply and retirement benefits. However, organized labor and work force diversity were not major issues, except perhaps for companies that employ a large number of unskilled labor. Other personnel issues that affect company morale and employee benefits such as drug/AIDS testing, employee parking/commuting, day care, and flexible work schedules were not major concerns to this group of large firms.

Employee Training

Employee training was very important to our sample of large firms (Table E-17). Ninety-six percent of those that responded indicated they offered formal training programs for their employees; and of these firms with formal training, 84 percent increased their programs compared to five years ago.

Large firms indicated in-house training as the most important source of training, followed by university/college, primary/secondary and vocational/technical (Table E-18). More than one-half of the respondents indicated that community colleges, apprenticeship and consultants were low in importance as sources of training.

Large firms were generally satisfied with their sources of training. In-house training (Table E-19), university/college and vocational/technical were cited as providing satisfactory training. On the other hand, primary/secondary schools were unsatisfactory to 58 percent of the respondents.

Among those companies where these training

Table E-16

Proportion of Large Firm Respondents Expressing Importance of Labor Issues and Importance of Occupational Groups

	Companies Attaching Importance to Occupation Group				
	Management	Professionals	Technical	Clerk	Unskilled
	(Percent of respondents)				
Labor Issues Considered Important					
Rising Labor Cost	80%	83%	80%	83%	88%
Lack of Skills	63	65	62	63	78
Declining Labor Supply	56	52	53	57	67
Drug/AIDS Testing	35	35	36	40	47
Health Benefits	89	92	90	90	91
Parking/Commute	19	16	17	20	21
Day Care	34	35	35	37	36
Organized Labor	46	44	47	48	55
Diversity	31	36	30	33	36
Retirement	57	60	55	62	59
Flexible Schedule	35	35	33	37	41
Other	5	2	6	7	7

Table E-17

Formal Training by Large Firms Compared to Five Years Ago

Level of Training	Number	Percent of those with Formal Training
No Formal Training	6	-
Same Level Training	22	16%
More Training	79	58
Much More Training	36	26
No Response	7	-
Total	150	100%

Table E-18

Important Sources of Training for Large Firms

Sources	Not Important 1	2	3	Very Important 4
	(Percent of respondents)			
In-house	1%	8%	35%	56%
Apprenticeship	40	29	19	12
Consultants	18	40	37	4
Vocational/Tech	12	28	43	16
Community College	17	44	33	6
University/College	7	16	45	32
Primary/Secondary	8	20	35	36

sources were important (Scores of 3 and 4), the levels of satisfaction were even higher for in-house training, university/college and vocational/technical schools. In ranking community colleges, a larger proportion of companies that valued their educational

Table E-19 Level of Satisfaction by Large Firms on Sources of Training

Sources	Not Satisfied 1	2	3	Very Satisfied 4
	(Percent of respondents)			
In-house	2%	16%	63%	19%
Apprenticeship	18	28	41	13
Consultants	8	37	50	5
Vocational/Technical	7	24	59	10
Community College	9	34	51	6
University/College	5	13	68	14
Primary/Secondary	16	42	35	6
Percent of those Firms Indicating Importance of these Sources of Training (Scores of 3 & 4)				
In-house	2	12	66	20
Apprenticeship	6	28	46	20
Consultants	-	22	67	11
Vocational/Technical	3	17	66	14
Community College	2	13	72	13
University/College	-	8	75	16
Primary/Secondary	14	42	35	8

Table E-20 Topics Covered in Training Programs of Large Firms

Topic	Never 1	2	3	Often 4
	(Percent of respondents)			
Manufacturing				
Manufacturing Processes	10%	13%	38%	39%
Engineering/Scientific	23	27	30	20
Quality Improvement	8	12	31	48
Manufacturing/Sales				
Customer Service	5	15	31	50
International Skills	60	27	12	2
Foreign Languages	77	22	1	-
Marketing Techniques	9	16	45	30
Administrative				
Clerical/Office Skills	13	32	40	15
Computer Skills (Adm.)	3	21	49	27
Managerial				
Strategic Planning	7	34	35	25
Supervisory/Leadership	-	9	49	43
General				
Basic Skills	41	41	11	7
Communication Skills	5	34	45	16
Career Development	16	39	37	8
Interpersonal Skills	7	24	49	20

services were satisfied, compared to the entire sample. This suggests that in-house training and public sources of training such as universities, colleges and vocational/technical schools were adequate. Primary and secondary education provided training were exceptions in that there was a fairly high proportion of dissatisfied firms.

This survey confirmed the commitment by

Table E-21 Reasons for Training Programs of Large Firms

Reasons	Not Important 1	2	3	Very Important 4
	(Percent of respondents)			
Technical Complexity	2%	12%	44%	42%
Company Procedures	1	23	45	31
Correct Basic Skills	7	41	37	15
Career Advancement	2	22	56	20
Improve Quality	-	2	32	66
Manage Employee Turnosver	13	40	33	15
Reduce Absenteeism	23	45	24	8
Workplace Safety	6	17	43	34

Table E-22 Increase in Formal Training by Large Firms for Important Occupational Groups

Level of Training	Companies that Attached Importance to Occupation Group: Management	Professionals	Technical	Clerk	Unskilled
	(Percent of respondents)				
Less Training	4%	6%	4%	4%	4%
Same Level Training	15	13	16	17	18
More Training	55	50	55	58	54
Much More Training	25	30	24	22	23
Total	100%	100%	100%	100%	100%

large firms to quality improvement and customer service (Table E-20). These were the most frequent topics in their training programs, followed by related topics of manufacturing processes and marketing techniques. International skills and foreign languages received the least attention. Basic skills were also relegated to public schools and other outside sources.

Most large firms focused their training programs on quality improvements (Table E-21). Other very important topics were updates on technical complexity of production and workplace safety. Career advancement received modest importance, while correction of basic skills, managing employee turnover and reducing absenteeism did not appear to be major topics for in-house training.

Three-fourths of the respondents had increased their level of training compared to five years ago, and this emphasis on training did not seem to vary among occupational classes that were important to them (Table E-22).

The quest for productivity and quality improvements was common among large companies, whether they are independent, corporate entities or foreign-owned branches (Table E-23). Large numbers of high technology companies, manufacturing firms and service, trade and other companies considered training for productivity and quality improvements to be very important.

Access to Capital

About two-thirds of the large firms indicated that they sought investment or working capital during the past five years. Of those companies that responded to the level of

Table E-23

Importance of Training to Improve Productivity and Quality by Type of Company and Major Product Group of Large Firms

Company Characteristics	Importance of Training to Improve Productivity and Quality: Not Important 1	2	3	Very Important 4
	(Percent of respondents)			
Type of Company				
Independent	-	-	33%	67%
Corporate Headquarters	-	5	35	60
Branch/Division	-	-	29	71
Foreign-Owned	-	16	16	67
Product Group				
High Technology	-	-	31	69
Durable Goods Mfg.	-	-	43	57
NonDurable Goods Mfg.	-	-	31	69
Services, Other	-	6	28	66

Table E-24

Difficulty Raising Capital by Large Firms

Level of Difficulty Raising Capital	Number of Firms	(Percent of Respondents) Percent	Cumulative
1 Low	39	49%	49%
2 Medium Low	24	30	79
3 Medium High	11	14	93
4 High	5	7	100
No Response	71	-	-
Total	150	100%	

difficulty raising capital, more than three-fourths reported little difficulty (Table E-24).

Among the different groups of companies that sought investment capital, most of them reported relatively low levels of difficulty (Table E-25). A larger proportion of independent companies and high technology firms encountered greater difficulty raising capital compared to corporations and their branches, and other manufacturers. These independent companies and high technology firms are commonly considered poor credit risks among bankers and other financial sources.

This relative ease at raising capital was due largely to the excellent financial condition of the large firms. Two-thirds of those companies that sought capital had a debt-to-equity ratio of less than two (Table E-26).

In general, companies that secured their loans with cash or cash equivalents, and hard assets such as buildings and equipment experienced less difficulty obtaining those loans (Table E-27). A large proportion of companies that listed inventory and accounts receivable as collateral had some difficulty obtaining loans. This is consistent with the greater risks for valuation changes and poor liquidity inherent in inventory and accounts receivable.

Sixty-one large firms or 41 percent of the sample indicated costs of loans-such as interest rates and origination fees-as a barrier

Table E-25 Difficulty Raising Capital by Type of Company and Major Product Group of Large Firms

	Number of Respondents	Level of Difficulty Raising Capital Low 1	2	3	High 4
		(Percent of respondents)			
Type of Company					
Independent	30	40%	30%	27%	3%
Headquarters	31	52	32	10	6
Branch/Division	15	60	27	-	13
Foreign-Owned	3	67	33	-	-
Product Group					
High Technology	25	48	28	12	12
Durable Goods Mfg.	12	67	25	8	-
Nondurable Goods	11	55	36	9	-
Services, Other	31	42	32	19	7

Table E-26 Debt-to-Equity Ratio of Large Firms that Sought Capital

Debt-Equity Ratio	Number of Firms	(Percent of Respondents) Percent	Cumulative
1 Less than 1:1	42	48%	48%
2 1:1 to less than 2:1	16	18	66
3 2:1 to less than 4:1	16	18	84
4 More than 4:1	13	15	100
No Response	11	-	-
Total	150	100%	

Table E-27 Difficulty Raising Capital by Type of Loan Collateral for Large Firms

Type	Number of Respondents	Level of Difficulty Raising Capital Low 1	2	3	High 4
		(Percent of respondents)			
Loan Collateral					
Cash & Cash Equivalents	11	44%	22%	22%	11%
Hard Assets (bldg, equip)	37	45	36	13	6
Inventory	12	12	12	50	26
Accounts Receivable	14	20	10	51	20
Other	12	67	33	-	-

in obtaining capital (Table E-28). However, only 7 percent of these firms considered costs of loans as a large barrier, while 63 percent stated that this barrier was relatively small. The other frequently cited barriers were financial institutions' requirements of adequate cash flow, collateral and lending limits. Sources of financing, discrimination, required return to equity, investors' control and other factors are cited less often by the samples. In all cases, it appears that most of

Table E-28 Barriers in Obtaining Investment Capital by Large Firms

Barriers	Number of Firms Reporting	Distribution by Level of Barrier Low 1	2	3	High 4
		(Percent of respondents)			
Cost of Loan	61	31%	32%	30%	7%
Collateral Requirements	48	46	23	17	14
Lending Limits	48	39	31	15	15
Cash Flow Requirements	50	30	40	22	8
Knowing Where to Go	43	65	23	2	10
Local Availability	46	59	17	13	11
Risk of Project	44	52	36	9	3
Discrimination	38	81	16	3	-
Amount of Required Return to Equity	40	43	30	20	7
Amount of Business Control by Investors	40	52	30	10	8
Lack of Market for Public Offering	36	56	25	8	11
Cost of Public Offering	35	54	20	23	3

Table E-29 Difficulty in Securing Capital by Intended Use of Investment Capital for Large Firms

Intended Use of Investment Captial	Number of Firms Reporting	Difficulty Securing Capital Low 1	2	3	High 4
		(Percent of respondents)			
Inventory	24	46%	40%	5%	10%
Land Acquisition	32	51	38	11	-
Building Acquisition	46	50	38	11	-
New Equipment	64	43	37	16	4
Research & Development	17	53	33	-	14
Retire Existing Debt	13	54	31	8	8
Refinance Existing Debt	23	49	30	10	10
Working Capital	53	48	28	15	9
Other	14	50	34	8	8

the companies considered these barriers to be relatively mild.

The level of difficulty in securing loans did not appear to vary by intended use of the loan (Table E-29). Indeed, it appears that the companies did not have very much difficulty obtaining loans, whatever the intended use. These loans were obtained mostly from national sources, rather than Minnesota lending institutions and investors.

Energy

Minnesota has one of the lowest electric and natural gas rates in the nation. Pipelines bring domestic natural gas which is cleaner and cheaper than fuel oil into the state, while electric utilities have built large, coal-fired generating units to replace oil-fired units and power imports from other states. There are also local refineries that supply the upper Midwest with gasoline, fuel oil and propane.

Large companies in Minnesota were generally satisfied with their energy sources in terms of cost, reliability and availability (Table E-30). More than one-half of the respondents indicated that they were moderately satisfied to highly satisfied with regard to cost of their energy sources. More than three-fourths indicated that they were moderately satisfied to highly satisfied with regard to reliability and availability of energy sources.

Table E-30 Level of Satisfaction to Various Energy Sources by Large Firms

Energy Source	Number Reporting	Level of Satisfaction Low 1	2	3	High 4
		(Percent of respondents)			
Primary Heating Source		Reasonable Cost			
Electricity	22	-	45%	41%	14%
Natural Gas	73	4	25	59	12
Fuel Oil	9	11	22	56	11
Propane	10	-	40	40	20
Coal	4	-	50	25	25
Own Source	7	14	43	29	14
Other	1	-	-	100	-
		Reliability			
Electricity	22	-	5	43	52
Natural Gas	76	1	9	49	41
Fuel Oil	9	-	22	56	22
Propane	10	-	-	50	50
Coal	4	-	-	33	67
Own Source	7	-	14	43	43
Other	1	-	-	-	100
		Availability			
Electricity	22	-	-	50	50
Natural Gas	76	-	8	43	48
Fuel Oil	9	-	22	56	22
Propane	10	-	10	30	60
Coal	4	-	-	33	67
Own Source	7	-	14	29	57
Other	1	-	-	-	100
Primary Process Source		Reasonable Cost			
Electricity	57	7	31	48	14
Natural Gas	29	10	32	43	15
Fuel Oil	7	29	14	43	14
Propane	8	13	38	25	24
Coal	4	-	50	25	25
Own Source	6	17	50	17	16
Other	1	100	-	-	-
		Reliability			
Electricity	57	2	12	41	45
Natural Gas	29	3	7	32	57
Fuel Oil	7	-	16	50	34
Propane	8	-	14	14	72
Coal	4	-	-	33	67
Own Source	6	-	17	33	50
Other	1	-	-	100	-
		Availability			
Electricity	57	-	11	34	55
Natural Gas	29	-	7	30	63
Fuel Oil	7	-	16	50	34
Propane	8	-	-	28	72
Coal	4	-	-	33	67
Own Source	6	-	17	33	50
Other	1	-	100	-	-

Table E-31

Importance of Transportation to Large Firms by Type of Company, Major Product and Market Orientation

Level of Importance Type of Company or Major Product	Number Reporting	Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
All Samples	141	25%	5%	16%	54%
Type of Company					
Independent	49	29	2	20	49
Headquarters	43	23	10	18	49
Branch/Division	42	21	7	10	62
Foreign-Owned	7	15	-	15	71
Major Product					
High Technology	38	32	11	18	39
Durable Goods Mfg.	25	-	4	20	76
NonDurable Goods Mfg.	27	-	4	19	77
Services, Other	51	43	4	12	41
Market Orientation					
Local Market					
0%-25% Local	101	18	8	18	56
25%-50% Local	13	38	-	-	62
51%-75% Local	6	33	-	17	50
76%-100% Local	15	47	-	20	33
Regional Markets					
0%-25% Regional	107	24	7	20	50
25%-50% Regional	13	31	-	-	69
51%-75% Regional	10	10	-	10	80
76%-100% Regional	5	20	20	-	60
National Markets					
0%-25% National	34	32	3	12	53
26%-50% National	23	22	-	22	57
51%-75% National	49	18	8	18	55
76%-100% National	29	24	10	14	52
International Markets					
0%-25% International	118	24	4	15	57
26%-50% International	16	25	19	19	37
51%-75% International	1	-	-	100	-

Most of the large firms use cheaper natural gas for heating and process use and they usually purchase energy on interruptible basis during the winter. During peak demands for natural gas with extremely cold weather, these firms are required to shift to the more expensive fuel oil and electricity. However, deregulation of domestic natural gas in the 1980s has led to plentiful supplies, which greatly reduced service interruptions among large industrial and commercial customers.

Transportation

About two-thirds of the large firm samples rated transportation moderately to highly important to their business, and more than one-half of the samples considered transportation to be very important (Table E-31). Since branches of large corporations, including foreign-owned branches are usually production plants, a larger proportion of them placed high importance on transportation compared to independent companies and corporate headquarters.

Table E-32 Importance of Different Modes of Product Transport to Large Firms

Transportation Modes	Number Reporting	Level of Importance: Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
Trucks	92	-	3%	68%	29%
Air Transportation	30	-	17	73	10
Rail Transportation	24	13	21	50	16
Barge Transportation	8	25	25	38	12
Freight Transport	26	-	8	77	15

Table E-33 Level of Satisfaction with Air Travel and Automobile for Business Travel of Large Firms

Transportation Modes	Number Reporting	Level of Importance: Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
Air Transportation	131	13%	31%	50%	6%
Automobile	61	-	11	71	18

Durable and non-durable goods manufacturers were more emphatic on transportation; three-fourths of the respondents indicated transportation was of high importance to their business. Slightly more than one-half of high technology samples considered transportation to be important. On the other hand, a large number of companies in services, trade and other industries were not very concerned with transportation.

As expected, large companies serving regional and national markets attached greater importance to transportation compared to those supplying local markets. We noted also that as the proportion of products shipped to local markets increased, the proportion of firms attaching importance to transportation declined. Conversely, more of the companies that shipped large proportions of their products to regional and national markets attached greater importance to transportation than those that sold to local markets.

Modes of Transportation

Ninety-two large firms, or 61 percent of the sample, reported trucks as their primary mode of transport (Table E-32). Almost all of these samples were satisfied with trucking. A smaller proportion of the samples reported air, rail, barge and freight transport, and they mostly indicated moderate to high levels of satisfaction for these modes.

Business Travel

More than three-fourths of the large firm samples considered business travel to be an important part of their operations (Scores of 3 and 4). Most companies reported that they used air travel, while only 41 percent reported that they used automobiles. The levels of satisfaction for both modes were fairly high (Table E-33).

Importance of Speed, Cost and Other Transportation Characteristics

Large companies primarily indicating truck transport as important, emphasized reasonable cost, reliability and quality of service (Table E-34). Speed, frequency of service, safety and other characteristics appeared less important. For air transportation, speed was the highly

Table E-34 Level of Satisfaction of Large Firms with Various Transport Modes

Transportation Modes	Number Reporting	Level of Satisfaction: Not Satisfied 1	2	3	Very Satisfied 4
		(Percent of respondents)			
Trucking					
Speed	69	-	4%	45%	51%
Cost	68	-	4	16	79
Frequency	64	-	6	45	48
Reliability	66	-	-	21	79
Traceability	63	-	5	49	46
Safety	65	-	12	40	48
Quality of Service	65	-	-	28	72
Mode Availability	27	26	26	26	22
Air Transportation					
Speed	18	-	-	28	72
Cost	18	-	6	11	83
Frequency	17	-	6	53	41
Reliability	17	-	-	18	82
Traceability	17	-	12	35	53
Safety	17	6	18	47	29
Quality of Service	18	-	-	28	72
Mode Availability	8	12	38	38	12
Rail Transportation					
Speed	14	7	-	43	50
Cost	14	-	-	29	71
Frequency	14	-	7	50	43
Reliability	14	-	-	14	86
Traceability	13	8	-	54	38
Safety	14	-	14	29	57
Quality of Service	14	-	7	29	64
Mode Availability	7	29	43	14	14
Barge/Ship Transportation					
Speed	2	-	100	-	-
Cost	2	-	-	-	100
Frequency	2	-	-	-	100
Reliability	2	-	-	-	100
Traceability	1	-	-	-	100
Safety	2	-	50	-	50
Quality of Service	2	-	-	-	100
Mode Availability	-	-	-	-	-
Commercial Freight Services					
Speed	13	-	-	38	62
Cost	13	-	8	38	54
Frequency	11	-	9	64	27
Reliability	12	-	-	25	75
Traceability	11	-	-	73	27
Safety	11	9	18	45	27
Quality of Service	12	-	-	33	67
Mode Availability	6	17	17	50	17

desirable characteristic, along with reasonable cost, reliability and quality of service. For rail transport and freight services, speed, cost and reliability were equally important.

Research and Development

More than three-fourths of the large firm samples indicated that they plan to introduce a new product or service during the next five years. Further, 66 percent of the respondents

Table E-35 Importance of Research and Development Investment to the Success of Large Firms

	Currently		In Five Years	
	Number	Percent	Number	Percent
1 Not Important	22	15%	13	10%
2 Not Very Important	28	19	12	9
3 Somewhat Important	34	24	38	28
4 Very Important	60	42	70	53
Total	144	100%	133	100%

Table E-36 Importance of Research and Development to Various Types of Large Firms

Type of Company or Major Product	Number of Respondents	Level of Importance: Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
Type of Company					
Independent	49	14%	24%	20%	41%
Headquarters	45	18	20	24	38
Branch/Division	42	12	12	24	52
Foreign-Owned	8	25	25	38	13
Major Product					
High Technology	40	5	13	23	60
Durable Goods Mfg.	24	8	25	29	38
Non-durable Goods Mfg.	26	8	27	12	54
Services, Other	54	30	19	28	24

considered research and development investments to be important to the success of their companies, and 42 percent indicated these investments to be very important (Table E-35). An increasing proportion believed that research and development will become more important during the next five years.

More than three-fourths of branches/division of large firms considered research and development to be an important part of their business (Scores of 3 and 4) (Table E-36). This proportion came to less than two-thirds for independents and less than one-half for foreign-owned branches in our sample. Similarly, high technology companies and those engaged in manufacturing stressed research and development, while about one-half of respondents in services, trade and other industries did not indicate importance of research and development for their businesses.

Large firms appeared to value highly the proprietary nature of research and development (Table E-37). More than two-thirds of the respondents conducted research and development in-house, while only 11 percent subcontracted with other firms. Less than 4 percent subcontracted with academia or the federal government.

Importance of Different Technologies

More than three-fourths of the respondents stressed the importance of high technology equipment to fully automate the production process, increase communication and information handling capabilities, and improve quality or productivity such as

Table E-37 Methods of Conducting Research and Development by Large Firms

Methods	Number of Firms	Percent of Total
In-house/internal	100	67%
Subcontract with other Firms	16	11
Subcontract with Academia	4	3
Subcontract with Federal Govt.	3	2

Table E-38 Importance of Different Type of High Technology Currently and in Five Years for Large Firms

Type of High Technology	Number of Respondents	Level of Importance: Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
Currently					
Automated Production	138	8%	14%	39%	38%
Communication/Information	140	3	17	50	31
Quality/Productivity Systems	138	5	13	49	33
Advanced Materials	132	20	22	34	23
Next Five Years					
Automated Production	132	5	9	30	57
Communication/Information	138	1	7	38	54
Quality/Productivity Systems	134	3	4	44	49
Advanced Materials	128	17	18	33	32

computer-aided design (Table E-38). Large firms were aware of the potentials of these computer-based technologies, particularly with increasing competition in the marketplace during the next five years. The proportion of companies ranking these technologies as very important increased sharply from one-third to about one-half of all companies when the time frame was extended to the next five years. However, this response did not hold for advanced materials, where the responses appeared more evenly distributed across the four levels of importance.

Independent companies, corporate headquarters and branches of U.S. corporations attached high importance to new technologies (Table E-39). Corporations emphasized automated production and communication of information, while independent companies tried to minimize production costs through equipment that improved productivity and communication. High technology and durable goods manufacturing placed high importance on equipment to improve productivity and advanced materials.

Impact of Taxes and Regulations

More than 90 percent of the large firm samples indicated significant impact of taxes and regulations on their operations (Table E-40). The respondents were emphatic on their response to taxes and regulations: 58 percent of the respondents placed a very significant impact, while only 6 percent showed small impact of taxes and regulations. This finding is consistent with most other surveys and location studies comparing economic development programs and initiatives among states, in addition to traditional business concerns such as access to labor, transportation, markets and raw materials.[38]

The perceived significant impact of taxes and regulations did not vary among independents and corporate entities, except foreign-owned branches (Table E-41). Those companies providing non-durable manufactured goods reported the most adverse impacts.

Table E-39 Importance of High Technology to Different Types of Large Firms and Major Product Groups

Type of Company or Major Product	Number Reporting	Level of Importance: Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
Equipment for more fully automated production					
Type of Company					
Independent	46	11%	17%	35%	37%
Headquarters	42	10	10	50	31
Branch/Division	40	5	10	38	48
Foreign-Owned	8	-	38	25	38
Major Product					
High Technology	37	8	14	41	38
Durable Goods Mfg.	24	-	17	50	33
Non-durable Goods Mfg.	24	-	21	29	50
Service, Other	51	16	10	39	35
Equipment for communication of information					
Type of Company					
Independents	48	4	17	44	35
Headquarters	45	2	11	60	27
Branches/Division	41	-	20	49	32
Foreign-Owned	8	13	38	25	25
Major Product					
High Technology	40	3	20	50	28
Durable Goods Mfg.	24	-	21	63	17
Non-durable Goods Mfg.	24	-	21	42	38
Service, Other	54	6	11	46	37
Other equipment to improve productivity					
Type of Company					
Independents	48	8	15	48	29
Headquarters	42	5	10	57	29
Branches/Division	41	2	12	46	39
Foreign-Owned	7	-	29	29	43
Major Product					
High Technology	40	-	8	53	40
Durable Goods Mfg.	24	4	8	67	21
Non-durable Goods Mfg.	24	-	8	46	46
Service, Other	50	12	22	40	26
Advanced materials to improve product or processes					
Type of Company					
Independents	45	24	20	33	22
Headquarters	39	26	23	21	31
Branches/Division	41	10	27	44	20
Foreign-Owned	7	29	-	57	14
Major Product					
High Technology	37	5	14	51	30
Durable Goods Mfg.	23	4	26	43	26
Non-durable Goods Mfg.	24	13	29	33	25
Service, Other	48	44	23	17	17

Table E-40 Impact of Taxes and Regulations on Business Operating Cost of Large Firms

Severity of Impact	Number of Respondents	Percent
1 No Impact	2	1%
2 Not Very Significant	8	5
3 Somewhat Significant	52	35
4 Very Significant	87	58
No Response	1	1
Total	150	100%

Table E-41 Impact of Taxes and Regulations to Different Types of Large Firms and Major Product Groups

Type of Company or Product/Service	Number of Respondents	Severity of Impact: Not Significant 1	2	3	Very Significant 4
		(Percent of respondents)			
Type of Company					
Independent	52	4%	8%	31%	58%
Headquarters	47	-	2	44	54
Branches/Division	43	-	7	35	58
Foreign-Owned	8	-	-	13	88
Major Product					
High Technology	42	2	10	43	45
Durable Goods Mfg.	25	-	-	46	54
Non-durable Goods Mfg.	27	-	-	15	85
Services, Other	56	-	8	35	58

Overall Ranking of Impacts of Taxes and Regulations on Large Companies

Sample firms ranked eight categories of taxes and regulations based on impacts on their businesses, with the highest impact being ranked 1. By using the rankings as weights, we created an overall ranking of impacts for the entire sample. The overall score for each tax or regulation was calculated as the sum of the percentages of respondents on each level of impact (scores of 1 through 8) multiplied by the level itself as weight. Hence, a low overall score means that most respondents ranked it at scores of 1 through 5, which are scores indicating high impact.

Workers' compensation had the highest impact among all taxes and regulations, followed by corporate income taxes, unemployment insurance, commercial/industrial property taxes and personal income taxes (Table E-42). These are "particularly visible taxes" that Roger Schmenner (1982) contended to be detrimental to state recruitment efforts.[39] On the other hand, sales taxes, residential property taxes and research and development tax credits were relatively less important to large firms.

Impact of Regulations on Businesses

There was no consensus among our sample of large firms regarding the impact of pollution control regulations on their businesses (Table E-43). There seemed to be as many firms that reported no impact to less impact as there were firms that reported significant to very significant impact. On employment regulations, businesses tended to attach more

Table E-42 Overall Ranking of Impacts of Taxes and Regulation on Large Firms

Tax/Regulation	Rank	Overall Score*
Worker's Compensation	1	267
Corporate Income Tax	2	328
Unemployment Insurance	3	364
Commercial/Ind Property Tax	4	380
Personal Income Tax	5	408
Sales Tax	6	518
Residential Property Tax	7	558
Research and Dev. Tax Credit	8	655

* Sum of proportion of respondents on each rank, multiplied by that rank as weight; the lowest score has the most impact.

Table E-43 Impact of Regulations on Large Firms

		Severity of Impact			
	Number of Respondents	Not Significant 1	2	3	Very Significant 4
		(Percent of respondents)			
Pollution Control Regulations					
Air Pollution	126	30%	31%	18%	21%
Water Pollution	129	24	28	25	23
Toxic Waste	129	21	32	29	18
Solid Waste	135	16	21	36	27
Employment Regulations					
Hiring and Selection	144	8	23	36	33
Hours and Wages	143	18	29	33	20
Civil Rights	144	18	25	35	22
Health and Safety	144	11	25	38	26
Liability Insurance	143	8	23	41	28

significant impact than no impact, particularly on such topics as hiring and selection, liability insurance and health and safety standards (OSHA).

Pollution control regulations did not appear to impact any particular type of company compared to the others, except for non-durable goods manufacturing (Table E-44). Food and kindred product manufacturers and pulp and paper mills generate a large amount of pollutants into the water and toxic wastes into the dump sites, so that a large proportion of these companies were impacted more than the others. On the other hand, services, trade and other industries appeared to be least concerned about pollution control regulations because they do not produce large amounts of pollutants.

Impact of Employment Regulations on Different Types of Large Firms

Most large firms indicated that employment regulations had a significant impact on their businesses (Table E-45). The impacts seemed equally severe among different types of companies and major product groups. The exceptions were large proportions of service and trade companies that were significantly impacted by civil rights (discrimination), and durable goods manufacturing firms that were impacted by liability insurance. Corporations and durable and non-durable manufacturing

Table E-44

Impact of Pollution Control Regulations on Different Types of Large Firms and Major Product Group

Type of Company or Major Product	Number of Respondents	Severity of Impact: Not Significant 1	2	3	Very Significant 4
		(Percent of respondents)			
Air Pollution					
Type of Company					
Independents	43	37%	28%	23%	12%
Headquarters	39	31	41	8	21
Branch/Division	37	24	24	24	27
Foreign-Owned	7	14	29	14	43
Major Product					
High Technology	36	25	33	22	19
Durable Goods Mfg.	24	21	42	17	21
Non-durable Goods Mfg.	23	13	17	22	48
Services, Other	43	49	30	14	7
Water Pollution					
Type of Company					
Independents	41	34	24	20	22
Headquarters	42	24	31	29	17
Branch/Division	38	16	26	26	32
Foreign-Owned	8	13	38	25	25
Major Product					
High Technology	38	21	29	26	24
Durable Goods Mfg.	24	13	29	25	33
Non-durable Goods Mfg.	25	12	16	44	28
Services, Other	42	40	33	12	14
Toxic Waste					
Type of Company					
Independents	42	29	24	31	17
Headquarters	42	24	33	24	19
Branch/Division	37	14	38	24	24
Foreign-Owned	8	-	38	62	-
Major Product					
High Technology	38	11	29	32	29
Durable Goods Mfg.	23	13	43	30	13
Non-durable Goods Mfg.	24	13	21	46	21
Services, Other	44	39	34	16	11
Solid Waste					
Type of Company					
Independents	45	18	24	36	22
Headquarters	44	20	25	32	23
Branch/Division	38	11	16	32	42
Foreign-Owned	8	-	13	75	13
Major Product					
High Technology	38	13	24	42	21
Durable Goods Mfg.	24	8	25	38	29
Non-durable Goods Mfg.	26	4	19	35	42
Services, Other	47	28	19	30	23

Table E-45

Impacts of Employment Regulations on Different Types of Large Firms and Major Product Groups

Type of Company or Major Product	Number of Respondents	Severity of Impact: Not Significant 1	2	3	Very Significant 4
		(Percent of respondents)			
Hiring and Selection Practices					
Type of Company					
Independents	50	8	14%	34%	44%
Headquarters	46	7	39	37	17
Branch/Division	40	10	13	38	40
Foreign-Owned	8	13	37	37	13
Major Product					
High Technology	40	18	15	38	30
Durable Goods Mfg.	23	9	30	43	17
Non-durable Goods Mfg.	27	4	26	30	41
Services, Other	54	4	24	35	37
Hours and Wage Regulations					
Type of Company					
Independents	50	20	28	34	18
Headquarters	45	13	40	33	13
Branch/Division	40	20	20	30	30
Foreign-Owned	8	25	25	38	13
Major Product					
High Technology	40	23	33	30	15
Durable Goods Mfg.	23	17	30	43	9
Non-Durable Goods Mfg.	27	26	26	30	18
Services, Other	53	11	28%	32	28
Civil Rights (Discrimination)					
Type of Company					
Independents	50	18	18	40	24
Headquarters	45	16	38	33	13
Branch/Division	41	22	15	32	32
Foreign-Owned	8	13	50	38	-
Major Product					
High Technology	40	25	18	35	23
Durable Goods Mfg.	23	13	35	39	13
Non-Durable Goods Mfg.	27	26	33	19	22
Services, Other	54	11	22	43	24
Health and Safety Standards (OSHA)					
Type of Company					
Independents	50	12	34	30	24
Headquarters	46	13	17	43	26
Branch/Division	40	10	18	40	33
Foreign-Owned	8	-	50	50	-
Major Product					
High Technology	40	13	35	38	15
Durable Goods Mfg.	23	4	22	43	30
Non-Durable Goods Mfg.	27	7	22	30	41
Services, Other	54	15	20	41	24
Liability Insurance					
Type of Company					
Independents	48	8	29	31	31
Headquarters	45	9	16	53	22
Branch/Division	42	5	24	38	33
Foreign-Owned	8	13	25	50	13
Major Product					
High Technology	39	13	31	33	23
Durable Goods Mfg.	24	4	17	63	17
Non-Durable Goods Mfg.	26	4	27	27	42
Services, Other	54	7	19	44	30

Table E-46 Quality of Technical Assistance on Regulations for Large Firms

	Number of Respondents	Quality of Technical Assistance: Poor 1	2	3	Excellent 4
		(Percent of respondents)			
Pollution Control Regulations					
Air Pollution	75	7%	31%	53%	9%
Water Pollution	86	6	33	51	10
Toxic Waste	89	7	39	46	8
Solid Waste	96	5	40	47	8
Employment Regulations					
Hiring and Selection	116	9	32	50	9
Hours and Wages	105	6	30	53	11
Civil Rights	106	9	33	46	11
Health and Safety	115	7	24	53	16
Liability Insurance	116	10	28	45	17

firms showed greater sensitivity to health and safety standards (OSHA) than the other groups.

Quality of Technical Assistance

Most large firms were satisfied with the quality of technical assistance available for pollution control regulations and employment regulations (Table E-46). Only about 7 percent of respondents indicated poor technical assistance with pollution control regulations. Most companies reported adequate to moderately high levels of satisfaction on technical assistance. About 9 percent of the respondents reported excellent technical assistance.

There were more responses given regarding technical assistance for employment regulations than pollution control regulations. A slightly larger percentage of respondents gave poor ratings on technical assistance for employment regulations, compared to those for pollution control regulations. However, more companies rated technical assistance on employment regulations to be moderately high and excellent, compared to their ratings on pollution control technical assistance. Except for hiring and selection regulations, more than 10 percent of respondents indicated excellent assistance on employment regulations.

Large firms that were impacted very significantly by pollution control and employment regulations also reported excellent technical assistance (Table E-47). There were only seven respondents that reported poor technical assistance. It appears that technical assistance was delivered to those most in need, and government agencies were given generally satisfactory ratings on their technical assistance.

Business Changes for the 1990s

When surveying companies about their business plans during the next five years, we covered several issues relating to changes in staffing patterns, worker training, acquisition and utilization of capital, application of new technology, and investments in research and development. We discuss our findings in this section, focusing on planned changes in staffing patterns and capital usage as these are influenced by trends in labor productivity, quality control objectives, new technology, and investments in research and development.

Economic recovery from a deep recession during the early 1980s was followed by business retrenchment, cost cutting, mergers and quality control improvements by large firms in reaction to strong competition from abroad. The sluggishness in manufacturing employment was actually driven by

Table E-47 Impact of Regulations and Quality of Technical Assistance to Large Firms

Quality of Technical Assistance	Number of Respondents	Impact of Regulations: No Impact 1	2	3	Very Significant 4
		(Percent of respondents)			
Pollution Control Regulations					
Air Pollution					
1 Poor	6	-	-	-	100%
2 Satisfactory	27	-	4	33	63
3 Highly Satisfactory	48	-	2	33	65
4 Excellent	7	-	-	14	86
Water Pollution					
1 Poor	7	-	-	-	100
2 Satisfactory	31	-	6	35	58
3 Highly Satisfactory	48	-	4	29	67
4 Excellent	9	-	-	33	67
Toxic Waste					
1 Poor	7	-	-	-	100
2 Satisfactory	38	-	5	32	63
3 Highly Satisfactory	45	-	7	29	64
4 Excellent	7	-	-	29	71
Solid Waste					
1 Poor	6	-	-	-	100
2 Satisfactory	42	-	7	33	60
3 Highly Satisfactory	47	-	6	30	64
4 Excellent	8	-	-	25	75
Employment Regulations					
Hiring and Selection Practices					
1 Poor	12	-	8	8	83
2 Satisfactory	38	-	8	24	68
3 Highly Satisfactory	60	-	5	48	47
4 Excellent	13	-	-	23	77
Hours and Wages Regulations					
1 Poor	6	-	-	17	83
2 Satisfactory	34	-	9	21	71
3 Highly Satisfactory	68	-	6	44	50
4 Excellent	14	-	-	29	71
Civil Rights (Discrimination)					
1 Poor	13	-	8	-	92
2 Satisfactory	39	-	8	28	64
3 Highly Satisfactory	55	-	5	47	47
4 Excellent	16	-	-	31	69
Health and Safety Standards (OSHA)					
1 Poor	8	-	13	-	88
2 Satisfactory	29	-	10	31	59
3 Highly Satisfactory	64	-	5	38	58
4 Excellent	19	-	-	42	58
Liability Insurance					
1 Poor	13	-	8	8	85
2 Satisfactory	33	-	9	30	61
3 Highly Satisfactory	55	-	5	42	53
4 Excellent	20	-	-	35	65

Table E-48 Planned Changes in Staffing Patterns During the Next Five Years by Large Firms

Occupational Groups	Number of Respondents	Planned Changes in Staffing Pattern: Decrease Significantly 1	2	3	Increase Significantly 4
		(Percent of respondents)			
Management	105	2%	33%	60%	5%
Professionals/Scientists/Engineers	93	-	31	56	13
Technical/ Skilled	97	-	26	65	9
Clerical/Sales	100	1	52	45	2
Unskilled Labor	93	13	48	32	7

productivity increases and shifts to newer production plants or new products by durable goods manufacturing, rather than a deindustrialization of the economy.[40] Businesses harnessed technology not only to develop new products but to improve production methods and minimize costs.

A decline in the value of the U.S. dollar relative to major currencies and expanding world markets have stimulated U.S. exports. With increasing demand for their products, manufacturers began rehiring workers. Exports have become a large contributor to economic growth and this is expected to continue with a united West European market by the end of 1992 and emerging free market orientation of Eastern Europe. However, several cost-cutting measures of large companies involve sourcing of low value products and materials from abroad or from states with low labor cost, substituting capital equipment for manual labor in assembly operations and production controls, and labor-saving innovations in new production plants.[41] In Minnesota and the rest of the U.S., the new jobs require higher level of skills and training.

Changes in Staffing Patterns

Three-fourths of large firm respondents planned to change their staffing patterns during the next five years. Consistent with current trends and outlook, businesses indicated they would see increases in management, professional and technical personnel, and reductions in clerical and unskilled labor (Table E-48). This reflects the continuing application of labor-saving capital and gains in labor productivity, particularly for unskilled labor. Emphasis on product development by large companies means increasing recruitment of scientists, engineers and other technical personnel.

Among large companies planning staffing changes during the next five years, twice as many companies planned to increase management, professionals and technical personnel than those planning reductions (Table E-49). Independent companies and corporate entities appeared to have similar propensities to increase upper level personnel. More companies in these groups were planning reductions in clerical/sales and unskilled labor compared to those that planned for increases.

Among different product groups, non-durable goods manufacturing and high technology companies showed the largest planned increases in professionals and technical personnel. Services, trade and other industries had the highest proportion of companies that planned to increase administrative (management) and clerical/ sales personnel. These are consistent with the importance and dominance of different occupational groups in these industries, such as scientists and technicians for high technology companies, and managers and sales personnel for trade and services.

Table E-49

Planned Increases in Staffing by Different Types of Large Companies and Major Product Groups

Occupational Groups	Number of Respondents	Planned Increases in Staffing Pattern: Increase Staff (Percent of respondents)	Decreasing Staff (Percent of respondents)
Type of Company			
Management Personnel			
Independents	36	64%	36%
Headquarters	37	62	38
Branch/Division	29	72	28
Foreign-owned	3	33	67
Professionals/Scientists and Engineers			
Independents	31	71	29
Headquarters	34	58	42
Branch/Division	25	80	20
Foreign-owned	3	33	67
Technical/Skilled			
Independents	33	82	18
Headquarters	34	68	32
Branch/Division	27	78	22
Foreign-owned	3	33	67
Clerical/Sales			
Independents	34	41	59
Headquarters	36	47	53
Branch/Division	27	56	44
Foreign-owned	3	33	67
Unskilled Labor			
Independents	28	43	57
Headquarters	34	41	59
Branch/Division	28	32	68
Foreign-owned	3	33	67
Management Personnel			
Major Product/Service			
High Technology	32	59	41
Durable Goods Mfg.	17	47	53
Non-Durable Goods Mfg.	21	71	29
Services, Other	35	74	26
Professionals/Scientists and Engineers			
High Technology	30	80	20
Durable Goods Mfg.	15	60	40
Non-durable Goods Mfg.	20	90	10
Services, Other	28	46	54
Technical/Skilled			
High Technology	32	81	19
Durable Goods Mfg.	16	75	25
Non-durable Goods Mfg.	20	85	15
Services, Other	29	59	41
Clerical/Sales			
High Technology	30	40	60
Durable Goods Mfg.	16	38	62
Non-durable Goods Mfg.	21	48	52
Services, Other	33	58	42
Unskilled Labor			
High Technology	28	43	57
Durable Goods Mfg.	16	38	62
Non-durable Goods Mfg.	20	35	65
Services, Other	29	38	62

Table E-50

Planned Increases in Staffing by Large Firms and Difficulty Recruiting for Various Occupations

Difficulty Recruiting	Planned Increases in Staffing		
	All	Moderate Increase	Significant Increase
	(Percent of all those contemplating increase in staffing)		
Management Personnel			
Easy to Recruit	7%	7%	-
Relatively Easy	27	25	2
Somewhat Difficult	43	39	4
Difficult to Recruit	22	21	1
Professionals/Scientists & Engineers			
Easy to Recruit	2	2	-
Relatively Easy	17	17	-
Somewhat Difficult	60	50	10
Difficult to Recruit	21	13	8
Technical/Skilled			
Easy to Recruit	4	3	1
Relatively Easy	32	29	3
Somewhat Difficult	40	37	3
Difficult to Recruit	24	19	5
Clerical/Sales			
Easy to Recruit	14	14	-
Relatively Easy	51	51	-
Somewhat Difficult	26	24	2
Difficult to Recruit	9	7	2
Unskilled Labor			
Easy to Recruit	34	31	3
Relatively Easy	40	26	14
Somewhat Difficult	23	23	-
Difficult to Recruit	3	3	-

Planned Increases in Staffing by Level of Difficulty Recruiting Staff in Various Occupations

Most large firms contemplating increasing their workforce encountered difficulty in recruiting, particularly for management, professionals and technical staff (Table E-50). Clerical/skilled and unskilled positions appeared easier to fill for these companies. Compared to the entire sample, a larger proportion of these companies experienced difficulty recruiting, particularly for upper level occupations.

Large firms found it easier to retain staff than recruit new employees, and most firms that planned to increase their staff did not have difficulty keeping their present staff (Table E-51). However, this group of companies tended to have higher difficulty retaining staff, compared to the entire sample, particularly for clerical/sales and unskilled labor. This suggests that those recruiting at lower occupational levels were also building contingencies for higher turnover rates.

Table E-51 Planned Increases in Staffing by Large Firms and Difficulty Retaining for Various Occupations

Difficulty Retaining	Planned Increases in Staffing		
	All	Moderate Increase	Significant Increase
	(Percent of all those contemplating increase in staffing)		
Management Personnel			
Easy to Retain	18%	18%	-
Relatively Easy	58	54	4
Somewhat Difficult	22	18	3
Difficult to Retain	2	2	-
Professionals/Scientists & Engineers			
Easy to Retain	8	7	1
Relatively Easy	54	48	6
Somewhat Difficult	31	26	5
Difficult to Retain	7	3	4
Technical/Skilled			
Easy to Retain	12	10	2
Relatively Easy	50	46	4
Somewhat Difficult	31	26	5
Difficult to Retain	7	6	1
Clerical/Sales			
Easy to Retain	23	23	-
Relatively Easy	43	43	-
Somewhat Difficult	30	27	3
Difficult to Retain	5	2	3
Unskilled Labor			
Easy to Retain	18	15	3
Relatively Easy	42	39	3
Somewhat Difficult	27	24	3
Difficult to Retain	12	6	6

The large firms placed high importance on rising labor costs, lack of appropriate skills, labor shortages and inadequate health benefits among personnel issues at present and during the next five years. Most companies planning staff increases attached high importance to these issues, and this relationship was intense across occupational groups (Table E-52). Also, the percentage of companies that placed high importance on personnel issues and planned for staff increases became larger as the planning horizon extended to the next five years. Evidently, rising labor costs and labor shortages will be more important issues in the future, particularly for those companies planning to increase their workforce.

Changes in Labor and Capital

Planned changes in staffing patterns and capital use by large firms suggest that there will be business expansion through acquisition of new equipment, land and buildings, and increased hiring of managers, professional and technical personnel. New equipment, working capital, inventory and other short-term or current assets tended to be substitutes for clerical and unskilled labor, while land and

Table E-52 Planned Increases in Staffing by Large Firms and Importance of Personnel Issues

Personnel Issues	Current Importance (Percent of those contemplating staff increases)	Importance In Five Years (Percent of those contemplating staff increases)
	Management Personnel	
Rising Labor Cost	81%	87
Lack of Skills	63	79
Labor Shortage	64	76
Health Benefits	87	55
	Professionals/Scientists & Engineers	
Rising Labor Cost	80	89
Lack of Skills	66	86
Labor Shortage	57	75
Health Benefits	91	97
	Technical/Skilled	
Rising Labor Cost	82	90
Lack of Skills	70	87
Labor Shortage	61	76
Health Benefits	93	97
	Clerical/Sales	
Rising Labor Cost	83	89
Lack of Skills	66	80
Labor Shortage	67	82
Health Benefits	87	98
	Unskilled Labor	
Rising Labor Cost	86	94
Lack of Skills	71	91
Labor Shortage	71	85
Health Benefits	91	100

buildings appeared complementary (Table E-53). A large number of respondents that invested in current assets also planned to reduce clerical and unskilled workers. On the other hand, planned increases in managerial, professional and technical staff followed investments in all forms of capital.

Changes in Staffing Pattern and Introduction of New Product

The apparent growth strategy of large firms was to introduce new products during the next five years and increase staffing for various occupational groups, except clerical/sales and unskilled labor (Table E-54). There were almost two companies that planned to increase staff with the introduction of new products for every one that planned to reduce its workforce.

Table E-53 Planned Changes in Staffing Pattern and Utilization of New Capital by Large Firms

Utilization of Newly Acquired Capital	Planned Changes in Staffing: Decrease Significantly 1	2	3	Increase Significantly 4
	(Number of respondents)			
Management Personnel				
New Equipment	1	17	31	4
Working Capital	2	12	29	1
Inventory	-	4	13	1
Research & Development	-	4	12	1
Land	-	8	18	1
Buildings	-	13	24	2
Extinguish Debt	-	3	3	3
Refinance Debt	2	7	10	2
Professionals				
New Equipment	-	16	26	6
Working Capital	-	14	21	7
Inventory	-	6	7	4
Research & Development	-	4	7	5
Land	-	8	12	4
Buildings	-	14	17	4
Extinguish Debt	-	4	3	1
Refinance Debt	-	9	6	3
Technical/Scientists & Engineers				
New Equipment	-	10	34	6
Working Capital	-	11	28	5
Inventory	-	3	12	3
Research & Development	-	3	9	4
Land	-	6	17	2
Buildings	-	8	25	3
Extinguish Debt	-	3	5	-
Refinance Debt	-	6	14	-
Clerical/Sales				
New Equipment	1	27	21	2
Working Capital	-	24	18	1
Inventory	-	8	9	1
Research & Development	-	8	8	1
Land	-	11	13	1
Buildings	-	17	17	2
Extinguish Debt	-	3	5	1
Refinance Debt	-	12	8	1
Unskilled Labor				
New Equipment	8	24	12	5
Working Capital	6	19	12	4
Inventory	2	7	5	3
Research & Development	3	4	7	2
Land	3	8	9	4
Buildings	3	16	11	4
Extinguish Debt	-	2	4	1
Refinance Debt	4	11	4	-

Table E-54 Planned Changes in Staffing Pattern and Introduction of New Products by Large Firms

Planned Changes In Staffing Pattern	Planned Introduction of New Products: Number Reporting	Introduce New Product	No New Product
		(Number of respondents)	
Management			
Decrease	2	2	-
Slight Decrease	34	29	5
Slight Increase	61	53	8
Increase	5	3	2
Total	102	87	15
Professionals			
Decrease	-	-	-
Slight Decrease	29	25	4
Slight Increase	50	43	7
Increase	12	12	-
Total	91	80	11
Technical/Skilled			
Decrease	-	-	-
Slight Decrease	24	22	2
Slight Increase	61	50	11
Increase	9	8	1
Total	94	80	14
Clerical/Sales			
Decrease	2	2	-
Slight Decrease	34	29	5
Slight Increase	61	53	8
Increase	5	3	2
Total	102	87	15
Unskilled Labor			
Decrease	1	1	-
Slight Decrease	51	46	5
Slight Increase	44	35	9
Increase	2	2	-
Total	98	84	14

Importance of Training to A Company's Economic Growth

Large firms placed overwhelming importance on improved manufacturing processes, quality control, customer service and marketing for continued company growth during the next five years (Table E-55). Administrative, managerial and general skills were important to these firms, while international skills and foreign languages were unimportant. The respondents were divided on the importance of basic skills, which could be related to the low importance of unskilled labor to this group.

Changes in Transportation Mode

Large firms gave a low response rate on changes in transportation modes (Table E-56). Nevertheless, most firms that planned to increase trucks, air, rail, barge and freight transport were also generally satisfied with service from these modes. Several firms that indicated a decline in their use of railroad and barges were dissatisfied with these modes.

Similarly, there were very few samples that responded to the question on satisfaction with transportation characteristics such as speed, cost, frequency and reliability. Leading

Table E-55 Importance of Training to Growth of Large Firms

Areas for Training	Importance of Training to Company Growth: Not Important 1	2	3	Very Important 4
	(Percent of respondents)			
Manufacturing				
Processes/Equipment	9%	3%	34%	55%
Engineering/Scientific	22	10	33	35
Quality Control	9	4	20	67
Marketing/Sales				
Customer Service	4	7	18	71
International Skills	33	21	32	13
Foreign Languages	49	32	13	5
Marketing/Sales	4	6	34	55
Administrative				
Clerical/Office	6	35	46	13
Computer Skills	1	12	46	41
Managerial				
Strategic Planning	2	12	39	46
Supervisory/Leadership	1	2	32	65
General Skills				
Basic Skills	22	27	30	21
Communication Skills	4	9	42	46
Career Development	9	20	45	25

Table E-56 Planned Changes in Transport Mode by Large Firms and Level of Satisfaction on Transport Mode

Planned Changes in Transport Mode	Number of Respondents	Level of Satisfaction: Not Satisfied 1	2	3	Very Satisfied 4
		(Percent of respondents)			
Trucks					
Decrease	6	-	100%	-	-
Increase	31	-	3	52%	45%
Air Transport					
Decrease	3	-	100	-	-
Increase	16	-	88	12	-
Railroad					
Decrease	9	22	11	56	11
Increase	6	-	17	50	33
Barge, Water Transport					
Decrease	4	50	25	25	-
Increase	2	-	50	-	50
Freight Services					
Decrease	2	-	-	50	50
Increase	10	-	10	80	10

Table E-57 Transport Problems of Large Companies that Planned to Increase Transport Use

Transport Problem	Transport Mode				
	Trucks	Air	Rail	Barge	Freight
	(Number of respondents increasing transport and reporting moderate to severe transport problems)				
Reduction of Air Service					
Availability	14	9	4	3	9
Quality	15	11	4	3	9
Airport Congestion	13	13	4	4	9
Lack of Rail Service	6	2	5	2	3
Deteriorating Roads and Bridges	23	11	6	3	10
Inadequate Shipping Services	10	6	3	3	6
Poor Road Access	14	7	3	2	6
Road Congestion	18	12	4	3	8
Lack of Mass Transit	4	3	2	2	2
Problems Transporting Hazardous Materials	7	6	4	2	3
Increasing Costs	26	18	6	3	14
Reduction in Trucking Service Availability	13	7	6	3	7

Table E-58 Planned Introduction of New Products by Type of Company and Major Product Group of Large Firms

Type of Company Product/Service	Sample	New Product Introduction	
		Number	Percent of Sample
All Samples	150	114	76%
Type of Company			
Independents	52	42	81
Headquarters	47	35	74
Branch/Division	43	33	77
Foreign-Owned	8	4	50
Major Product/Service			
High Technology	42	36	86
Durable Goods Mfg.	25	19	76
Non-durable Goods	27	22	81
Services, Other	56	37	66

problems for companies that planned to increase transport were increasing costs, deteriorating roads and bridges, and road congestion (Table E-57).

Introduction of New Products

More than three-fourths of the large firms planned to introduce a new product during the next five years (Table E-58). Independent companies led other groups with 81 percent that planned to introduce new products, followed by 75 percent of corporate entities and 50 percent of foreign-owned companies. Among different product groups, high technology and non-durable goods manufacturing were most innovative with more than 81 percent that planned to introduce new products, followed by 76 percent of durable goods manufacturing and 66 percent of services, trade and other industries.

Table E-59 Planned Introduction of New Products and Difficulty Raising Capital by Large Firms

Level of Difficulty Raising Capital	All Respondents		Introduce New Product	
	Number	Percent	Number	Percent
Low Level Difficulty	38	50%	29	49%
Not Difficult	24	32	19	32
Moderately Difficult	9	12	8	14
High Level Difficulty	5	6	3	5
Total	76	100%	59	100%

Difficulty Raising Capital and New Product Introduction

Most of the samples that planned to introduce a new product in five years did not have much difficulty in raising capital (Table E-59). The distribution of these companies according to levels of difficulty raising capital was similar across the entire sample. In fact, the large firms in this survey were found to be in excellent financial condition and they did not have difficulty raising capital.

Importance of Investments in Research and Development During the Next Five Years by Type of Company

Eighty-one percent of the respondents indicated the importance of research and development investments to the success of their company during the next five years (Table E-60). Four choices were allowed in this question, ranging from not important (Score of 1) to very important (Score of 4). More than one-fourth of the sample chose important (Score of 3) while twice as many, or more than one-half, of the samples chose very important (Score of 4).

This response is consistent with the expressed high importance of technology and planned introduction of new products by large firms during the next five years. Of the 114 companies that planned to introduce a new product during the next five years, 99 companies, or 87 percent, rated research and development investments as important to the continued success of their business. These companies viewed research and development investments as a direct way to harness advancing technology for new processes and new products.

Table E-60 Importance of Research and Development Investments to Different Types; of Large Companies

Type of Company Major Product/Service	Number of Respondents	Research and Development Investments	
		Important	Very Important
		(Percent of total sample)	
All Samples	144	28%	53%
Type of Company			
Independents	49	20	49
Headquarters	45	36	40
Branch/Division	42	21	60
Foreign-Owned	8	38	38
Major Product/Service			
High Technology	40	25	65
Durable Goods Mfg.	24	33	42
Non-durable Goods Mfg.	26	27	58
Services, Other	54	24	35

Corporate headquarters and their branches appeared to be very cognizant of the importance of research and development investments; a larger proportion of these companies responded positively compared to independents. Also, it is not surprising that high technology companies and manufacturers attached greater importance to research and development investments, compared to services, trade, and other industries.

Role of Government

Federal, state and local governments provide important services in education, transportation, social services, public safety, environment and housing that directly and indirectly benefit businesses. These services have high potentials for economies of scale in production and consumption, and often there are externalities in benefits or damages that require some public sector intervention. In the case of highway construction, a single planner and provider could eliminate much of the duplication of services from several providers. Private individuals, businesses and government benefit from improved highways in terms of ease of travel, reduced transport cost and increased economic activity, but there is great difficulty estimating separate

Table E-61 Importance of Government Programs to Large Firms in Minnesota

Programs	Number Reporting	Importance of Government Programs: Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
Education					
Elementary/Secondary	141	-	6%	27%	67%
Higher Education	139	1	7	35	58
Libraries	137	5	33	47	15
Social Services and Income Maintenance					
Public Welfare	138	25	44	24	7
Hospitals	138	5	25	48	22
Health	138	5	17	50	28
Employment Security	138	14	36	43	7
Transportation					
Highway	138	6	20	38	37
Air Transportation	136	12	22	40	26
Water Transport	137	58	28	8	5
Public Safety					
Police Protection	138	2	26	41	31
Fire Protection	138	2	21	37	40
Corrections	136	18	38	34	10
Protective Regulation	133	18	44	29	9
Environment and Housing					
Natural Resources	136	13	27	39	21
Parks and Recreation	136	13	35	34	19
Housing & Community Dev.	135	17	32	36	16
Sewerage	136	12	28	43	17
Other Sanitation	127	14	33	43	10

benefits and therefore assigning cost burden among these users.

In this survey, we asked businesses about the importance of government services in education, transportation, social services and income maintenance, public safety, and environment and housing to the successful operation of their businesses. We showed per capita public expenditures on these services in Minnesota compared to the national average based on the 1989 U.S. Department of Commerce publication *Government Finance* and solicited their opinions about increasing or decreasing state spending on these programs. In this way, we attempted to make an objective and quantitative measure of business priorities for various government services. A small group of companies, our focus group, helped expand on some of the issues and point out possible misinterpretation.

We obtained a high response rate on questions regarding the importance of government programs and spending levels on these programs; about 90 percent of the sample indicated their preferences (Table E-61). Although different types of businesses differ in their perceptions about the importance of specific government services, education programs received overwhelming endorsement from all groups. More than 90 percent of the respondents recognized education as important, and more than 55 percent indicated education to be very important. Further, elementary education and higher education appeared equally important to businesses. Libraries lagged behind education in terms of overwhelming importance, but 62 percent of the

Table E-62 Response of Large Firms to Government Spending on Various Programs

Programs	Number Reporting	Business' Response to Government Spending: Spend Less 1	2	3	Spend More 4
		(Percent of respondents)			
Education					
Elementary/Secondary	132	5%	30%	44%	21%
Higher Education	131	6	35	46	13
Libraries	128	12	52	30	6
Social Services and Income Maintenance					
Public Welfare	131	49	40	8	3
Hospitals	131	19	52	26	3
Health	130	12	43	37	8
Employment Security	131	41	46	9	4
Transportation					
Highway	129	7	37	44	12
Air Transportation	129	9	52	33	7
Water Transport	129	43	47	9	1
Public Safety					
Police Protection	130	2	41	46	12
Fire Protection	131	2	40	50	9
Corrections	130	7	61	23	8
Protective Regulation	128	23	56	16	5
Environment and Housing					
Natural Resources	131	6	47	35	11
Parks and Recreation	131	13	54	25	8
Housing & Community Dev.	131	20	47	27	6
Sewerage	130	6	52	37	5
Other Sanitation	123	7	54	34	5

respondents ranked library services as important.

The next group of important programs were hospitals and health services, and police and fire protection. About three-fourths of respondents ranked hospitals and health services as important government programs. Two-thirds of respondents considered police and fire protection important.

On the other hand, public welfare and employment security were not important government programs to large businesses. Less than one-third of respondents indicated importance of public welfare, and respondents were evenly divided on the importance of employment security. Similarly, the respondents did not indicate high importance of corrections and protective regulations, in spite of the high importance that they attached to police and fire protection.

Three-fourths of respondents indicated that highways were important to their businesses, while two-thirds indicated air transportation to be important. However, almost all respondents attached low importance to water transportation. The respondents were divided in their opinion of environmental and housing programs, with a slight majority favoring these programs.

Business Perceptions About Government Spending

Businesses' response to government spending reflected the relative importance that they attached to the various programs (Table

Table E-63 Importance of Education Programs to Different Types of Large Firms

Type of Product/Service	Number Reporting	Importance of Education Programs: Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
Elementary/Secondary Education					
High Technology	39	-	5%	33%	62%
Durable Goods Mfg.	24	-	4	33	63
Non-durable Goods Mfg.	26	-	8	19	73
Services, Other	52	-	8	23	69
Higher Education					
High Technology	39	-	3	36	62
Durable Goods Mfg.	24	-	13	42	46
Non-durable Goods Mfg.	26	-	4	31	65
Services, Other	50	2	10	32	56
Libraries					
High Technology	39	-	46	41	13
Durable Goods Mfg.	23	9	30	57	4
Non-durable Goods Mfg.	25	8	24	48	20
Services, Other	50	6	28	48	18

E-62). Higher spending was advocated for education, but less spending was recommended for libraries. Reduced spending levels were strongly indicated for social services and income maintenance, particularly public welfare and employment security.

Likewise, a majority of large firms recommended an increase in spending on highways, police and fire protection. A majority also indicated reduced spending for airports, water transport, corrections and protective regulations. With environment and housing, respondents were divided over these programs' importance to businesses, and a larger number suggested lower spending on these programs.

The strong recommendations for reduced spending on social services and income maintenance are not surprising because these are "business climate" issues; such spending is frequently cited as the reason for high state taxes, labor cost and other costs of doing business in the state. In addition, several researchers have argued that increased taxation to provide more welfare or other transfer payments retards economic growth, while increased taxation to provide more education, health services and better roads and highways enhances economic growth.[42]

Per capita state spending on social programs surpassed the national average by a wide margin. On the other hand, increased spending for education and highways were advocated to improve the competitiveness of the state versus other states and countries, although per capita expenditures on these programs also exceeded the national average by wide margins. For example, per capita state spending on highways and higher education were 46 percent and 28 percent higher, respectively, than the national average.

Importance of Government Programs in Education

Government programs in education received wide support from our sample of large firms (Table E-63). High technology companies and manufacturing firms need educated and trained workers and they depend on government programs to create this

Table E-64 Response to Government Spending on Education by Different Types of Large Firms

Type of Company Product/Service	Number Reporting	Appropriateness of Spending on Education: Spend Less 1	2	3	Spend More 4
		(Percent of respondents)			
Elementary/Secondary Education					
High Technology	34	3%	32%	44%	21%
Durable Goods Mfg.	24	8	46	25	21
Non-durable Goods Mfg.	24	8	29	46	17
Services, Other	50	4	22	52	22
Higher Education					
High Technology	34	6	35	38	21
Durable Goods Mfg.	24	4	54	33	8
Non-durable Goods Mfg.	24	12	29	54	4
Services, Other	49	4	29	53	14
Libraries					
High Technology	34	9	50	38	3
Durable Goods Mfg.	24	12	63	25	-
Non-durable Goods Mfg.	23	17	57	17	9
Services, Other	47	11	47	32	11

workforce. Several major U.S. corporations have pioneered business involvement in education and training, both in terms of extensive training for employees and major grant programs to universities.[43] Service and trade companies employed large numbers of clerical, sales and unskilled labor, but they were as supportive of education as the manufacturers and high technology companies. On the other hand, libraries generated less intense response from all groups.

Government Spending on Education

Seventy-four percent of respondents in services and trade industries favored higher spending on elementary/secondary education (Table E-64). Much of the workforce in these industries are clerical, sales and unskilled labor, yet they need strong command of basic skills such as arithmetic and reading comprehension to compete during the 1990s. Most of the high technology companies and non-durable goods manufacturers also supported higher spending on education, while a majority of durable goods manufacturers appeared less enthusiastic on education spending. Libraries received less support for government spending than did education among all types of large companies.

All large firms advocated increased spending on education regardless of their levels of difficulty recruiting personnel. We did not find any clear relationship between levels of difficulty recruiting managers, professionals and technical personnel with advocacy for higher education spending. Although this could be attributed to the practice of nationwide recruiting by large firms for upper level personnel, there were neither clear correlations between spending recommendations on elementary/secondary education and levels of difficulty recruiting clerical/sales and unskilled workers. These low skilled workers are generally available locally, and their skill levels depend on the quality of elementary/secondary education.

Those companies that planned to introduce a new product in five years were emphatic on the issue of government spending on education (Table E-65). More than two-thirds

Table E-65

Importance and Appropriateness of Government Spending on Education by Large Firms that Planned to Introduce New Product

Introduce New Product in Five Years	Number Reporting	Importance of Government Spending on Education: Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
Elementary/Secondary Education					
Introduce New Product	107	-	7%	23%	70%
No New Product	30	-	7	40	53
Higher Education					
Introduce New Product	106	-	6	29	65
No New Product	30	3	13	50	33
Libraries					
Introduce New Product	105	3	33	47	17
No New Product	29	14	31	52	3

	Number Reporting	Appropriateness of Government Spending on Education: Spend Less 1	2	3	Spend More 4
		(Percent of respondents)			
Elementary/Secondary Education					
Introduce New Product	99	4%	28%	45%	22%
No New Product	30	10	33	40	16
Higher Education					
Introduce New Product	79	4	34	47	14
No New Product	30	13	37	40	10
Libraries					
Introduce New Product	99	11	49	29	8
No New Product	29	14	55	31	-

of these companies ranked government spending on education as very important. In addition, a larger proportion of these innovative companies favored higher spending on education compared to those that did not plan to introduce a new product.

Government Spending on Transportation

The manufacturing companies in our sample indicated that highway transportation was of high importance to their businesses; while high technology, and services and trade companies were less emphatic on the importance of highway transportation (Table E-66). Air transportation ranked highly among manufacturers and high technology companies.

Water transportation received very low levels of importance among all groups of respondents, in large part because only eight companies in our sample of 150 used barge and ship as primary transport modes. Barge and ship transportation are used mainly for grains, coal and other high-bulk, low-value products that were not handled by most of our sample firms.

Table E-66 Importance of Transportation Programs to Different Types of Large Firms

Product/Service	Number Reporting	Importance of Transportation Programs: Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
Highway Transportation					
High Technology	38	8%	26%	32%	34%
Durable Goods Mfg.	24	-	8	63	29
Non-durable Goods Mfg.	26	-	4	42	54
Services, Other	50	10	28	28	34
Air Transportation					
High Technology	37	11	22	46	22
Durable Goods Mfg.	24	8	17	63	13
Non-durable Goods Mfg.	26	15	15	27	42
Services, Other	49	12	29	31	29
Water Transportation					
High Technology	38	68	24	5	3
Durable Goods Mfg.	24	58	21	17	4
Non-durable Goods Mfg.	26	73	19	8	-
Services, Other	49	43	41	6	10

Table E-67 Appropriateness of Government Spending on Transportation to Different Types of Large Firms

Major Product/Service	Number Reporting	Appropriateness of Spending on Transportation: Spend Less 1	2	3	Spend More 4
		(Percent of respondents)			
Highway Transportation					
High Technology	34	6%	53%	32%	9%
Durable Goods Mfg.	24	4	46	38	12
Non-durable Goods Mfg.	25	8	20	48	24
Services, Other	46	9	30	54	7
Air Transportation					
High Technology	34	9	56	35	-
Durable Goods Mfg.	24	8	50	29	13
Non-durable Goods Mfg.	25	8	52	32	8
Services, Other	46	9	50	33	9
Water Transportation					
High Technology	33	39	58	3	-
Durable Goods Mfg.	24	33	54	12	-
Non-durable Goods Mfg.	25	64	28	8	-
Services, Other	47	40	47	11	2

Table E-68 Appropriateness of Government Spending on Transportation and Satisfaction with Transport Modes by Large Firms

Satisfaction with Transport Mode	Number Reporting	Appropriateness of Spending on Transportation: Spend Less 1	2	3	Spend More 4
		(Percent of respondents)			
Highway Transportation					
Primary Mode = Trucks					
1 Not Satisfied	-	-	-	-	-
2 Somewhat Satisfied	3%	-	33%	67%	-
3 Moderately Satisfied	56	2	36	48	14
4 Very Satisfied	25	8	24	52	16
Air Transportation					
Primary Mode = Air					
1 Not Satisfied	-	-	-	-	-
2 Somewhat Satisfied	4	-	50	50	-
3 Moderately Satisfied	21	5	33	48	14
4 Very Satisfied	3	-	67	33	-
Water Transportation					
Primary Mode = Water					
1 Not Satisfied	2	50	50	-	-
2 Somewhat Satisfied	2	50	50	-	-
3 Moderately Satisfied	3	-	-	100	-
4 Very Satisfied	1	-	-	100	-

The large companies that responded to the appropriateness of government expenditures on transportation differed in their opinion depending on the types of products (Table E-67). Non-durable goods manufacturing, and services and trade tended to favor greater spending on highways, while high technology companies and durable goods manufacturing showed less support for this type of spending. Since high technology companies and durable goods manufacturing placed high importance on highways, it seemed contradictory that a large proportion of these companies also advocated reduced spending (score of 2). However, high technology and durable goods manufacturing typically transport low-bulk, high-value products so that they might not be heavy users of highways. In this case, the current condition and spending levels on highways might be adequate for their needs. On the other hand, non-durable goods manufacturing and trade industries were heavy users of highways, frequently transporting high-bulk, low-value products. They advocated highway improvements to lower their transport costs.

A majority of companies belonging to different product groups advised slightly reduced spending on air transportation, in spite of expressed high importance of this mode to their businesses. Companies already had high levels of satisfaction with airports, particularly in the Twin Cities, which could have caused them not to recommend larger expenditures. On the other hand, spending on water transportation fared poorly with our sample of large firms and most companies suggested spending cuts.

Large companies that use trucks as a primary mode of transport expressed a high level of satisfaction with highways (Table E-68). A large proportion of these companies also advocated increased spending on highways.

Similarly, those companies that rely heavily on air transport were generally satisfied with this mode, and a large proportion advocated increased spending on airports. For water transportation, there are very few firms dependent on this mode to allow for inferences.

Table E-69 Importance of Environment and Housing Programs to Different Types of Large Firms

Type of Product/Service	Number Reporting	Importance of Environment and Housing Programs: Not Important 1	2	3	Very Important 4
		(Percent of respondents)			
Natural Resources					
High Technology	37	24%	27%	35%	14%
Durable Goods Mfg.	22	5	23	55	18
Non-durable Goods Mfg.	26	-	27	38	35
Services, Other	51	16	29	35	20
Parks and Recreation					
High Technology	37	22	35	30	14
Durable Goods Mfg.	22	-	27	55	18
Non-durable Goods	26	8	27	27	38
Services, Other	51	14	41	31	14
Housing Programs					
High Technology	37	22	32	32	14
Durable Goods Mfg.	22	5	32	55	9
Non-durable Goods Mfg.	26	27	35	15	23
Services, Other	50	14	30	40	16
Sewerage					
High Technology	36	14	17	50	19
Durable Goods Mfg.	22	-	27	59	14
Non-durable Goods Mfg.	26	12	31	35	23
Services, Other	52	15	35	37	13
Other Sanitation					
High Technology	34	9	38	38	15
Durable Goods Mfg.	19	5	16	68	11
Non-durable Goods Mfg.	25	24	36	36	4
Services, Other	49	16	35	39	10

Government Spending on the Environment and Housing

Large firms differed widely in their opinion on government programs for the environment and housing (Table E-69). The number of non-respondents and the proportion of mid-range responses increased considerably for this set of government programs. Nevertheless, high technology and manufacturing companies appeared very concerned with natural resources, sewerage and other sanitation, perhaps due to their need for process water and regulations about disposal of by-products.

A high proportion of large firms expressed fiscal prudence by advocating reduction in government expenditures for these programs (Table E-70). Even high technology companies and manufacturers that placed importance on government spending on natural resources and sewerage advocated reduced spending. However, there were only a few companies that strongly advocated reduced spending on natural resources and sewerage (score of 1). This was matched by companies that strongly advocated increased spending (score of 4). More than two-thirds of respondents advocated reduced spending

Table E-70

Appropriateness of Government Spending on Environment and Housing to Different Type of Large Firms

Type of Major Product/Service	Number Reporting	Appropriateness of Spending on Social and Environmental Programs: Spend Less 1	2	3	Spend More 4
		(Percent of respondents)			
Natural Resources					
High Technology	33	9	61	18	12
Durable Goods Mfg.	23	9	35	43	13
Non-durable Goods Mfg.	25	4	28	48	20
Services, Other	50	4	54	36	6
Parks and Recreation					
High Technology	33	12	64	18	6
Durable Goods Mfg.	23	17	43	30	9
Non-durable Goods Mfg.	25	16	52	20	12
Services, Other	49	10	55	30	6
Housing Programs					
High Technology	33	27	52	12	9
Durable Goods Mfg.	23	13	48	35	4
Non-durable Goods Mfg.	25	28	40	28	4
Services, Other	50	14	46	34	6
Sewerage					
High Technology	32	6	50	38	6
Durable Goods Mfg.	23	4	48	39	9
Non-durable Goods Mfg.	25	4	64	32	-
Services, Other	50	8	48	38	6
Other Sanitation					
High Technology	30	7	53	37	3
Durable Goods Mfg.	21	5	48	43	5
Non-durable Goods Mfg.	25	8	68	20	4
Services, Other	47	8	49	36	6

for parks and recreation and housing programs.

Government Spending on Social Services

A focus group of companies advised us on emerging business issues of the 1990s. This group argued against government spending on public welfare, health, employment security and workers' compensation because of their effect on employee payroll taxes and insurance costs. Our sample of large firms generally recommended spending cuts on these programs (Table E-71), although we could not correlate apprehensions on rising labor costs with advocacy for reduced spending. Some companies were very concerned with rising labor costs and yet they advocated increased spending on public welfare and employment security. On the other hand, some companies that were concerned with declining labor supply recommended increased spending on public welfare, perhaps in anticipation that this could increase the labor pool.

Those companies that were concerned with employee health benefits and retirement favored increased government spending on

Table E-71 Appropriateness of Government Spending on Social Services and Emerging Importance of Personnel Issues

Importance of Personnel Issues in Five Years	Number Reporting	Appropriateness of Spending on Social Services: Spend Less 1	2	3	Spend More 4
		(Percent of respondents)			
Spending on Public Welfare					
Rising Labor Cost					
1 Not Important	2	50%	50%	-	-
2 Somewhat Important	15	47	53	-	-
3 Important	43	49	47	2	2
4 Very Important	67	49	34	12	4
Declining Labor Supply					
1 Not Important	17	65	29	-	6
2 Somewhat Important	21	43	57	-	5
3 Important	33	58	39	3	-
4 Very Important	54	44	35	15	6
Spending on Employment Security					
Rising Labor Cost					
1 Not Important	2	50	50	-	-
2 Somewhat Important	15	27	73	-	-
3 Important	43	40	47	7	7
4 Very Important	67	46	37	13	3
Declining Labor Supply					
1 Not Important	17	53	47	-	-
2 Somewhat Important	21	19	76	-	5
3 Important	33	55	42	3	-
4 Very Important	54	43	30	20	7
Spending on Health					
Employee Health Benefits					
1 Not Important	2	-	-	-	100
2 Somewhat Important	3	67	-	-	33
3 Important	32	9	41	41	9
4 Very Important	89	11	44	39	6
Employee Retirement					
1 Not Important	3	-	33	-	67
2 Somewhat Important	35	20	43	26	11
3 Important	53	9	45	42	4
4 Very Important	30	7	30	57	7

health benefits. Aging of the workforce makes health and retirement important issues of the 1990s, and our respondents indicated their concern on these issues.[86]

Summary and Conclusions

This report presents the results of our survey of 150 large firms in Minnesota. We asked for their appraisal of current business conditions in the state, future plans and the role of government during the 1990s. Our samples were distributed among different types of companies and industries in similar

proportion as the population of large firms. These firms tended to be old and established, in sound financial condition and serve primarily regional and national markets. These were also innovative companies, investing in research and development and looking at new product introduction as a major source of growth.

Current Issues and Concerns

The large firms were satisfied with the state's infrastructure. Supplies of natural gas, fuel oil and electricity were viewed as adequate and reliable, and they were reasonably priced. More than three-fourths of the respondents indicated that they were satisfied with their energy sources. Similarly, the large firms rated transportation to be very important to their business, particularly those manufacturing firms that ship to national markets. Six of every seven respondents indicated their satisfaction with trucking, air transport and commercial freight services.

Two-thirds of the large firms indicated that they sought investment capital during the last five years, primarily from national sources. Three-fourths of the respondents did not have difficulty raising capital, due largely to their sound financial condition. About one-half of the firms had a debt-to-equity ratio of 1:1 or less; and two-thirds of the firms had ratios of less than 2:1. Most of the firms sought capital for new equipment, acquisition of land and buildings, and for working capital.

Management and professional labor groups were very important to large firms, and they experienced difficulty recruiting for these groups. Technical/skilled labor were important to them and they were also harder to recruit, compared to clerical/sales and unskilled labor. The most often cited reasons for recruiting difficulty were personal taxes, labor shortage and lack of skills. Cost of labor was also an important factor, but climate/weather did not appear to be important. On the other hand, retention of personnel was not a problem with most large firms. For the very important management group, 77 percent of respondents indicated relative ease of retention.

Rising cost of employee health benefits and rising cost of labor were overriding personnel issues to most large firms. Anticipating an aging of the population (and workforce), the large firms indicated their concern about declining labor supply and retirement benefits. Meanwhile, current employee benefits and concerns such as parking/commuting, day care and flexible work schedules were not significant personnel issues to large firms.

Employee training was very important to the large firms. Ninety-six percent of the respondents indicated that they offered formal training programs to their employees, and most of these firms increased their programs compared to five years ago. Most frequently cited topics of training programs were quality improvement, customer service, manufacturing processes and marketing techniques. The quest for productivity and quality improvements through labor training was common among large companies, whether they are independent firms, corporate entities or foreign-owned branches or subsidiaries. Large numbers of high technology companies, manufacturing firms, and service, trade and other companies considered training for productivity and quality improvements to be very important.

Issues and Plans for the 1990s

Three-fourths of the large firms planned to change their staffing pattern during the next five years. Consistent with business trends and outlook, the large firms indicated that they would see increases in management, professional and technical personnel, and reductions in clerical and unskilled labor. Most of the companies that planned to increase staff were also wary of rising labor costs, lack of appropriate skills, future labor shortages and employee health benefits. They placed high importance on training programs for company growth during the next five years.

Business expansion would occur through introduction of new products, acquisition of new equipment, land and buildings, and increased hiring of managers, professionals and technical personnel. More than three-fourths of the large firms indicated that they plan to introduce a new product during the

next five years. More than one-half of the respondents considered research and development investments to be very important to the success of their business in five years. New technologies that will become very important are automation equipment, communication/information systems and quality/productivity equipment and systems.

Most firms that planned to increase trucks, air, rail and commercial freight services were generally satisfied with these transport modes. Leading problems in the future would be increasing costs, deteriorating roads and bridges, and road congestion.

Role of Government

We obtained a high response rate on questions regarding the impact of taxes and regulations, and the importance of government programs and spending levels on these programs. More than 90 percent of the large firms indicated significant impact of taxes and regulations on their operations. Workers' compensation had the highest impact among all taxes and regulations, followed by corporate income taxes, unemployment insurance, commercial/ industrial property taxes, and personal income taxes. On the other hand, sales taxes, residential property taxes and research and development tax credits were less important to large firms.

Pollution control regulations appeared important only to those firms that were heavily impacted, such as companies that generated substantial waste products. In general, large firms were satisfied with technical assistance available for compliance with these regulations.

Most large firms indicated that employment regulations had a significant impact on their business. The impacts of various regulations seemed uniform among different types of companies, except for service and trade companies that were more adversely affected by civil rights (discrimination) and durable goods manufacturing firms severely impacted by product liability insurance. Government agencies were given satisfactory ratings for technical assistance on these regulations.

More than 90 percent of the respondents indicated government programs in education as important; and more than 55 percent rated education as very important. The next group of important programs were hospitals and health services, followed by police and fire protection and highways and air transportation. On the other hand, public welfare and employment security were not important programs to large businesses.

Primary/secondary schools and university/ college institutions were important sources of training to large firms, second only to in-house training programs. While five of every six respondents were satisfied with university/ college institutions, more than one-half of these firms were not satisfied with primary/ secondary education. In addition, two-thirds of these firms advocated increased spending for primary/secondary education, in spite of a state spending level that was already 16 percent higher than the national average.

Likewise, the large firms recommended increased spending on highways, police and fire protection in spite of state spending levels that were up to 46 percent above the national average. A majority of firms indicated reduced spending for airports, water transport, corrections and protective regulation, environment and housing.

There were strong recommendations for reduced spending on social services and income maintenance, such as public welfare and employment security. The state per capita spending levels on these programs were higher than the national average by 37 percent and 58 percent, respectively.

Conclusion

Minnesota is home to a large number of national and multinational companies. It ranks sixth among states in the number of large corporate headquarters per million residents. These firms employ 62 percent of all non-farm workers and they provide attractive salaries, wages and benefits. Our survey showed these large firms to be innovative and highly competitive. Most of

their products and services are shipped to regional and national markets. They are generally satisfied with the state's physical and capital infrastructure, including energy and transportation systems.

Business growth during the 1990s will come from new product introductions; increased hiring of management, professional and technical personnel; and quality and productivity improvements. Large firms experienced significant difficulty recruiting managers, professionals and technical employees, but they reported little problem retaining them. Clerical and unskilled workers will become less important to large firms, as new technologies and manufacturing techniques demand higher skill levels.

The large firms were concerned about labor shortages and the lack of appropriate skills. They strongly recommended increased government spending on education. In addition, highways should accommodate growth, and government should increase spending to maintain and improve the transportation system. This advocacy for spending was in spite of the state's above average spending on these programs. On the other hand, spending on most other programs were viewed as excessive and contributing to the high cost of government. The most disliked government programs were in the areas of public welfare and employment security.

Indeed, the large firms were planning for growth during the 1990s and they had indicated the factors necessary to bring about this growth. Government has an important role in providing basic services, maintaining and improving the infrastructure and providing quality education.

Endnotes

1. State Policy Research Inc., "Economic Development Winners," *State Policy Reports*, Vol.8, No. 20, Alexandria, VA., pp.2-3.

2. Minnesota Department of Trade and Economic Development, *Minnesota Living*, 1990, St. Paul, MN., p. 4.

3. *Id.*, p.4. See also "100 Largest Private Companies," *Corporate Report Minnesota*, December 1990.

4. *Minnesota Living, op. cit., p.4.* See also, "Regional 100-Non-Minnesota Companies Prominent in the State's Economy," *Corporate Report Minnesota*, April 1990.

5. David Zielinski. 1990. "An Uneasy Edge," *Corporate Report Minnesota*, January 1990, pp. 66-90. See also Breandan O'Huallachain. 1989. "Agglomeration of Services in American Metropolitan Areas," *Growth and Change*, Summer 1989.

6. State Policy Research Inc., *op. cit.*, p. 2. See also M. Ross Boyle. 1990. "Corporate Headquarters," *Commentary*, Winter, 1990.

7. E.R. Hansen, *et. al.* 1990, "Enterprise Florida: Growing the Future," *The Survey of Regional Literature*, No. 13, March 1990, p. 19.

8. *Id.*, p.19.

9. *Id.*, p.19.

10. *Id.*, p. 19.

11. *Id.*, p. 19. See also New York, Gifford Pinchott III. 1985. *Intrapreneuring*, (New York, Harper & Row, 1985).

12. E.R. Hansen, *et. al.* 1990. *op. cit.*

13. U. S. Small Business Administration, "USELM Microdata Files," Minnesota, 1982-86," Washington D.C., August 1988.

14. *Id.*

15. Ernesto C. Venegas. 1988. "Job Creation in Urban and Rural Areas of Minnesota by Small Businesses and Large Corporations," Minnesota Department of Trade and Economic Development, St. Paul, MN, December 29, 1988.

16. James Miller. 1987. "Recent Contributions of Small Businesses and Corporations to Rural Job Creation," Economic Research Service Staff Report No. 861212, Washington, D.C., Feb. 1987. See also Steven R. Kale. 1989. "Theoretical Contributions to the Understanding of U.S. Nonmetropolitan Economic Change," *Economic Development Quarterly*, Vol. 3., No.1, February 1989, and John M. Redman and Thomas D. Rowley. 1989. "State-Level Comparison of Metro and Nonmetro Economic Performance, 1979-86," Economic Research Service, USDA., Washington D.C., November 1989.

17. Ernesto C, Venegas. 1988., *op. cit.* See also Minnesota Department of Job and Training, Distribution of Covered Establishment and Employment, First Quarter (March), St. Paul, MN., Annual.

18. *Id.*, p.6. See also Metropolitan Council, "Forecasts of Population, Households and Employment, 1990 and 2000," St. Paul, MN, Oct. 1986, Bill Byers, *et. al.*, "Diagnosing the Twin Cities Economy," Metropolitan Council, July 1988, and Minnesota Department of Jobs and Training, *Labor Market Review*, (Monthly), St. Paul, MN.

19. *Id.*, pp. 12-14.

20. *Id.*, p. 13.

21. David Stamps. 1990. "Twin Cities Lone Prairie," *Information Week*, March 26, 1990, p. 43.

22. *Corporate Report Minnesota*, "High Tech 100," Oct. 1990.

23. *Corporate Report Minnesota*, "100 Largest Private Companies," December 1990, Separate Issues for 100 largest publicly owned companies and regional (non-Minnesota) companies doing business in the state.

24. David Birch. 1979. "The Job Creation Process," MIT Program on Neighborhood and Regional Change, Cambridge, MA.

25. Tom Bergeron. 1987 (ed.). "Corporate Executives Rate Site Selection Factors," *Area Development*, December 1987. See also H. Brinton Milward and Heidi Hosbach Newman. 1989., "State Incentive Packages and the Industrial Location Decision," *Economic Development Quarterly*, Vol.3, No. 3, August 1989.

26. Ross Boyle. 1990. *op. cit.*, p. 21.

27. *Id.*, p.21.

28. "The Changing Work Force: Population Trends will Continue to Affect Manufacturers," *Focus*, Vol. 3, No. 6, (National Center for Manufacturing Sciences, Ann Arbor, MI). See also Office of Technology Assessment, *Technology and the American Economic Transition: Choices for the Future*, Washington D.C., U.S. Government Printing Office, May 1987.

29. See for example, Paul G. Hoel. 1962. *Introduction to Mathematical Statistics*, (New York, John Wiley, 3rd ed.) pp. 112-113.

30. *Id.*, pp. 110-117.

31. See Shirley Dowdy and Stanley Wearden. 1983. *Statistics For Research*, (New York, John Wiley, 1982), pp. 164-165 and Paul G. Hoel. 1962., *op. cit.*, p. 110 and 149.

32. This range is set at two standard deviations on both sides of the mean and defines 95 percent of the normal curve area, See Paul G. Hoel. 1962. *op.cit.*, p. 111.

33. Shirley Dowdy and Stanley Wearden. 1983. *op.cit.*, p. 164, and Paul G. Hoel. 1962. *op.cit.*, p. 115.

34. See Paul G. Hoel. 1962., *op. cit.*, pp. 148-151.

35. See Office of Technology Assessment. 1988., *op.cit.*, p. 151

36. See for example, H. Brinton Milward and Heidi Hosbach Newman. 1989., *op. cit.*, p. 216.

37. See for example, Tom Bergeron. 1987 (ed.)., *op.cit.*, p. 22.

38. H. Brinton Milward and Heidi Hosbach Newman. 1989., *op. cit.*, p. 208.

39. Roger Schemenner. 1982. *Making Business Location Decisions*. (New Jersey, Prentice Hall, 1982). The effects of taxes and regulations on state economic growth and industry recruiting have spurred debate beginning in mid-1980s. For review of studies and surveys, see H. Brinton Milward and Heidi Hosbach Newman. 1989., *op. cit.* and Edyth Rothman. 1988. "Taxes and Growth: New Evidence," Minnesota Chamber of Commerce, February 1988.

40. See Gerald A. Carlino. 1989. "Deindustrialization in the Nation and its Regions," *Business Review*, (Federal Reserve Bank of Philadelphia), Jan/Feb 1989, and "Midwest Manufacturing: Shining Up the Rustbelt," *Chicago Fed Letter*, (Federal Reserve Bank of Chicago), April 1989.

41. Gerald A. Carlino. 1989. stated the popular view that "technical innovation made it possible for manufacturing to shift its location from high cost states to low cost states outside the industrial core," *Ibid.*, p. 25.

42. Several authors have argued that the use of tax monies are more important and offsetting to the effects of high tax rates, see for example, Stephen P.A. Brown. 1987. "New Directions for Economic Growth: Redesigning Fiscal Policies in Louisiana, New Mexico and Texas," *Economic Review*, (Federal Reserve Bank of Dallas), July 1987.

43. Several major corporations (AT & T, Ford Motor Co., General Motors Corp., Texas Instruments, Inc.) have pioneered business involvement in education and training in terms of extensive employee training programs and major grants to universities. "Major Companies Invest in Human Capital," *Focus*, Vol. 3, No. 6, June 1990, (National Center for Manufacturing Sciences, Ann Arbor, MI).

Appendix:

The Minnesota Enterprise 1990 Survey of Business

The MINNESOTA ENTERPRISE 1990 BUSINESS SURVEY

THE MINNESOTA ENTERPRISE 1990 SURVEY OF BUSINESS

BACKGROUND INFORMATION

1. How many years has your company been in business? _____ years

2. What type of company is your facility? (Circle one)
   1. Independent
   2. U.S. headquarters of a multi-location company
   3. Branch/Division/Subsidiary of U.S. company
   4. Branch/Division/Subsidiary of a foreign company

3. What is your primary product/service and its SIC Code classification (if known)?
   Primary Product _____
   SIC Code _____

4. How many people does your company employ in:

Minnesota (Circle one)	*Worldwide, incluing Minnesota (Circle one)*
1. Fewer than 20	1. Fewer than 20
2. 20 to 99	2. 20 to 99
3. 100 to 499	3. 100 to 499
4. 500 or more	4. 500 or more

5. In 1988, what were your company's: (Circle one)

Annual Revenues	*or*	*Assets Managed*
1. Less than $0.5 million		1. Less than $25 million
2. $0.5 million to $0.9 million		2. $25 million to $49.9 million
3. $1 million to $4.9 million		3. $50 million to $74.9 million
4. $5 million to $24.9 million		4. $75 million to $99.9 million
5. $25 million to $99.9 million		5. $100 million to $249.9 million
6. $100 million to $249.9 million		6. More than $250 million
7. More than $250 million		

6. Where do you sell your products? Please indicate the approximate percentage:
   _____% Local (Minnesota)
   _____% Regional (Midwest)
   _____% National
   _____% International
   100 % Total

7. If you currently do not export to foreign countries do you plan to export in the next five years?
   _____Yes _____No

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A project of the Minnesota Department of Trade and Economic Development/Policy Analysis, Science and Technology Division

LABOR AVAILABILITY AND COSTS

8. Is your business labor intensive or capital intensive? (Circle appropiate number.)

Labor Intensive			*Capital Intensive*	
1	2	3	4	

9. Indicate the importance of the following occupational groups in your business. (Circle appropriate numbers.)

	Not Important			*Very Important*	
Management	1	2	3	4	
Professionals/Scientists & Engineers	1	2	3	4	
Technical/Skilled	1	2	3	4	
Clerical/Sales	1	2	3	4	
Unskilled	1	2	3	4	

10. How difficult is it to recruit and retain staff with appropriate training and experience? (Circle appropriate numbers and rate only those categories which apply.)

	Recruit				***Retain***				
	Easy			*Difficult*	*Easy*			*Difficult*	
Management	1	2	3	4	1	2	3	4	
Professionals/ Scientists & Engineers	1	2	3	4	1	2	3	4	
Technical/Skilled	1	2	3	4	1	2	3	4	
Clerical/Sales	1	2	3	4	1	2	3	4	
Unskilled	1	2	3	4	1	2	3	4	

11. If it is difficult to recruit or retain employees, how important are the following reasons: (Circle appropriate numbers.)

	Recruiting				***Retaining***				
	Not Important			*Very Important*	*Not Important*			*Very Important*	
Cost of Labor	1	2	3	4	1	2	3	4	
Lack of Skills	1	2	3	4	1	2	3	4	
Labor Shortage	1	2	3	4	1	2	3	4	
Personal Taxes	1	2	3	4	1	2	3	4	
Climate-Weather	1	2	3	4	1	2	3	4	
Other_____ (Explain)	1	2	3	4	1	2	3	4	

12. Indicate any changes in staffing you plan in the next five years. (Circle appropriate numbers and rate only those categories which apply.)

____No Changes Planned	*Decrease Significantly*			*Increase Significantly*	
Management	1	2	3	4	
Professionals/Scientists & Engineers	1	2	3	4	
Technical/Skilled	1	2	3	4	
Clerical	1	2	3	4	
Unskilled	1	2	3	4	

<CR>

13. How important are the following personnel issues to your company and employees now and how important do you expect them to be in five years?
(Circle appropriate numbers.)

	Currently				*In Five Years*				
	Not Important			*Very Important*	*Not Important*			*Very Important*	
Rising Labor Costs	1	2	3	4	1	2	3	4	___
Lack of Appropriate Skills	1	2	3	4	1	2	3	4	___
Declining Labor Supply	1	2	3	4	1	2	3	4	___
Drug/AIDS Testing	1	2	3	4	1	2	3	4	___
Employee Health Benefits	1	2	3	4	1	2	3	4	___
Employee Parking/Commuting	1	2	3	4	1	2	3	4	___
Day Care	1	2	3	4	1	2	3	4	___
Organized Labor Issues	1	2	3	4	1	2	3	4	___
Work Force Diversity	1	2	3	4	1	2	3	4	___
Retirement/Pension	1	2	3	4	1	2	3	4	___
Flexible/Alternative Work Schedule	1	2	3	4	1	2	3	4	___
Other Issues									
_____	1	2	3	4	1	2	3	4	___
_____	1	2	3	4	1	2	3	4	___

EMPLOYEE TRAINING

14. How much formal training (i.e. training that is professionally designed and conducted for or by your company) do you provide now compared to five years ago?
(Circle appropriate number.)

No Formal Training	*less*	*same*	*more*	*much more*	
_____	1	2	3	4	___

☞ **If you indicated "No Formal Training" go to question 19.**

15. How important are the following sources of formal training to your company, and how satisfied are you with the results of the training in terms of employee performance?
(Circle appropriate numbers.)

	Importance				*Satisfaction*				
	Not Important			*Very Important*	*Not Satisfied*			*Very Satisfied*	
In-House	1	2	3	4	1	2	3	4	___
Apprenticeship/Internship for licensure	1	2	3	4	1	2	3	4	___
Consultant/Commercial Course	1	2	3	4	1	2	3	4	___
Vocational/Technical Educ.	1	2	3	4	1	2	3	4	___
Community College	1	2	3	4	1	2	3	4	___
University/College	1	2	3	4	1	2	3	4	___
Primary/Secondary Institutions (Basic Skills)	1	2	3	4	1	2	3	4	___
Other_____	1	2	3	4	1	2	3	4	___

16. What topics are most frequently covered in your company's training programs? (Circle appropriate numbers and rate only those categories which apply.)

	Never			*Often*
Manufacturing				
Processes/Equipment (including computer skills)	1	2	3	4
Engineering/Scientific Techniques	1	2	3	4
Quality Improvement/Control	1	2	3	4
Marketing/Sales				
Customer Service	1	2	3	4
International Skills (customs regulations, etc.)	1	2	3	4
Foreign Languages	1	2	3	4
Marketing/Sales Techniques	1	2	3	4
Administrative				
Clerical/Office Skills	1	2	3	4
Computer Skills for Administrative Functions	1	2	3	4
Managerial				
Strategic Planning	1	2	3	4
Supervisory/Leadership Techniques	1	2	3	4
General				
Basic Skills (reading, writing, math)	1	2	3	4
Communications Skills	1	2	3	4
Career Development	1	2	3	4
Interpersonal/Personal skills	1	2	3	4

17. Why do you provide formal training? (Circle appropriate numbers.)

	Not Important			*Very Important*
Meet increased technical complexity of jobs	1	2	3	4
Teach company procedures	1	2	3	4
Correct basic skills deficit	1	2	3	4
Encourage career advancement	1	2	3	4
Improve productivity/quality	1	2	3	4
Manage employee turnover	1	2	3	4
Reduce absenteeism	1	2	3	4
Increase workplace safety	1	2	3	4
Other_____	1	2	3	4

<CR>

18. In the coming five years please indicate how important each of the following types of training will be for your company's economic growth.
(Circle appropriate numbers and rate only those categories which apply.)

	Not Important			*Very Important*	
Manufacturing					
Processes/Equipment (including computer skills)	1	2	3	4	
Engineering/Scientific Techniques	1	2	3	4	
Quality Improvement/Control	1	2	3	4	
Marketing/Sales					
Customer Service	1	2	3	4	
International Skills (customs regulations, etc.)	1	2	3	4	
Foreign Languages	1	2	3	4	
Marketing/Sales Techniques	1	2	3	4	
Administrative					
Clerical/Office Skills	1	2	3	4	
Computer Skills for Administrative Functions	1	2	3	4	
Managerial					
Strategic Planning	1	2	3	4	
Supervisory/Leadership Techniques	1	2	3	4	
General					
Basic Skills (reading, writing, math)	1	2	3	4	
Communications Skills	1	2	3	4	
Career Development	1	2	3	4	

IMPACT OF TAXES AND REGULATIONS

19. What overall impact do state business taxes and regulations have on your business operating costs? (Circle appropriate number.)

No Impact			*Very Significant Impact*
1	2	3	4

☞ **If you circled "1" please go to question 23.**

20. Rank the impact of the following state and local taxes on the successful operation of your business (one through eight, where one is highest).

	Rank
Worker's Compensation	____
Unemployment Insurance	____
Corporate Income Taxes	____
Sales Taxes	____
Commercial/Industrial Property Taxes	____
Research & Development Tax Credit	____
Personal Income Taxes	____
Residential Property Tax	____
Other (explain)_____	____

21. Rate the impact of the following regulations on the successful operation of your business.

Pollution Control Regulations	*N/A*	*No Impact*			*Very Significant Impact*
Air Pollution	___	1	2	3	4
Water Pollution	___	1	2	3	4
Toxic Waste	___	1	2	3	4
Solid Waste	___	1	2	3	4
Other (explain)_____	___	1	2	3	4
_____					

Employment Regulations	*No Impact*			*Very Significant Impact*
Hiring and Selection Practices	1	2	3	4
Hours and Wage Regulations	1	2	3	4
Civil Rights (Discrimination)	1	2	3	4
Health and Safety Standards (OSHA)	1	2	3	4
Liability Insurance	1	2	3	4
Other (explain) _____	1	2	3	4
_____	1	2	3	4

☞ **If no impact, go to question 23.**

22. Rate the quality of technical assistance available to help you comply with the following regulations.

Pollution Control Regulations	*N/A*	*Poor*			*Excellent*
Air Pollution	___	1	2	3	4
Water Pollution	___	1	2	3	4
Toxic Waste	___	1	2	3	4
Solid Waste	___	1	2	3	4
Other (explain)_____	___	1	2	3	4
_____					

Employment Regulations	*Poor*			*Excellent*
Hiring and Selection Practices	1	2	3	4
Hours and Wage Regulations	1	2	3	4
Civil Rights (Discrimination)	1	2	3	4
Health and Safety Standards (OSHA)	1	2	3	4
Liability Insurance	1	2	3	4
Other (explain) _____	1	2	3	4
_____	1	2	3	4

<CR

23. Rate the importance of the following state and local government services and programs to the successful operation of your business. Please also rate your perception of the appropriateness of the level of expenditure on those services based on the per capita expenditure data provided below. (Circle appropriate numbers.)

	Importance				*Cost*		*Spending*				
	Not Important			*Very Important*	*Average Expenditures*		*Spend Less*			*Spend More*	
Education					MN	U.S.					
Elementary/Secondary	1	2	3	4	$ 799	$ 690	1	2	3	4	__
Higher Education	1	2	3	4	327	255	1	2	3	4	__
Libraries	1	2	3	4	16	14	1	2	3	4	__
Social Services and Income Maintenance											
Public Welfare	1	2	3	4	497	362	1	2	3	4	__
Hospitals	1	2	3	4	211	177	1	2	3	4	__
Health	1	2	3	4	73	75	1	2	3	4	__
Employment Security	1	2	3	4	19	12	1	2	3	4	__
Transportation											
Highway	1	2	3	4	330	226	1	2	3	4	__
Air Transportation	1	2	3	4	16	22	1	2	3	4	__
Water Transport	1	2	3	4	26	7	1	2	3	4	__
Public Safety											
Police Protection	1	2	3	4	89	107	1	2	3	4	__
Fire Protection	1	2	3	4	31	48	1	2	3	4	__
Corrections	1	2	3	4	53	77	1	2	3	4	__
Protective Regulation	1	2	3	4	16	19	1	2	3	4	__
Environment and Housing											
Natural Resources	1	2	3	4	62	42	1	2	3	4	__
Parks & Recreation	1	2	3	4	71	49	1	2	3	4	__
Housing & Community Development	1	2	3	4	80	54	1	2	3	4	__
Sewerage	1	2	3	4	67	66	1	2	3	4	__
Other Sanitation	1	2	3	4	18	30	1	2	3	4	__
TOTAL					**$3,932**	**$3,365**					

Source: *Government Finances in 1987-1988* U.S. Department of Commerce, Bureau of the Census.

FINANCE ISSUES

24. Has your company sought investment and/or working capital in the past five years? _____Yes _____No _

☞ **If no, go to question 29.**

If yes, rate your company's difficulty in getting the capital:

Level of Difficulty			
Low			*High*
1	2	3	4

_

25. Rate your satisfaction with the primary sources of investment and/or working capital for your company in the past five years. (Circle appropriate numbers.) Please indicate if these sources were local or out of state. (Check Minnesota or Non-Minnesota where appropriate.)

	Level of Satisfaction				*Source Location*	
Type/Source	*Low*			*High*	*MN*	*Non-MN*
Stock Offering	1	2	3	4	___	___
Venture Capital	1	2	3	4	___	___
Personal Equity	1	2	3	4	___	___
Retained Earnings	1	2	3	4	___	___
Bond Sale	1	2	3	4	___	___
Commercial Paper	1	2	3	4	___	___
Commercial Loan	1	2	3	4	___	___
Government Loan	1	2	3	4	___	___
Grant	1	2	3	4	___	___
Other_____	1	2	3	4	___	___

26. Rate any barriers your company has faced in obtaining investment and/or working capital in the past five years. (Circle appropriate numbers.)

	Level of Barrier			
Barrier	*Low*			*High*
Cost (interest rates and loan origination fees)	1	2	3	4
Collateral Requirements and/or Offsetting Deposit Requirements	1	2	3	4
Lending Limits	1	2	3	4
Cash Flow Requirements	1	2	3	4
Knowing Where to Go	1	2	3	4
Local Availability	1	2	3	4
Risk of Project	1	2	3	4
Discrimination	1	2	3	4
Amount and Timing of Return Required by Equity Investors	1	2	3	4
Amount of Business Control Required by Equity Investors	1	2	3	4
Lack of Market for Public Offering	1	2	3	4
Cost of Public Offering, Limited Offering or Private Placement	1	2	3	4
Other_____	1	2	3	4
None of the Above_____				

27. What uses did the company make of the capital it raised? (Circle each number that applies.)

1. Inventory
2. Acquisition or Improvement of Land
3. Acquisition or Improvement of Buildings
4. Acquisition of New Equipment
5. Research and Development Expenses
6. Extinguish Existing Debt
7. Refinance Existing Debt
8. Working Capital (to include uses for basic operations, rent, leases, salaries and wages, costs of goods, marketing and the like).
9. Other_____

<CR

28. If your company raised capital through a commercial loan, was that loan secured by: (Circle the number that applies for your largest loan.)
    1. Cash or Cash Equivalents
    2. A Secured Interest in Hard Assets (e.g., equipment, buildings)
    3. Inventory
    4. Accounts Receivable
    5. Other_____

29. What is the present ratio of debt to equity in your company? (Circle one)
    1. Less than 1:1
    2. More than 1:1, but less than 2:1
    3. Between 2:1 and 4:1
    4. More than 4:1

30. How many non-trade secured creditors does the company have? (Circle one)
    1. One
    2. Two - Four
    3. Four - Six
    4. more than Six

ENERGY AND TRANSPORTATION

☞ **If energy costs are not an important share of your company's operations, go to question 33.**

31. Identify your company's primary heating source and process energy source. (Check one in each column that applies to your business.)

	Heating	*Processing*	
Electricity	___	___	___
Natural Gas	___	___	___
Fuel Oil	___	___	___
Propane	___	___	___
Coal	___	___	___
Own Source (specify)_____	___	___	___
Other (specify)_____	___	___	___

32. Rate the importance and your satisfaction with your company's energy serivce. (Circle appropriate number.)

	Importance				*Satisfaction*				
	Not Important			*Very Important*	*Not Satisfied*			*Very Satisfied*	
Cost	1	2	3	4	1	2	3	4	___
Reliability	1	2	3	4	1	2	3	4	___
Availability (sufficient)	1	2	3	4	1	2	3	4	___

33. How important is transportation of products in the operation of your business? (Circle one number.)

Not Important			*Very Important*
1	2	3	4

☞ **If you circled "1" go to question 37.**

34. Select the **primary** mode of transportation used by your business for shipments of your product. Indicate your level of satisfaction with the selected mode of transportation. (Check mode and circle satisfaction level.)

Mode	Not *Satisfied*			Very *Satisfied*
____Truck	1	2	3	4
____Air	1	2	3	4
____Rail	1	2	3	4
____Barge/Ship	1	2	3	4
____Freight Services	1	2	3	4

35. Below is a list of transportation characteristics. Indicate the **importance** of each characteristic to your company as well as your current level of **satisfaction** with it. (Circle appropriate numbers.)

	Importance				***Satisfaction***			
	Not Important			*Very Important*	*Not Satisfied*			*Very Satisfied*
Speed	1	2	3	4	1	2	3	4
Cost	1	2	3	4	1	2	3	4
Frequency	1	2	3	4	1	2	3	4
Reliability	1	2	3	4	1	2	3	4
Traceability	1	2	3	4	1	2	3	4
Safety	1	2	3	4	1	2	3	4
Quality of Service	1	2	3	4	1	2	3	4
Preferred Mode Unavailable	1	2	3	4	1	2	3	4
Other_____	1	2	3	4	1	2	3	4

36. What major **changes** in your use of transportation modes do you expect in the next five years? (Check those that apply.)

	No Change	*Decrease Significantly*			*Increase Significantly*
Truck	____	1	2	3	4
Air	____	1	2	3	4
Rail	____	1	2	3	4
Barge/Ship	____	1	2	3	4
Freight Services	____	1	2	3	4

37. Is business travel an important element in the operation of your business? (Circle one number.)

Not Important			*Very Important*
1	2	3	4

☞ **If you circled "1" go to question 40.**

38. What is your primary mode of business travel, and how satisfied are you with that mode? Please also indicate your reason.

	Not			*Very*	*Reason*				
Mode	*Satisfied*			*Satisfied*	*Cost*	*Reliability*	*Speed*	*Service Availability*	
Air	1	2	3	4	___	___	___	___	_____
Automobile	1	2	3	4	___	___	___	___	_____

39. As a business, what transportation problems will inhibit your economic growth in the next five years? (Rate only those that apply to your business.)

____None Expected

	Severity of Problem *Not Severe*			*Very Severe*	
Reduction of Air Service Availability	1	2	3	4	_
Reduction in Air Service Quality	1	2	3	4	_
Airport Congestion	1	2	3	4	_
Lack of Rail Service	1	2	3	4	_
Deteriorating Roads and Bridges	1	2	3	4	_
Inadequate Shipping Services	1	2	3	4	_
Poor Road Access	1	2	3	4	_
Road Congestion	1	2	3	4	_
Lack of Mass Transit	1	2	3	4	_
Problems Transporting Hazardous Materials and Waste	1	2	3	4	_
Increasing Costs	1	2	3	4	_
Reduction in Trucking Service Availability	1	2	3	4	_
Other (specify)_____	1	2	3	4	_

TECHNOLOGY AND RESEARCH AND DEVELOPMENT INVESTMENTS

40. Do you plan to introduce a new product or service in the next five years?
____Yes ____No _

41. How important are R&D investments to the success of your business operations now and in the next five years?

	Currently				*In Five Years*				
	Not Important			*Very Important*	*Not Important*			*Very Important*	
	1	2	3	4	1	2	3	4	__

☞ **If you circled "1" go to question 43.**

42. What is your primary method of conducting R&D? (Check one.)
Do you plan to change your method of conducting R&D in the next five years?
(Circle appropriate numbers, and rate only those categories which apply.)

Primary Method (Check One)	*In Five Years* *Decrease Significantly*			*Increase Significantly*	
___ In-house/internal	1	2	3	4	
___ Subcontract or venture with other firms	1	2	3	4	
___ Subcontract or venture with academic institution	1	2	3	4	
___ Subcontract or venture with federal government	1	2	3	4	

43. Rate the importance of the following technologies to the success of your business operations now and in the next five years. (Circle appropriate number.)

Technology	*Currently* *Not Important*			*Very Important*	*In Five Years* *Not Important*			*Very Important*	
Equipment for more fully automating your production process (e.g. computer integrated manufacturing, etc.)	1	2	3	4	1	2	3	4	___
Equipment/systems for communication of information (data, voice or visual)	1	2	3	4	1	2	3	4	___
Other equipment/systems to improve quality or productivity (e.g. computer aided design, etc.)	1	2	3	4	1	2	3	4	___
Advanced materials to improve product or processes (e.g. composites, etc.)	1	2	3	4	1	2	3	4	___

EXPORTERS' QUESTIONS

44. Which of the following best describes your company's export activity?
(Circle one number.)
1. We do not export and are not interested in exporting
2. We do not export but are interested in exporting within five years
3. We are preparing to export
4. We export in response to unsolicited orders
5. We export occasionally
6. We export frequently

45. What percent of your company's total sales are due to exports? (Circle one number.)
1. None
2. Under 5 percent
3. 5 percent to 10 percent
4. Over 10 percent

46. How many years has your company been exporting? (Circle one number.)
    1. Less than two
    2. two to five
    3. six to 10
    4. 11 to 20
    5. More than 20

47. Please rate each of the following "obstacles to exporting" based on your company's previous export sales experiences/efforts.

	Not a Problem			*Serious Problem*	
Foreign Market Research	1	2	3	4	
Overseas Marketing and Advertising Information	1	2	3	4	
Pricing issues	1	2	3	4	
Legal requirements in the U.S.					
Information	1	2	3	4	
Compliance	1	2	3	4	
Legal Requirements in the Foreign Country					
Information	1	2	3	4	
Compliance	1	2	3	4	
Financing	1	2	3	4	
Shipping Information	1	2	3	4	
Insurance	1	2	3	4	
Language Differences	1	2	3	4	
Cultural Differences	1	2	3	4	
AppropriatEly Trained Staff	1	2	3	4	
Currency Fluctuations	1	2	3	4	
Availability of Hard Currency	1	2	3	4	
Political Environment in Target Country	1	2	3	4	
Other (specify)_____	1	2	3	4	

48. For each of the steps listed below, please indicate the level of activity your company is taking to increase its exports.

	Level of Activity				
	None			*A lot*	
Conducting foreign market research	1	2	3	4	
Visiting foreign markets					
(including trade shows and trade missions)	1	2	3	4	
Retaining export management company	1	2	3	4	
Retaining foreign distributor or agent	1	2	3	4	
Participating with export trading company	1	2	3	4	
Attending seminars, workshops or					
discussions outside of your company	1	2	3	4	
Obtaining foreign trade leads	1	2	3	4	
Seeking counter-trade facilitator	1	2	3	4	
Seeking joint venture opportunity	1	2	3	4	
Seeking overseas investment opportunity	1	2	3	4	
Other (specify)_____	1	2	3	4	

49. Please rate each of the following sources of export information.

	Importance				*Satisfaction*				
	Not Important			*Very Important*	*Not Satisfied*			*Very Satisfied*	
Other Companies in Your Industry, Associations	1	2	3	4	1	2	3	4	
Consultant	1	2	3	4	1	2	3	4	
Export Service Provider									
Bank	1	2	3	4	1	2	3	4	
Freight Forwarder	1	2	3	4	1	2	3	4	
Attorney	1	2	3	4	1	2	3	4	
Other_____	1	2	3	4	1	2	3	4	
U.S. Dept. of Commerce	1	2	3	4	1	2	3	4	
Minnesota Trade Office	1	2	3	4	1	2	3	4	
Other (specify below)	1	2	3	4	1	2	3	4	

_____

50. Please indicate the countries to which your company currently exports and those for which your company plans to develop exports.

	Currently Exporting to	*Interested in Exporting to*		*Currently Exporting to*	*Interested in Exporting to*
Australia	___	___	Norway	___	___
Belgium	___	___	People's Republic of China	___	___
Canada	___	___	Singapore	___	___
Denmark	___	___	South Korea	___	___
Finland	___	___	Sweden	___	___
France	___	___	Taiwan	___	___
Hong Kong	___	___	Thailand	___	___
Italy	___	___	United Kingdom	___	___
Japan	___	___	USSR	___	___
Mexico	___	___	West Germany	___	___
Netherlands	___	___			

ADDITIONAL COMMENTS

51. Please discuss any other significant changes in your business operations you have planned for the 1990s:

_____

_____

_____

Mail to: Minnesota Enterprise Survey
Department of Trade and Economic Development
900 American Center Building
150 East Kellogg Boulevard
St. Paul, Minnesota 55101

☐ Please send me a copy of the final results.