

**NATIONAL SCIENCE FOUNDATION
INDUSTRY/UNIVERSITY
COOPERATIVE RESEARCH CENTERS**

FINAL
***1993-94 PROCESS OUTCOME
SURVEY RESULTS***

***DESCRIPTIVE STATISTICS
COMPILED FROM
FACULTY AND INDUSTRY FORMS:
LONG AND SHORT VERSIONS***

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**D. O. GRAY/D. C. MEYER
DEPARTMENT OF PSYCHOLOGY
NORTH CAROLINA STATE UNIVERSITY**

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OVERVIEW**Data Set**

Response rate: 37/47 eligible centers (79%)

CENTERS

| Survey Form | Faculty | Industry |
|---------------|-----------|-----------|
| Short | 24 | 24 |
| Long | 12 | 13 |
| Totals | 36 | 37 |

INDIVIDUALS

| Survey Form | Faculty | Industry |
|---------------|------------|------------|
| Short | 186 | 254 |
| Long | 146 | 102 |
| Totals | 332 | 356 |

All of the data included in the 1993 data set reflects respondent reports of activity for their center during the previous year. The data are presented in the same order as they appear in their respective questionnaires (i.e., Faculty Long or Industry Long). Please note that the varying response rates are due to:

- a) Some questions are not included in the short form. Questions marked with an asterisk (*) appear only on long questionnaire forms.
- b) Missing Data.

Also, please recall that the "Long" Version questionnaires are required after a center's first and third year of operation. Thus, the subsample responding to the "long form" will tend to be different (younger) than the total sample.

Report Processing

Last year we began to report two sets of descriptive statistics for some variables. As in the past, **individual-level descriptive statistics** (e.g., means score derived from individual respondents) are provided for all questions (beginning on page 2 and 14). In addition, we also report **center-level descriptive statistics** (e.g., mean derived from center means) for questions on the "short form" questionnaire (beginning on page 11 and 22). Only short form questions were used because the number of centers reporting long form questions is too small. Unweighted means (i.e., centers with four respondents were treated the same as centers with 30 respondents) are reported for most of the multiple choice items¹.

Most evaluators use the statistics in this report to make normative comparisons. We believe center-level scores are more appropriate for making comparisons among centers: standard deviations based on center-level data provide a reasonable basis for judging how far above or below the mean a center is performing while individual standard deviations do not reflect center-level performance.

Five Industry Form questions (19A, 19B, 20A2 pertaining to research dollars invested and 25A, & 25B pertaining to number of students trained) warranted the reporting of means in two ways: 1) based on respondents who reported some activity only; and 2) based on all respondents (those reporting no ACTIVITY were treated as if they reported zero).

Final notes: a) All items/questions on the short form are also on the long form; b) the sum of group percentages may exceed 100% due to rounding.

¹This year **weighted means** were calculated for several quantitative items (questions 19a, 19b, 20a and 20b) in the aggregated industry section. Essentially, this weighting procedure assures that centers with more responses for a given question effect the statistics more than centers with a few responses. Hence, the weighted statistics are less effected by low center response rates and outliers. As in the past, median scores are also provided for variables which are affected by outliers.

1993-94 FACULTY RESULTS - INDIVIDUALS

| | <u>N</u> | <u>%</u> | | | | | | | |
|--|-------------|-----------|------------------|------------------|------------------|-----------------|----------|----------|----------|
| 1. In general, how much experience do you have working with industry?* | | | | | | | | | |
| A great deal | 42 | 29 | | | | | | | |
| A moderate amount | 53 | 36 | | | | | | | |
| A little | 42 | 29 | | | | | | | |
| None at all | 9 | 6 | | | | | | | |
| 2 a. Academic Rank * | | | | | | | | | |
| Assistant | 21 | 15 | | | | | | | |
| Associate | 23 | 17 | | | | | | | |
| Full | 48 | 35 | | | | | | | |
| Other | 46 | 33 | | | | | | | |
| 2 b. Is Respondent Tenured?* | | | | | | | | | |
| Tenured | 69 | 50 | | | | | | | |
| Not Tenured | 70 | 50 | | | | | | | |
| If untenured, is respondent in Tenure-Track Position? | | | | | | | | | |
| No | 47 | 70 | | | | | | | |
| Yes | 20 | 30 | | | | | | | |
| 3. Percent Allocation of FTE:* | <u>MEAN</u> | <u>SD</u> | | | | | | | |
| Center-Funded Research | 34% | 28 | | | | | | | |
| Non-Center Research | 24% | 22.9 | | | | | | | |
| Teaching | 26% | 23.2 | | | | | | | |
| Administration | 11% | 16.7 | | | | | | | |
| Other | 14% | 19.8 | | | | | | | |
| 4. Extent of University Influence on Decisions Affecting the Center:* | | | | | | | | | |
| | | | <i>No</i> | <i>Some</i> | <i>A lot of</i> | <i>Almost</i> | | | |
| | | | <i>Influence</i> | <i>Influence</i> | <i>Influence</i> | <i>Complete</i> | | | |
| | | | 1 | 2 | 3 | 4 | | | |
| | <u>MEAN</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> |
| Planning and Strategy | 1.6 | 54 | 46 | 53 | 45 | 10 | 9 | 0 | 0 |
| Project Selection | 1.2 | 98 | 84 | 17 | 15 | 2 | 1 | 0 | 0 |
| Conduct of Research | 1.2 | 99 | 85 | 15 | 13 | 3 | 3 | 0 | 0 |
| Evaluation of Research | 1.2 | 95 | 81 | 20 | 17 | 4 | 2 | 0 | 0 |
| Budget and Logistics | 1.9 | 30 | 26 | 63 | 55 | 21 | 18 | 1 | 1 |
| App'tments of Fac.& Staff | 2.6 | 23 | 21 | 28 | 25 | 35 | 31 | 26 | 23 |

4b. Extent of Center Director Influence on Decisions Affecting the Center:*

| | <u>MEAN</u> | <i>No Influence</i> | | <i>Some Influence</i> | | <i>A lot of Influence</i> | | <i>Almost Complete Control</i> | |
|-----------------------------------|-------------|---------------------|----|-----------------------|----|---------------------------|----|--------------------------------|----|
| | | 1 | | 2 | | 3 | | 4 | |
| | | N | % | N | % | N | % | N | % |
| Planning and Strategy | 2.9 | 1 | 5 | 17 | 14 | 81 | 64 | 22 | 18 |
| Project Selection | 2.6 | 10 | 8 | 48 | 37 | 56 | 43 | 15 | 12 |
| Conduct of Research | 2.0 | 25 | 20 | 76 | 60 | 22 | 18 | 3 | 2 |
| Evaluation of Research | 2.3 | 20 | 16 | 52 | 41 | 51 | 40 | 5 | 4 |
| Budget and Logistics | 3.0 | 7 | 6 | 24 | 19 | 63 | 50 | 32 | 25 |
| Appointments of Faculty and Staff | 2.4 | 23 | 19 | 42 | 35 | 38 | 32 | 18 | 15 |

4c. Extent of Faculty Influence on Decisions Affecting the Center:*

| | <u>MEAN</u> | <i>No Influence</i> | | <i>Some Influence</i> | | <i>A lot of Influence</i> | | <i>Almost Complete Control</i> | |
|-----------------------------------|-------------|---------------------|----|-----------------------|----|---------------------------|----|--------------------------------|----|
| | | 1 | | 2 | | 3 | | 4 | |
| | | N | % | N | % | N | % | N | % |
| Planing and Strategy | 2.3 | 14 | 11 | 63 | 51 | 41 | 33 | 5 | 4 |
| Project Selection | 2.4 | 22 | 18 | 43 | 34 | 50 | 40 | 11 | 3 |
| Conduct of Research | 3.3 | 3 | 2 | 14 | 11 | 55 | 43 | 56 | 44 |
| Eval. of Research | 2.6 | 13 | 11 | 36 | 29 | 61 | 50 | 13 | 11 |
| Budget and Logistics | 2.2 | 24 | 19 | 52 | 42 | 28 | 31 | 8 | 7 |
| Appointments of Faculty and Staff | 2.1 | 25 | 21 | 63 | 54 | 22 | 19 | 7 | 6 |

4d. Extent of Industry Advisory Board Influence on Decisions Affecting the Center:*

| | MEAN | <i>No Influence</i> | | <i>Some Influence</i> | | <i>A lot of Influence</i> | | <i>Almost Complete Control</i> | |
|-------------------------------|------|---------------------|----|-----------------------|----|---------------------------|----|--------------------------------|----|
| | | N | % | N | % | N | % | N | % |
| | | | | | | | | | |
| Plan. and Strategy | 2.6 | 6 | 5 | 41 | 34 | 69 | 57 | 6 | 5 |
| Project Selection | 3.0 | 3 | 2 | 21 | 17 | 71 | 57 | 30 | 24 |
| Conduct of Research | 2.1 | 20 | 16 | 74 | 60 | 26 | 21 | 2 | 2 |
| Eval. of Research | 2.9 | 9 | 7 | 23 | 18 | 71 | 56 | 23 | 18 |
| Budget and Logistics | 2.4 | 15 | 12 | 56 | 41 | 47 | 39 | 10 | 8 |
| Appoint. of Faculty and Staff | 1.4 | 83 | 72 | 23 | 20 | 8 | 7 | 1 | 1 |

4e. Extent of Student Influence on Decisions Affecting the Center:*

| | MEAN | <i>No Influence</i> | | <i>Some Influence</i> | | <i>A lot of Influence</i> | | <i>Almost Complete Control</i> | |
|-------------------------------|------|---------------------|----|-----------------------|----|---------------------------|----|--------------------------------|---|
| | | N | % | N | % | N | % | N | % |
| | | | | | | | | | |
| Planning and Strategy | 1.4 | 86 | 72 | 26 | 22 | 6 | 5 | 2 | 2 |
| Project Selection | 1.3 | 87 | 72 | 28 | 23 | 5 | 2 | 1 | 3 |
| Conduct of Research | 2.4 | 24 | 20 | 35 | 29 | 55 | 45 | 8 | 7 |
| Eval. of Research | 1.6 | 63 | 53 | 42 | 35 | 12 | 10 | 3 | 3 |
| Budget and Logistics | 1.2 | 99 | 83 | 17 | 14 | 2 | 2 | 1 | 1 |
| Appoint. of Faculty and Staff | 1.1 | 110 | 97 | 2 | 2 | 2 | 2 | 0 | 0 |

4f. Extent of Established University Procedures Influence on Decisions Affecting the Center:*

| | MEAN | No Influence 1 | | Some Influence 2 | | A lot of Influence 3 | | Almost Complete Control 4 | |
|-------------------------------|------|-------------------|----|---------------------|----|-------------------------|----|------------------------------|----|
| | | N | % | N | % | N | % | N | % |
| Planning and Strategy | 1.6 | 58 | 52 | 44 | 40 | 7 | 6 | 2 | 2 |
| Project Selection | 1.2 | 93 | 86 | 13 | 12 | 2 | 1 | 0 | 0 |
| Conduct of Research | 1.3 | 81 | 72 | 26 | 23 | 4 | 4 | 1 | 1 |
| Evaluation of Research | 1.2 | 91 | 82 | 17 | 15 | 2 | 2 | 1 | 1 |
| Budget and Logistics | 1.8 | 45 | 41 | 42 | 38 | 19 | 17 | 4 | 4 |
| Appoint. of Faculty and Staff | 2.1 | 36 | 34 | 34 | 32 | 22 | 21 | 14 | 13 |

5. During the past year how satisfied were you with the following features of the Center?

| | MEAN | Completely Satisfied 1 | | A Great Deal Satisfied 2 | | Somewhat Satisfied 3 | | Not At All Satisfied 4 | |
|------------------------------------|------|---------------------------|----|-----------------------------|----|-------------------------|----|---------------------------|---|
| | | N | % | N | % | N | % | N | % |
| Technical quality of the research | 3.1 | 92 | 30 | 167 | 53 | 53 | 17 | 1 | - |
| Commun. between Staff and Industry | 2.9 | 68 | 22 | 154 | 50 | 75 | 24 | 14 | 5 |
| Center Administ. practices | 3.0 | 91 | 29 | 139 | 44 | 72 | 23 | 13 | 4 |
| Responsiveness to Industry needs | 3.1 | 92 | 30 | 153 | 51 | 54 | 18 | 4 | 1 |
| Innovative quality of research | 3.0 | 90 | 28 | 153 | 48 | 71 | 22 | 5 | 2 |
| Project selection process | 2.9 | 84 | 26 | 147 | 46 | 67 | 21 | 20 | 6 |

6. How important to you are the following goals and outcomes of the Center?*

| | MEAN | <i>Extremely Important</i> | | <i>Considerably Important</i> | | <i>Somewhat Important</i> | | <i>Not at all Important</i> | |
|---|------|----------------------------|----|-------------------------------|----|---------------------------|----|-----------------------------|----|
| | | 4 | | 3 | | 2 | | 1 | |
| | | N | % | N | % | N | % | N | % |
| General expansion of knowledge in this technical area | 3.6 | 96 | 67 | 42 | 29 | 6 | 4 | 0 | 0 |
| Enhancement of graduate students' technical training | 3.6 | 93 | 64 | 39 | 27 | 11 | 8 | 1 | 1 |
| Enhancement of graduate students' understanding of industry | 3.1 | 53 | 37 | 58 | 40 | 31 | 22 | 2 | 2 |
| Redirection of university research toward industrial problems | 3.0 | 36 | 25 | 72 | 50 | 31 | 22 | 4 | 3 |
| Enhancement of quality of industrial research | 3.0 | 47 | 33 | 64 | 44 | 24 | 17 | 9 | 6 |
| Development of new research projects | 2.7 | 29 | 20 | 53 | 37 | 50 | 35 | 11 | 8 |
| Development of patentable products | 2.0 | 8 | 6 | 32 | 22 | 63 | 44 | 41 | 29 |
| Development of commercialized products | 2.1 | 9 | 7 | 35 | 24 | 60 | 42 | 40 | 29 |

7. Compared to the research you typically conduct outside the Center, would you describe your Center-funded research as:*

| | MEAN | <i>More Basic</i> | | <i>No Effect</i> | | <i>More Applied</i> | | | | | |
|------------------------------|------|-------------------|---|------------------|----|---------------------|----|-----------------|----|----|----|
| | | 1 | | 2 | | 3 | | 4 | | 5 | |
| | | N | % | N | % | N | % | N | % | N | % |
| Basic or Applied | 3.7 | 0 | 0 | 15 | 11 | 31 | 24 | 56 | 42 | 30 | 22 |
| | | <i>Broader</i> | | | | | | <i>Narrower</i> | | | |
| Broader or Narrower in Scope | 3.2 | 3 | 2 | 27 | 21 | 53 | 40 | 39 | 30 | 10 | 8 |
| | | <i>Longer</i> | | | | | | <i>Shorter</i> | | | |
| Time Frame | 3.3 | 6 | 5 | 24 | 18 | 47 | 36 | 38 | 28 | 17 | 13 |

8. What effect has participation in the Center had for you in the following areas:

| | MEAN | Negative Effect | | | | No Effect | | | | Positive Effect | | |
|---|------|-----------------|---|----|---|-----------|----|-----|----|-----------------|----|---|
| | | N | 1 | | 2 | | 3 | | 4 | | 5 | |
| | | | N | % | N | % | N | % | N | % | N | % |
| Opportunities for Consulting | 3.5 | 3 | 1 | 0 | 0 | 199 | 62 | 83 | 26 | 34 | 11 | |
| Opportunities for Research Contracts | 3.8 | 2 | 1 | 4 | 1 | 106 | 33 | 144 | 44 | 68 | 21 | |
| Access to Equip | 3.8 | 2 | 1 | 3 | 1 | 135 | 42 | 116 | 36 | 68 | 21 | |
| Trust and Conf. in Industry | 3.8 | 2 | 1 | 13 | 4 | 106 | 33 | 136 | 43 | 63 | 20 | |
| Evaluation of the Quality of Industrial Research | 3.6 | 2 | 1 | 19 | 6 | 126 | 40 | 130 | 41 | 41 | 13 | |
| Chances for Promotion/ Tenure & Salary Increases | 3.4 | 7 | 2 | 8 | 3 | 172 | 54 | 102 | 32 | 27 | 9 | |
| Amount of Inter-action with Other Faculty | 4.0 | 1 | - | 5 | 2 | 58 | 18 | 185 | 57 | 74 | 23 | |
| Ability to Support Student Theses/ Dissertation Research | 4.1 | 2 | 1 | 4 | 1 | 72 | 22 | 109 | 34 | 132 | 41 | |
| Amt. of Autonomy in Conducting Research | 3.6 | 2 | 1 | 29 | 9 | 127 | 39 | 96 | 30 | 70 | 22 | |
| Ability to Publish in a Timely Fashion | 3.5 | 6 | 1 | 23 | 7 | 146 | 45 | 90 | 28 | 57 | 18 | |

9. What effect has participation in the Center had for the university in the following areas?*

| | MEAN | Negative Effect | | | | No Effect | | | | Positive Effect | |
|--|------|-----------------|---|---|---|-----------|----|----|----|-----------------|----|
| | | 1 | | 2 | | 3 | | 4 | | 5 | |
| | | N | % | N | % | N | % | N | % | N | % |
| Knowledge Base | 4.1 | 1 | 1 | 0 | 0 | 15 | 11 | 84 | 62 | 36 | 27 |
| Student Recruit. | 4.0 | 0 | 0 | 0 | 0 | 32 | 23 | 71 | 52 | 34 | 25 |
| Faculty Recruit. | 3.7 | 0 | 0 | 2 | 2 | 56 | 42 | 55 | 41 | 20 | 15 |
| Qual. of Research Projects in the University | 3.9 | 1 | 1 | 4 | 3 | 27 | 20 | 84 | 61 | 21 | 15 |
| Res. Funds from Private Sources | 4.0 | 0 | 0 | 0 | 0 | 32 | 24 | 65 | 49 | 36 | 27 |
| Res. Funds from Public Sources | 3.9 | 0 | 0 | 2 | 1 | 44 | 33 | 56 | 42 | 31 | 23 |
| University Patent | 3.3 | 0 | 0 | 0 | 1 | 95 | 73 | 31 | 24 | 5 | 4 |

10. Compared to other forms of research funding you have received in the past, how would you rate this Center on the following dimensions?*

| | MEAN | Compares Favorably | | About the Same | | Compares Unfavorably | |
|--|------|--------------------|----|----------------|----|----------------------|----|
| | | 1 | | 2 | | 3 | |
| | | N | % | N | % | N | % |
| Amount of work invested to obtain funding | 1.7 | 56 | 44 | 58 | 46 | 13 | 10 |
| Administrative time/effort invested in project | 1.8 | 42 | 34 | 62 | 50 | 21 | 17 |
| Likelihood funding will be avail. to support my long range goals | 1.9 | 39 | 32 | 64 | 52 | 21 | 17 |
| Amount of funding provided to conduct research | 2.0 | 32 | 25 | 62 | 48 | 34 | 27 |
| Budgetary flexibility | 1.8 | 48 | 38 | 54 | 47 | 18 | 14 |

11a. During the past year, how many publications in the open literature have you had based on center research?

| <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|----------|-------------|---------------|-----------|
| 306 | 2.3 | 2 | 3.4 |

b. How many of these were with company scientists?

| | | | |
|-----|-----|---|-----|
| 267 | 0.4 | 0 | 1.2 |
|-----|-----|---|-----|

c. With students?

| | | | |
|-----|-----|---|-----|
| 294 | 2.0 | 1 | 3.1 |
|-----|-----|---|-----|

12a. During the past year, how many presentations have you made at conferences or professional meetings based on center research?

| <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|----------|-------------|---------------|-----------|
| 308 | 2.5 | 2 | 3.7 |

b. How many were with company scientists?

| | | | |
|-----|------|---|-----|
| 268 | 0.32 | 0 | 0.9 |
|-----|------|---|-----|

c. With students?

| | | | |
|-----|-----|---|-----|
| 299 | 1.8 | 1 | 2.6 |
|-----|-----|---|-----|

13a. During the past year, how many students theses/dissertations based on Center research were completed under your supervision?

| <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|----------|-------------|---------------|-----------|
| 260 | 0.9 | 1 | 1.3 |

b. How many of these are currently in progress?

| | | | |
|-----|-----|---|-----|
| 277 | 1.8 | 1 | 2.4 |
|-----|-----|---|-----|

14a. Excluding Center board/monitor meetings, how many times during the past year did you personally have contact with individuals from other companies?

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|---------------|----------|-------------|---------------|-----------|
| 1. By phone? | 312 | 11.2 | 5 | 16.8 |
| 2. In person? | 313 | 5.8 | 2 | 10.4 |

b. During the last year, how many days have you spent visiting or working at member company laboratories?

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|----------------|----------|-------------|---------------|-----------|
| Number of Days | 288 | 4.2 | 1 | 12.6 |

15. How long, on average, do you feel that it should take for a new Center research project to yield tangible results?

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|------------------|----------|-------------|---------------|-----------|
| Number of months | 316 | 19.6 | 18 | 11 |

16. To what extent are you generally satisfied with the operation and activities of the Center?

| <u>MEAN</u> | <u>4</u> Completely Satisfied | | <u>3</u> Considerably Satisfied | | <u>2</u> Somewhat Satisfied | | <u>1</u> Not at all Satisfied | |
|-------------|----------------------------------|----------|------------------------------------|----------|--------------------------------|----------|----------------------------------|----------|
| | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> |
| 3.0 | 83 | 26 | 178 | 55 | 61 | 19 | 4 | 1 |

AGGREGATED FACULTY RESULTS FOLLOW

1993-94 FACULTY RESULTS - CENTERS

Numbering refers to faculty long form questionnaire. Only faculty short questions included.

Question Number

5. How satisfied were you with the following features of the Center?

Completely Satisfied = 1; Not At All Satisfied = 4

| | <u>MEAN</u> | <u>SD</u> | <u>N</u> |
|---------------------------------------|-------------|-----------|----------|
| Technical quality of the research | 3.2 | .4 | 36 |
| Commun. between Staff and Industry | 3.0 | .4 | 36 |
| Center Administ. practices | 3.0 | .4 | 36 |
| Responsiveness to Industry needs | 3.2 | .4 | 36 |
| Innovative quality of research | 3.0 | .5 | 36 |
| Project selection process | 3.0 | .4 | 36 |

8. What effect has participation in the Center had for you in the following areas:

Negative Effect = 1; Positive Effect = 5

| | <u>MEAN</u> | <u>SD</u> | <u>N</u> |
|---|-------------|-----------|----------|
| Opportunities for Consulting | 3.5 | .4 | 36 |
| Opportunities for Research Contracts | 3.9 | .4 | 36 |
| Access to Equip | 3.7 | .4 | 36 |
| Trust and Conf. in Industry | 3.8 | .4 | 36 |
| Evaluation of the Quality of Industrial Research | 3.6 | .4 | 36 |
| Chances for Promotion/ Tenure & Salary Increases | 3.4 | .4 | 36 |

8. Effect participation in the Center had for you :
 Negative Effect = 1; Positive Effect = 5

| | <u>MEAN</u> | <u>SD</u> | <u>N</u> |
|---|-------------|-----------|----------|
| Amount of Inter- action with Other Faculty | 4.0 | .3 | 36 |
| Ability to Support Student Theses/ Dissertation Research | 4.2 | .5 | 36 |
| Amt. of Autonomy in Conducting Research | 3.7 | .5 | 36 |
| Ability to Publish in a Timely Fashion | 3.5 | .5 | 36 |

11a. During the past year, how many publications in the open literature have you had based on center research? **

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|--|----------|-------------|---------------|-----------|
| | 36 | 2.7 | 1.7 | 2.7 |
| b. How many of these were with company scientists? | 32 | 0.7 | .3 | 1.5 |
| c. With students? | 36 | 2.4 | 1.5 | 2.65 |

12a. During the past year, how many presentations have you made at conferences or professional meetings based on center research? **

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|---|----------|-------------|---------------|-----------|
| | 36 | 2.7 | 2.2 | 1.5 |
| b. How many were with company scientists? | 32 | 0.6 | 0.2 | 1.0 |
| c. With students? | 36 | 2.1 | 1.6 | 1.6 |

** These values are calculated as the average per faculty respondent per center.

13a. During the past year, how many students theses/dissertations based on Center research were completed under your supervision? **

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|--|----------|-------------|---------------|-----------|
| | 36 | 1.0 | 1.0 | .8 |

b. How many of these are currently in progress?

| | | | | |
|--|----|-----|-----|-----|
| | 36 | 1.8 | 1.8 | 1.4 |
|--|----|-----|-----|-----|

14a. Excluding Center board/monitor meetings, how many times during the past year did you personally have contact with individuals from other companies? **

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|---------------|----------|-------------|---------------|-----------|
| 1. By phone? | 36 | 12.6 | 9.9 | 7.5 |
| 2. In person? | 36 | 6.7 | 5.6 | 4.1 |

b. During the last year, how many days have you spent visiting or working at member company laboratories?

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|----------------|----------|-------------|---------------|-----------|
| Number of Days | 35 | 5.1 | 2.2 | 6.6 |

15. How long, on average, do you feel that it should take for a new Center research project to yield tangible results? **

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|------------------|----------|-------------|---------------|-----------|
| Number of months | 36 | 19.0 | 18.9 | 5.0 |

16. To what extent are you generally satisfied with Center operations and activities
Completely Satisfied = 4; Not at all Satisfied = 1

| | <u>N</u> | <u>MEAN</u> | <u>SD</u> |
|--|----------|-------------|-----------|
| | 36 | 3.1 | .43 |

INDUSTRY RESULTS FOLLOW

** These values are calculated as the average per faculty respondent per center.

1993-94 INDUSTRY RESULTS

| | N | MEAN | MED. | SD |
|--|----------|-------------|-------------|-----------|
| 1. How many years have you spent with the company?* | 102 | 14.6 | 13 | 9.1 |
| 2. How many years have you spent in R&D with the company?* | 100 | 10.7 | 8 | 8.5 |
| 3. How many years have you spent in industry in general?* | 102 | 21.2 | 20 | 8.7 |
| 4. How many years have you spent in R&D with industry?* | 100 | 14.9 | 14 | 9.8 |
| 5a. What is the highest degree you have received?* | N | | | % |
| High School | 19 | | | 19 |
| AA/AS | 1 | | | 1 |
| BA/BS | 16 | | | 16 |
| MA/MS | 27 | | | 27 |
| Ph.D. | 39 | | | 38 |
| b. In what field?* | | | | |
| Engineering | 66 | | | 65 |
| Physical Science | 27 | | | 27 |
| Social Science | 0 | | | 0 |
| Liberal Arts | 1 | | | 1 |
| Management | 7 | | | 7 |
| Other | 1 | | | 1 |
| 6. Coursework from university where Center is located?* | | | | |
| Yes | 26 | | | 25 |
| No | 76 | | | 75 |
| | N | MEAN | | SD |
| 7. How many years have you been a board member?* | 97 | 2.9 | | 2.2 |
| 8. Were you a board member when your company joined the Center?* | N | | | % |
| Yes | 45 | | | 45 |
| No | 54 | | | 55 |

9. To what extent do you have scientific/technical expertise in the research areas being investigated within the Center?*

Degree of technical expertise:

| | <u>FREQ</u> | <u>%</u> |
|----------------------|-------------|----------|
| In (almost) no areas | 1 | 1 |
| In a few areas | 16 | 16 |
| About half | 26 | 26 |
| In most areas | 51 | 51 |
| In all areas | 7 | 7 |

10. How involved were you in the establishment of the Center?*

| | | |
|-----------------|----|----|
| Not at all | 49 | 48 |
| A little | 18 | 18 |
| A modest amount | 17 | 17 |
| A great deal | 18 | 18 |

11. How frequently do you disseminate Center technical reports and updates to the following groups?

| | <u>MEAN</u> | <i>Never</i> | | <i>1-2/year</i> | | <i>3-4 year</i> | | <i>5+/year</i> | |
|------------------------------------|-------------|--------------|----------|-----------------|----------|-----------------|----------|----------------|----------|
| | | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> |
| Technical staff in your group | 2.9 | 7 | 2 | 114 | 34 | 115 | 34 | 103 | 31 |
| Technical staff in your division | 2.6 | 20 | 6 | 144 | 44 | 101 | 31 | 63 | 19 |
| Technical staff in other divisions | 2.2 | 72 | 23 | 137 | 43 | 69 | 22 | 39 | 12 |
| Your immediate supervisor | 2.4 | 2 | 16 | 137 | 43 | 79 | 25 | 53 | 17 |
| Top corporate management | 1.6 | 172 | 55 | 118 | 37 | 20 | 6 | 7 | 2 |

13. During the past year, how would you rate the overall research program in the Center compared to similar research programs in other U.S. universities?

| | <u>MEAN</u> | <u>N</u> | <u>%</u> |
|--------------------|-------------|----------|----------|
| Top 2% (4) | 2.7 | 47 | 15 |
| Top 10% (3) | | 138 | 44 |
| Above average (2) | | 123 | 39 |
| Below average (1) | | 7 | 2 |
| Not comparable (9) | | 29 | N/A |

14. During the past year how satisfied were you with the following features of the Center?

| | <u>MEAN</u> | A | | | | | | | |
|---|-------------|-----------------------------|----------|-----------------------------|----------|---------------------------|----------|-----------------------------|----------|
| | | <i>Completely Satisfied</i> | | <i>Great Deal Satisfied</i> | | <i>Somewhat Satisfied</i> | | <i>Not at All Satisfied</i> | |
| | | <u>4</u> | <u>%</u> | <u>3</u> | <u>%</u> | <u>2</u> | <u>%</u> | <u>1</u> | <u>%</u> |
| Technical quality of the research | 3.1 | 78 | 22 | 219 | 63 | 48 | 14 | 4 | 1 |
| Communication between Center staff and your company | 3.1 | 119 | 34 | 141 | 40 | 77 | 22 | 13 | 4 |
| Center administrative practices | 3.1 | 111 | 32 | 148 | 43 | 80 | 23 | 5 | 2 |
| Responsiveness of the Center to industry needs | 3.0 | 97 | 28 | 149 | 43 | 96 | 27 | 8 | 2 |
| Innovative quality of research | 2.9 | 61 | 18 | 194 | 56 | 87 | 25 | 5 | 1 |
| Proj. selection process | 2.9 | 82 | 24 | 157 | 45 | 95 | 28 | 12 | 4 |

17. How important to you are the following goals and outcomes of the Center?*

| | MEAN | <i>Extremely Important</i> 4 | | <i>Considerably Important</i> 3 | | <i>Somewhat Important</i> 2 | | <i>Not at all Important</i> 1 | |
|--|------|---------------------------------|----|------------------------------------|----|--------------------------------|----|----------------------------------|----|
| | | N | % | N | % | N | % | N | % |
| Gen. expansion of knowledge in this tech. area | 3.3 | 48 | 48 | 34 | 34 | 18 | 18 | 0 | 0 |
| Enhancement of grad. student tech. training | 3.0 | 29 | 29 | 42 | 42 | 27 | 27 | 2 | 2 |
| Enhancement of grad. students' understanding of industry | 3.0 | 29 | 29 | 42 | 42 | 28 | 28 | 1 | 1 |
| Redirection of university res. towards indust. problems | 3.5 | 59 | 59 | 31 | 31 | 10 | 10 | 0 | 0 |
| Enhancement of quality of indust. research | 3.3 | 50 | 50 | 33 | 33 | 13 | 13 | 4 | 4 |
| Development of new company res. projects | 2.6 | 19 | 19 | 29 | 30 | 41 | 42 | 9 | 9 |
| Development of patentable products | 1.9 | 5 | 5 | 12 | 12 | 45 | 46 | 36 | 37 |
| Development of commercialized products | 2.2 | 15 | 15 | 20 | 20 | 37 | 38 | 26 | 27 |

18. How long, on average, do you feel that it should take for a new Center research project to yield tangible results?

| | N | MEAN | MEDIAN | SD |
|------------------|-----|------|--------|------|
| Number of months | 352 | 22 | 24 | 12.3 |

19a. During the past year, approximately how many new research projects have been stimulated in your Division's research laboratories by Center activities?

NUMBER OF PROJECTS

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|---|----------|-------------|---------------|-----------|
| <i>entire sample</i> | 283 | 1.2 | 1.0 | 2.0 |
| <i>those responding at least 1</i> | 155 | 2.2 | 2.0 | 2.3 |
| b. RESEARCH DOLLARS (in thousands) | | | | |
| <i>those responding at least 1</i> | 138 | 398 | 77.5 | 914 |
| <i>entire sample</i> | 269 | 205 | 8 | 683 |
| <i>research dollars per project</i> | 138 | 190 | 50 | 574 |

20a. During the past year, has participation in the Center activities stimulated additional research contracts with faculty?

| | <u>N</u> | <u>%</u> |
|-----|----------|----------|
| Yes | 100 | 33 |
| No | 200 | 67 |

If yes, approximately how many research dollars (in thousands)?

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|--------------------------------------|----------|-------------|---------------|-----------|
| <i>those responding "yes" to 20a</i> | 87 | 89.7 | 30 | 181.4 |
| <i>entire sample</i> | 300 | 26.4 | 0 | 105.6 |

b. During the past year, has participation in the Center activities stimulated research contracts with other laboratories or researchers?

| | <u>N</u> | <u>%</u> |
|-----|----------|----------|
| Yes | 72 | 25 |
| No | 212 | 75 |

If yes, approximately how many research dollars (in thousands)?

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|--------------------------------------|----------|-------------|---------------|-----------|
| <i>those responding "yes" to 20b</i> | 59 | 128.3 | 40 | 400 |
| <i>entire sample</i> | 284 | 26.7 | 0 | 188.5 |

21. During the past year, to what extent has the research conducted at the Center caused changes in the R&D projects in your company?

| | <u>MEAN</u> | <i>A Lot</i> 4 | | <i>Some</i> 3 | | <i>A Little</i> 2 | | <i>Hardly Any</i> 1 | |
|---|-------------|--------------------------|----------|-------------------------|----------|-----------------------------|----------|-------------------------------|----------|
| | | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> |
| Research topics and issues | 2.0 | 20 | 6 | 96 | 27 | 97 | 28 | 130 | 38 |
| Research methods and procedures used | 1.8 | 17 | 5 | 80 | 24 | 74 | 21 | 170 | 50 |
| Criteria methods used to evaluate the research projects | 1.5 | 5 | 2 | 44 | 13 | 77 | 23 | 206 | 62 |

23. What percentage of the Center research projects do you take interest in and monitor closely?

| <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|----------|-------------|---------------|-----------|
| 334 | 41.7 | 40 | 26.1 |

24. During the past year, has your participation in the Center produced any of the following benefits to your company?

| | <u>MEAN</u> | <i>Significant Effect</i> 3 | | <i>Moderate Effect</i> 2 | | <i>No Effect</i> 1 | |
|---|-------------|---------------------------------------|----------|------------------------------------|----------|------------------------------|----------|
| | | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> |
| Improvements in products and services | 1.5 | 22 | 8 | 96 | 34 | 164 | 58 |
| New products developed due to related efforts | 1.4 | 16 | 6 | 74 | 27 | 182 | 67 |
| Reduction of production costs | 1.2 | 8 | 3 | 37 | 14 | 208 | 82 |
| Improvements in processes and methods of production | 1.4 | 13 | 5 | 79 | 30 | 174 | 65 |

(item 24 cont ->)

| | <u>MEAN</u> | <u>Significant Effect 3</u> | | <u>Moderate Effect 2</u> | | <u>No Effect 1</u> | |
|---|-------------|-----------------------------|----------|--------------------------|----------|--------------------|----------|
| | | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> |
| Better personnel recruit. | 1.5 | 27 | 10 | 86 | 32 | 154 | 58 |
| Improved abil. to cooperate with outside scientists | 1.9 | 63 | 20 | 171 | 53 | 87 | 27 |
| Increased interaction with other companies | 2.1 | 94 | 28 | 172 | 52 | 68 | 20 |
| Increased interaction with University faculty | 2.2 | 119 | 35 | 184 | 54 | 37 | 11 |

25a. During the past year, how many students trained in the center research projects have been interviewed for possible employment in your company?

| | <u>N</u> | <u>Mean</u> | <u>Median</u> | <u>SD</u> |
|------------------------------------|----------|-------------|---------------|-----------|
| <i>entire sample</i> | 273 | 1.1 | 0.0 | 3.6 |
| <i>those responding at least 1</i> | 94 | 3.2 | 2.0 | 5.6 |

b. How many have actually been hired?

| | <u>N</u> | <u>Mean</u> | <u>Median</u> | <u>SD</u> |
|------------------------------------|----------|-------------|---------------|-----------|
| <i>entire sample</i> | 244 | .3 | 0.0 | .6 |
| <i>those responding at least 1</i> | 45 | 1.3 | 1.0 | .6 |

26. During the past year, how many days have CENTER SCIENTISTS/ENGINEERS spent on-site visiting or working in your labs?

| <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|----------|-------------|---------------|-----------|
| 297 | 4.9 | 1.0 | 14.5 |

27. During the past year, how many days have YOUR SCIENTISTS/ENGINEERS spent on-site visiting or working in your Center labs?

| <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|----------|-------------|---------------|-----------|
| 319 | 10.7 | 4.0 | 39.4 |

28. Excluding Center board/monitor meetings, how many times during the past year did you personally have contact with faculty affiliated with the Center?

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|--------------|----------|-------------|---------------|-----------|
| a. By phone | 344 | 9.1 | 5 | 12.4 |
| b. In person | 321 | 3.9 | 2 | 7.7 |

29. What effect has your participation in the Center had on the following:

| | <u>MEAN</u> | <i>Negative Effect</i> | | | | <i>No Effect</i> | | | | <i>Positive Effect</i> | |
|--|-------------|------------------------|----------|----------|----------|------------------|----------|----------|----------|------------------------|----------|
| | | 1 | | 2 | | 3 | | 4 | | 5 | |
| | | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> |
| Trust and confid. in the University | 4.2 | 1 | - | 9 | 3 | 50 | 14 | 149 | 43 | 138 | 40 |
| My evaluation of the quality of university research | 4.1 | 0 | 0 | 6 | 2 | 70 | 20 | 171 | 49 | 101 | 29 |
| Chances for career advancement, promotion and salary increases | 3.1 | 4 | 1 | 3 | 1 | 278 | 81 | 43 | 13 | 17 | 5 |

30. To what extent are you generally satisfied with the operation and activities of the Center?

| <u>MEAN</u> | <i>Completely Satisfied</i> | | <i>Considerably Satisfied</i> | | <i>Somewhat Satisfied</i> | | <i>Not at all Satisfied</i> | |
|-------------|-----------------------------|----------|-------------------------------|----------|---------------------------|----------|-----------------------------|----------|
| | 4 | | 3 | | 2 | | 1 | |
| | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> | <u>N</u> | <u>%</u> |
| 2.9 | 63 | 18 | 204 | 59 | 77 | 22 | 3 | 1 |

31. What's the likelihood your firm will renew its membership?

| | <u>N</u> | <u>%</u> | <u>MEAN</u> |
|----------------|----------|----------|-------------|
| Almost certain | 121 | 35 | 3.0 |
| Very likely | 132 | 38 | |
| Uncertain | 77 | 22 | |
| Unlikely | 18 | 5 | |

AGGREGATED INDUSTRY RESULTS FOLLOW

1993-94 AGGREGATED INDUSTRY RESULTS

Numbering refers to industry long form questionnaire.

QUESTION NUMBER.

11. How frequently do you disseminate Center technical reports to the following:

Never=1; 5+/year= 4

| | <u>N</u> | <u>MEAN</u> | <u>SD</u> |
|------------------------------------|----------|-------------|-----------|
| Technical staff in your group | 37 | 2.8 | .5 |
| Technical staff in your division | 37 | 2.6 | .5 |
| Technical staff in other divisions | 37 | 2.1 | .5 |
| Your immediate supervisor | 37 | 2.3 | .4 |
| Top corporate management | 37 | 1.5 | .3 |

13. Overall research program in the Center compared to similar research programs:

Top 2%= 4; Below average=1

| <u>N</u> | <u>MEAN</u> | <u>SD</u> |
|----------|-------------|-----------|
| 37 | 2.6 | .4 |

14. How satisfied were you with the following features of the Center?

Completely Satisfied = 4; Not at All Satisfied = 1

| | <u>N</u> | <u>MEAN</u> | <u>SD</u> |
|--|----------|-------------|-----------|
| Technical quality of research | 37 | 3.0 | .4 |
| Communication: Center staff & company | 37 | 3.0 | .4 |
| Center adm practices | 37 | 3.0 | .4 |
| Responsiveness ind. needs | 37 | 2.9 | .4 |
| Innovative quality of research | 37 | 2.9 | .4 |
| Proj. selection process | 37 | 2.9 | .4 |

18. How long, on average, should a research project take to yield results:**

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|------------------|----------|-------------|---------------|-----------|
| Number of months | 37 | 22.8 | 21.3 | 6.2 |

** These values are calculated as the average per firm per center.

Aggregated Industry -count. FINAL 1993-94 Process Outcome 24

19a. Approximately how many new research projects have been stimulated in your Division's research laboratories by Center activities:**

NUMBER OF PROJECTS

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|---------------|----------|-------------|---------------|-----------|
| entire sample | 37 | 1.2 | 1.0 | 1.0 |

b. RESEARCH DOLLARS (in thousands)

| | | | | |
|------------------------------|----|-------|-------|-------|
| entire sample | 36 | 205 | 80.0 | 317.2 |
| research dollars per project | 19 | 231.1 | 143.9 | 245.1 |

20a. Approximately how many research dollars (in thousands) are additional research contracts with faculty worth?:**

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|---------------|----------|-------------|---------------|-----------|
| entire sample | 37 | 26.4 | 12.3 | 40.0 |

b. During the past year, has participation in the Center activities stimulated research contracts with other laboratories or researchers:**

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|---------------|----------|-------------|---------------|-----------|
| entire sample | 37 | 26.7 | 9.1 | 130.1 |

21. To what extent has the research conducted at the Center caused changes in the R&D projects in your company? A Lot= 4; A Little= 1

| | <u>N</u> | <u>MEAN</u> | <u>SD</u> |
|---|----------|-------------|-----------|
| Research topics & issues | 37 | 1.9 | .4 |
| Research methods & procedures | 37 | 1.8 | .4 |
| Criteria used to evaluate research projects | 37 | 1.5 | .3 |

23. What percentage of Center research projects do you take interest in & monitor:

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|--|----------|-------------|---------------|-----------|
| | 37 | 43 | 43.5 | 14.0 |

24. Has your participation produced any of the following benefits to your company: Significant Effect= 3; No Effect = 1

| | <u>N</u> | <u>MEAN</u> | <u>SD</u> |
|---|----------|-------------|-----------|
| In products & services | 37 | 1.4 | .3 |
| New products developed due to related efforts | 37 | 1.4 | .3 |
| Reduction of production costs | 37 | 1.2 | .2 |
| Improvements in process & production methods | 37 | 1.4 | .3 |
| Better personnel recruit. | 37 | 1.5 | .3 |
| Improved ability to cooperate with outside scientists | 37 | 1.9 | .3 |
| Increased interaction with other companies | 37 | 2.0 | .4 |
| Increased interaction with University faculty | 37 | 2.2 | .3 |

** These values are calculated as the average per firm per center.

Aggregated Industry -count. FINAL 1993-94 Process Outcome 25

25a. During the past year, how many students trained in the center research projects have been interviewed for possible employment in your company? **

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|---------------|----------|-------------|---------------|-----------|
| entire sample | 37 | 1.2 | .9 | 1.5 |

b. How many have actually been hired?

| | | | | |
|---------------|----|----|----|----|
| entire sample | 36 | .4 | .2 | .5 |
|---------------|----|----|----|----|

26. How many days have CENTER SCIENTISTS/ENGINEERS spent on-site visiting labs: **

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|--|----------|-------------|---------------|-----------|
| | 37 | 6.2 | 3.3 | 9.9 |

27. How many days have YOUR SCIENTISTS/ENGINEERS spent on-site visiting labs: **

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|--|----------|-------------|---------------|-----------|
| | 37 | 10.8 | 5.4 | 15.7 |

28. How many times during the past year did you personally have contact with faculty affiliated with the Center? **

| | <u>N</u> | <u>MEAN</u> | <u>MEDIAN</u> | <u>SD</u> |
|--------------|----------|-------------|---------------|-----------|
| a. By phone | 37 | 9.9 | 7.9 | 6.3 |
| b. In person | 37 | 4.5 | 3.0 | 4.3 |

29. What effect has your participation in the Center had on the following:
Negative Effect = 1, Positive Effect = 5

| | <u>N</u> | <u>MEAN</u> | <u>SD</u> |
|---|----------|-------------|-----------|
| Trust and confid. in the University | 37 | 4.2 | .3 |
| Evaluation of university research | 37 | 4.0 | .3 |
| Chances for advancement, promotion, etc | 37 | 3.1 | .2 |

30. To what extent are you generally satisfied with the operation and activities of the Center?

Completely Satisfied = 4; Not at all Satisfied = 1

| | <u>N</u> | <u>MEAN</u> | <u>SD</u> |
|--|----------|-------------|-----------|
| | 37 | 2.9 | .3 |

31. What's the likelihood your firm will renew its membership?

Almost certain = 4; Unlikely = 1

| | <u>N</u> | <u>MEAN</u> | <u>SD</u> |
|--|----------|-------------|-----------|
| | 37 | 2.9 | .5 |

** These values are calculated as the average per firm per center.