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HUFFMAN, Donald Claude, 1934—
A TECHNIQUE FOR CLASSIFYING FARM MANAGERS ACCORDING TO MANAGERIAL ABILITY.

The Ohio State University, Ph.D., 1963
Economics, agricultural

University Microfilms, Inc., Ann Arbor, Michigan
immediate consideration and thus goals may become modified. The manager may find borrowing additional capital for the firm to be desirable but have to yield some control of the firm to acquire this additional capital.

Once the corporation's board of directors has established the goals and policies, they may hire an individual or several individuals to perform the various managerial functions of resource procurement, resource transformation, and product disposal. The sole proprietor would exercise much greater control over these functions even though he may hire technical advice or perhaps hire portions of these functions performed than the manager who is a part of a larger or more complex firm. The scope of management decisions within the control of one individual is of importance in contrasting types of firms.

The relationship of the manager to the firm differs with organizational structure. The sole proprietor is much more closely associated with the total process of the firm than the individual with responsibility for only one segment of the managerial function. The sole proprietorship firm is organized for the fulfillment of the manager's personal goals. The firm's achievement represents his personal achievement. However, if the manager has responsibility for only a small portion of the total management function, the firm's achievement results from a composite of individual managers. No one individual can claim full credit for the firm's activities. Thus management may be more separated from the manager than is the case in which one manager has full responsibility.
15. How many acres do you own? ____________

16. How many acres that you own are cropland? ____________ Permanent pasture? ____________

17. How many acres do you rent? ____________

18. How many acres of this is cropland? ____________ Permanent pasture? ____________

19.  

<table>
<thead>
<tr>
<th>CROP</th>
<th>1961</th>
<th>YIELD</th>
<th>RATE AND ANALYSIS OF FERTILIZER APPLIED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soybeans</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Wheat</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Oats</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Hay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
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</tbody>
</table>

How many acres of meadow were used as rotational pasture? ____________

20. Do you follow a definite rotation? ______YES ______NO

If YES, why?

If NO, why not?
21. Do you keep any livestock other than hogs? ___YES ___NO.

If YES

<table>
<thead>
<tr>
<th>No. of Animals</th>
<th>Kind of Livestock</th>
<th>Average Annual Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

22. Custom Work:

<table>
<thead>
<tr>
<th>Job:</th>
<th>Acres</th>
<th>Hired</th>
<th>Done for Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combining</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corn Picking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silo Filling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If custom work hired, why?

If custom work done for others, why?

23. What type of financial record keeping system do you use?

___ Simple cash accounting (simple ledger).
___ Complete farm accounting, single entry (e.g. old Ohio Record Book).
___ Complete farm accounting, modified double entry (e.g. New Ohio Record Book).
___ Invoice file (filing of receipts, invoices, cancelled checks).

Comments:

24. Do you refer back to your records when making a major decision? ___YES ___NO.

If YES, please give a specific example and how you used them.

25. Would more detailed records help you in planning and decision making? ___YES ___NO.

If YES, how would more detailed records help and why don't you keep them?
26. How would you rate yourself as a farm manager?
   ____ Superior
   ____ Above average
   ____ Average
   ____ Below average
   ____ Poor

27. What characteristics or factors do you consider to be most important to be a successful farmer?

28. Do you think you could get an off-farm job which would make you more money than farming? ____YES ____NO.
   If YES, how much more could you make? ______________
   What type of job? (Explain)

   Why don't you take such a job?

29. At your present level of income, how much would a non-farm job have to pay to induce you to quit farming? ______________

30. Please describe briefly what you believe would be an ideal farm situation for you, taking into account your likes and dislikes, your abilities, and the investment you have in farming.
### Hours Per Week

<table>
<thead>
<tr>
<th>Persons</th>
<th>Age</th>
<th>Years School</th>
<th>Winter</th>
<th>Spring Planting</th>
<th>Summer</th>
<th>Autumn Harvest</th>
<th>Specific Responsibilities</th>
<th>Usual Jobs Performed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wife</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sons:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daughters:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full-Time Hired:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Approximately how many total man-days of hourly or day workers do you hire? ________________

What specific jobs does this type of help usually perform?

If attended college, what curriculum?

32. Which of the following types of agricultural training have you participated in?

- __4-H - No. of years?
- __F.F.A. - No. of years?
- __Agricultural short courses sponsored by state college (2 to 8 week session)
- __Workshops sponsored by county agent of state college (2 day to 1 week sessions)
- __Veterans on-the-job training
- __Adult farmer classes
- __Production and marketing meetings sponsored by local merchants or bankers
- __Production, marketing, or planning meetings sponsored by county agent, Vo., g. teacher, or State College
### FINANCIAL INVENTORY SUMMARY

<table>
<thead>
<tr>
<th>Tax Valuation</th>
<th>Amount of Taxes Paid &amp; Tax Rate</th>
<th>Value of Outstanding Loans (if any)</th>
<th>Terms of Loans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 1962</td>
<td></td>
<td>Jan. 1962</td>
<td></td>
</tr>
</tbody>
</table>

| Real Estate   |                                  |                                   |                |
| Chattels      |                                  |                                   |                |
| Total         |                                  |                                   |                |

What is the value of personal loans or extended credit which you have?

What is the estimated market value of other securities and properties which you have?  

Briefly describe these securities and properties:

34. How many dollars **net farm profit** did you report on your 1040F income tax return last year?

35. What is your goal for net farm profit, i.e. what do you feel is a reasonable return to expect for your labor, abilities, and investment in the farm business?

36. At your present level of dollar income, which is more important to you:
   - Additional dollar income
   - Additional pleasures or satisfactions which cannot be bought with money.

   **If additional dollar income:**
   How high would your dollar income have to go before other satisfactions (things money won't buy) become just as important as additional dollar income?

   **If satisfactions:**
   How low would your dollar income have to go before additional dollar income would be just as important as other satisfactions (things money won't buy)?
37. For each of the following groups of goals, please tell me your first, second and third choice in order of importance to you:

**GROUP I**
- a) Obtain a farm income which will provide an above average level of living.
- b) Have the farm business paid for.
- c) Obtain a high rate of return on your capital investment.
- d) To remain debt free.
- e) To accumulate savings in addition to the farm business.
- f) Obtain a farm income sufficient to meet necessary cash expenditures.

**GROUP II**
- g) Own a considerable amount of labor-saving equipment.
- h) Have a modern home and furnishings.
- i) Minimize dependence on others to perform farm operations.
- j) Own all new or nearly new machinery and equipment.
- k) Be first in community to get farm jobs accomplished.
- l) Have highest yielding crops or livestock in the community.

**GROUP III**
- m) Participate in church and community activities.
- n) Be a leader in church and/or community activities.
- o) Be your own boss.
- p) Have a neat appearing farm.
- q) Have time for personal hobbies.
- r) Work with living things in the open air.

Of those three goals which you have ranked as first choice:
Which do you consider most important? __________(1)
Which is second most important? _______________(2)
Which is third most important? ________________(3)

Of those three goals which you have ranked second choice:
Which do you consider most important? __________(4)
Which is second most important? _______________(5)
Which is third most important? ________________(6)

You have indicated (_____) goal to be most important to you.
Which is next most important to you? ____/(2) or ____/(4).

☐(3) or ☐(4)  ☐(2) or ☐(5)
☐(3) or ☐(5)  ☐(3) or ☐(5)  ☐(2) or ☐(6)
☐(3) or ☐(6)  ☐(3) or ☐(6)  ☐(3) or ☐(6)
38. Which of the following activities do you participate in, how often and approximately how much time do you spend at each?

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>FREQUENCY</th>
<th>AVERAGE TIME EACH EVENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sightseeing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boating or Water-skiing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hunting or fishing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Golfing or bowling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ballgames</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swimming</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other physical sports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Photography</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handicraft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Playing cards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visiting friends or relatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gardening (Hobby)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School and community functions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Church functions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other social activities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family activities at home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Television</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Movies</td>
<td></td>
<td></td>
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<tr>
<td>Other</td>
<td></td>
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</tr>
</tbody>
</table>

39. Which of the following statements best describes your goal as far as participating in leisure-time activities?

1) Participate as often as you like.
2) Would like to participate about half again as much.
3) Would like to participate twice as much.
4) Would like to participate more than twice as much.
40. Do you do most of your own machinery maintenance and repair work or hire it done?
   _____ self
   _____ machinery dealer
   _____ local welding shop
   _____ other

41. When do you service and get machines ready for use such as planter, mower, or haybaler?
   _____ when time to use
   _____ week ahead of time
   _____ rainy days during preceding month
   _____ other (explain)

42. What is the extent of preventive maintenance practiced on machines?
   _____ replacement of only necessary parts at time of failure
   _____ thorough checking and replacement of worn parts when readying the machine for season's use
   _____ replacement of required and other badly worn parts at time of failure
   _____ thorough inspection and overhaul periodically during slack season

43. How would you classify your abilities for building and fencing construction and repairs?
   _____ could design plans for and perform finishing work in remodeling the house
   _____ could construct a building which did not require fine finishing work
   _____ can adequately perform most repair and maintenance work
   _____ can perform makeshift repairs to get by
   _____ might as well get someone else to do most jobs

44. How would you classify your abilities as a mechanic?
   _____ can perform a motor overhaul and most mechanical work if I have the tools
   _____ can do motor tune-up work and replace factory parts on most machines
   _____ perform general machine maintenance and less complicated machine repair
   _____ can perform makeshift repairs if I have to
   _____ change the oil and grease it and that's it

45. Which of the following do you think best describes how you estimate future prices of products you have to sell?
   _____ general trend in farm prices
   _____ current supply of the product
   _____ estimated future changes in both supply and demand for the product
   _____ don't try to predict prices

46. Which of the following types of formal insurance do you carry?
   _____ Life Insurance
   _____ Fire and Storm Insurance on Buildings
   _____ Fire and Storm Insurance on Machinery
   _____ Insurance on Stored Crops
   _____ Casualty Insurance on Livestock
   _____ Crop Insurance
   _____ Liability Insurance (other than auto)
47. For which of the following purposes are you willing to borrow money?

- buy land
- buildings and improvements
- breeding livestock
- feeder livestock
- machinery
- feed, seed, and fertilizer
- living expenses
- home remodeling, furnishings, or automobile
- children's education
- vacations

48. Who makes the major farm decisions such as buying a new machine or increasing the number of animals kept?

- operator only
- operator usually
- operator and wife share
- wife usually
- wife only

49. Who makes the routine farm decisions such as to sell this week or next, or type of feed purchased?

- operator only
- operator usually
- operator and wife share
- wife usually
- wife only

50. Who makes the decisions about the household operation e.g. buying groceries, when to purchase clothing, and general maintenance and repair of household furnishings?

- operator only
- operator usually
- operator and wife share
- wife usually
- wife only

51. If you run into a situation for which you are uncertain of what to do and it is difficult to make a decision about, what do you do?

- wait for further developments
- try to make out the best you can with what you know
- talk it over with neighbors or relatives
- seek professional advice e.g. county agent or consultant from an agency familiar with the type of problem.

52. After making a decision to do something, do you?

- always stick to it regardless
- nearly always stick to it
- sometimes reconsider if not too sure
- frequently sleep on it overnight and then reconsider
- may change my mind several times.
For each of the following sets of statements please tell me which is most like you and which is least like you:

53. Feels that farmers have to work too many hours
   Feels a family should do things together
   Sees little value in a farmer studying agriculture in school
   Is a good farm business manager

   Most   Least

54. New discoveries and changes in farming methods interest him greatly
   Dislikes being tied down to chores or irrigating
   Likes the fact that farming gives the whole family a chance to help
   earn the family living
   Would rather make $3,000 a year and be free of debt than make $5,000
   and be in debt.

   Most   Least

55. Farming gives him a sense of achievement
   Usually discusses farming plans with his wife
   Believes the old idea that anyone who is ambitious and works hard can
   get ahead is no longer true
   Usually waits to see what results neighbors get before trying out a
   new farm practice or seed variety

   Most   Least

56. Feels that a farmer has to keep learning and trying new things to stay
    on top
   Finds most articles in farm magazines impractical
   Feels that the city gives people more new and interesting experiences
   than does living in the country
   Feels that working together with friends and neighbors is the key to
   success

   Most   Least

57. Farm life puts too many restrictions on his social activities
   Has a hard time finding people of similar interests in the country
   Attends field days and farm meetings whenever possible
   Believes that the ideal farm is one on which all the work can be done
   by the farmer and his family

   Most   Least

58. Thinks it is wrong to charge interest when money is loaned to family
    members
   Has tried out several new farm practices in the last few years
   Independence or being your own boss is what he most likes about farm-
   ing
   Good neighbors are one of his biggest assets

   Most   Least

59. Likes the exercise in the open air and sunshine involved in farming
   Gets enjoyment out of learning new ways of doing things
   All he wants from his farm is to make a reasonable living for the
   family
   Doesn't really like to exchange work with neighbors

   Most   Least
Another major difference associated with organizational structure is the relationship of the firm and the home. As the organizational structure approaches that of a single manager sole proprietorship, the firm and home become more intimately related. This is especially true of farm businesses. Labor, management, and capital inputs between the firm and the household become intermingled. The personnel manager for General Motors plant number 3 goes to the office in the morning and deals with one particular block of resources for the Board of Directors under the supervision of the Plant superintendent and the general personnel manager. When he returns home in the evening he deals with his personal resources in achieving his domestic goals. He does not mix the firm's resources and problems with those of his home and household.

In contrast, the farm manager's home is typically attached to the farm firm. Personal capital is tied up in both. A financing problem of the firm becomes a finance problem of the household as does a labor problem. The farm firm represents a much larger segment of his personal life than is true for the corporation manager.

This is not to imply that the personnel manager is not interested in his job nor doesn't lie awake nights worrying about office problems. In fact, it may be the most important thing in his life. However, he does have a separation of management roles between his office and household. The individual entrepreneur intermingles the two roles. The firm and the household draw upon the same set of resources and consequently management of one affects the management of the other.
60. security and permanence are what he most wants out of farming .......... [ ] [ ]
gets little pleasure out of visiting neighbors ............................... [ ] [ ]
farming offers a challenge to him ............................................. [ ] [ ]
believes that the traditional ways are the best ways of doing things .. [ ] [ ]

61. thinks high school is enough education for a practical man like a
farmer ................................................................. [ ] [ ]
finds that one of the greatest helps in farming is to keep good records [ ] [ ]
tries to participate actively in community activities ...................... [ ] [ ]
living in a city would give him the opportunity for new and interest-
ing experiences .................................................... [ ] [ ]

62. gets great enjoyment out of working with plants or animals .......... [ ] [ ]
listens to farm programs to get new ideas and keep up on farming
methods ................................................................. [ ] [ ]
hates to borrow money even when he knows it is necessary to run the
farm properly .......................................................... [ ] [ ]
knows only a small proportion of his relatives well .................... [ ] [ ]

63. seldom makes an annual donation to his church ........................... [ ] [ ]
would have more fun living in a city than on a farm ...................... [ ] [ ]
keeps up to date on the latest farming methods .......................... [ ] [ ]
would rather exchange work with a neighbor than hire things done ..... [ ] [ ]

64. seldom discusses farming plans or buying farm equipment with his wife . [ ] [ ]
maximum profit is more important to him than improving the land ....... [ ] [ ]
has gotten a number of good ideas from farm magazines ................ [ ] [ ]
likes to watch things grow .............................................. [ ] [ ]
Farmers have different ideas about what is most important for a successful hog operation. Some think having the right system or equipment is most important, others say the right breeding stock, others say it's the feeding program, and others say it is just doing the little things.

What do you think are the most important decisions to be made with respect to the overall system of management?

What do you think are the most important details that crop up in the daily operations of your hog enterprise which must be attended to?
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I, Donald Claude Huffman, was born near Winston, Daviess County, Missouri, January 13, 1934. I received my elementary and secondary school education in the public schools of the Winston RVI school district of Daviess County, Missouri. I received my undergraduate training in Agricultural Education at the University of Missouri, which granted me the Bachelor of Science degree in 1959. During the summer of 1958 I attended the International Land Economics Institute held at the University of Illinois. The Master of Science degree was granted me in 1960 by the University of Missouri. I held the position of research assistant while doing work toward the Master of Science degree.

In September, 1960 I began work at The Ohio State University as a research assistant, specializing in the Department of Agricultural Economics. I held this position for one year at the end of which time I was appointed assistant instructor in teaching and research. This latter position I held for 21 months while completing the requirements for the Doctor of Philosophy degree.
The theory of the firm has been developed around the economic man concept. The management function then becomes primarily one of profit maximization within a given framework of other goal and policy considerations. This has proven to be a useful concept, particularly where the management responsibilities were apportioned among individuals, each operating within a framework of fairly well defined goals or policies for the benefit of a larger encompassing organization.

The economic man concept is perhaps less applicable to the individual entrepreneur or farm firm than to more complex firm organizations. This results primarily from the relationship of the manager to the firm and the involvement of personal goals with firm goals as discussed earlier.

The economic man concept has been helpful in developing theories and concepts of the production firm and its processes, but it has failed to provide sufficient information and understanding of the managerial processes to permit quantification of the managerial input. There is a growing school of thought that non-economic goals are of sufficient importance to incorporated firms of the non-farm sector to question the applicability of the economic man concept for evaluation of the managerial processes.

Even though we have assumed in the past that farm managers acted in an economic man concept, we must recognize and admit that there are other personal values involved which cannot be reduced to dollars and cents. In our economically oriented society, many of our satisfactions or pleasures may be purchased directly with dollars. There are others
which may indirectly cost dollars due to their affect upon dollar earning capacity. There are still other family and personal values which may have little or no relationship to monetary value.

Because of these interrelationships of economic and non-economic values or goals of the individual which become integrated in the managerial process, we must recognize and incorporate them in our theories regarding the managerial process. This study is directed toward the development of analytical techniques which may improve our ability to develop and test hypotheses dealing with farm managerial performance in these terms.

Psychologists, sociologists, philosophers, and economists are probing various aspects of the managerial complex to discover the relationship of these non-economic values to management and their influence on managerial performance. Psychologists have been attempting to measure the inner lives of the individual to better understand how the individual relates to himself. Sociologists have been trying to determine the influence of various motivations of the individual on how he relates to other individuals and to groups. Economists would like to measure these motivations to determine why the individual acts as he does, what actions he might be expected to take, how these actions and motivations are related to economic performance, and what his potential performance is.

Agricultural economists are interested in managerial ability and managerial behavior of farmers for use in formulating national policies, developing educational programs, selection of research
coefficients for use in farm planning, vocational guidance, resource allocation, and personnel selection.

From the research standpoint managerial ability still holds the key to the production process. We have progressed a long way in the physical sciences toward understanding physical relationships. For example we can measure the physical productivity of land, the relationship and productivity of various plant nutrients, the substitutability of capital and labor, and innumerable other relationships. By applying prices and marginal productivity concepts to these physical relationships we can determine optimum combinations of physical resource inputs. However, management is still a relatively unknown quantity. Until we can measure the managerial input, we are at a loss for determining the optimum amount of land, labor, and capital to associate with a given entrepreneur for the attainment of a given goal.

The growing complexity of agricultural firms along with rapidly changing technology places considerable stress upon management. Until we can develop a better understanding of the management processes and managerial behavior we are at a loss to cope with management problems, and hence to evaluate the ability of an individual manager to compete and achieve personal and other goals.

Statement of the Problem

The general problem under investigation is determining the relationship of the managerial complex to managerial performance. The general objective is to determine the characteristics and attributes of the managerial complex and relate these to managerial performance
in such a manner as will enable estimation or prediction of managerial performance within given circumstances and further enable us to seek ways to improve managerial performance of individuals.

The specific problem being investigated in this study is that of developing methodological procedures which may be used to evaluate managerial performance, isolate relevant characteristics and attributes of farm managers, and relate these characteristics in a meaningful manner to performance in the form of a predictive scale.

**Objectives**

The specific objectives of this study are:

1. To define a procedure for classifying farm managers according to their major goal orientations.
2. To define a criterion for classifying farm managers according to the goal structure of the individual.
3. To define a procedure for evaluating managerial performance in terms of goals.
4. To relate economic performance to goal achievement.
5. To establish criteria for the measurement (or classification) of managerial ability.
CHAPTER II
BACKGROUND AND METHOD OF STUDY

Regional Interests

A Research Conference on Risk and Uncertainty in Agriculture was sponsored in 1953 by the Northern Great Plains Committee on Tenure, Credit, and Land Values of the Great Plains Agricultural Council with the cooperation of Farm Foundation and the State Agricultural Experiment Stations of Iowa, Kentucky, and Michigan.\(^1\) Much interest was stimulated in the role of the farm manager as a result of this conference.

The Interstate Managerial Survey (IMS) was started in 1954 by the Risk and Uncertainty Subcommittee of the North Central Farm Management Research Committee (now known as NCR-4). Indiana, Iowa, Kansas, Kentucky, Michigan, North Dakota, and Ohio participated in this interdisciplinary study of 1,075 farm managers.

Specific objectives of the IMS were:

1. To examine the role of information in decision making.

\(^1\)Great Plains Council, Proceedings of Research Conference on Risk and Uncertainty in Agriculture, Publication No. 11, Agricultural Experiment Station, North Dakota Agricultural College, Fargo, August, 1955.
2. To establish the applicability of the managerial functions of observing, analyzing, deciding, taking action, and accepting responsibility for action in describing the decision making process.

3. To learn more about the analytical methods used by farm managers in making decisions.

4. To describe and establish expectation models used in the decision process.

5. To ascertain the use and extent of certain insurance and personal strategies.

6. To give empirical content to previous conceptual work concerning knowledge situations.

7. To obtain data to test hypotheses involving insurance and chance taking.2

While the objectives of this study were noble and the findings helpful, the findings were far from being conclusive.

Within the NCR-4 committee, a subcommittee (NCR-53) on the Managerial Resource in farming was formed which later became a separate regional research committee known as NC-59. This committee developed a regional research project statement (December 20, 1961) for the purpose of further investigating the managerial resource in farming.

Several of the states in the North Central Region, including Ohio, had developed research projects for the purpose of studying the farm managerial input. Some state projects were redirected or expanded to better satisfy the regional project objectives and were

Interstate Managerial Project Committee, Summary Data from the Interstate Managerial Survey, Bulletin 669, Kentucky Agricultural Experiment Station, University of Kentucky, Lexington, Kentucky, June, 1959, pp. 5-6.
incorporated as contributing projects. This project was funded July 1, 1962.

**The Ohio Project**

The specific objectives of Ohio's contributing project are to:

1. Develop an index or scale which will permit the ranking of established farmers according to their managerial ability.

2. Determine the relative importance of significant independent variables which are related to the various levels of managerial ability in general and by types of farming enterprises.

3. Refine and validate a scaling device based on the independent variables found to be related to managerial ability which can be used to predict the managerial ability of individuals with or without managerial experience.

As a forerunner to the present study, Meier prepared a master's thesis in which he reviewed a large segment of the literature dealing with management and reported the findings of a pilot investigation of goals of farm families as they relate to success.3

Larson recently completed a master's thesis dealing with the operational aspects of management on selected farms.4 Larson's study was primarily concerned with investigating methodological procedures

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which may be used in evaluating executive skills within the objectives of the Ohio Contributing project NC-59.

It is with this background and within the framework of objectives 1 and 2 of the Ohio contributing project statement that this study seeks to develop workable methodological procedures which may be used to isolate, quantify, and relate variables which describe managerial performance.

**Method of Study**

An ideal farm manager was defined as an individual having well-defined goals including personal, family, community, and economic considerations and possessing abilities and characteristics required for achievement of these goals. From this concept, reflection upon individual managers, both real and imagined, possessing 'desired' goals and their achievement provided a basis for the development of an extensive list of goals, characteristics, and attributes of the ideal farm manager and his farm business.

In this process many aspects of the individual and how he conducted his business affairs were probed. Included were general attitudes, family relationships, business relationships, method of organizing the farm business, planning periods, manner of making decisions, information sources, ordering of activities, and skills involved.

Means of identifying and quantifying the variables delineated were sought. Previous farm management studies were consulted for methods of obtaining information regarding the farm business and its
A TECHNIQUE FOR CLASSIFYING FARM MANAGERS
ACCORDING TO MANAGERIAL ABILITY

DISSEPTION
Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By
Donald Claude Huffman, B.S., M.S.

*****

The Ohio State University
1963

Approved by

[Signature]
Adviser
Department of Agricultural Economics and Rural Sociology
manager. Attitudinal and capability tests developed by psychologists and sociologists were reviewed, along with published results of studies using these devices, to select methods of measurement.

Attributes and characteristics were selected that were believed to be measurable.

The personal interview technique was chosen for obtaining the information for a combination of reasons. First, the quantity and nature of the information would have discouraged most respondents without personal contact. Second, this technique permitted depth probing of ideas which were not easily communicated. Third, it permitted using the respondents' interests to probe various attitudes not specifically outlined in the questionnaire. Fourth, it permitted observation of the respondents' reactions to various questions.

Various personal interview question techniques were analyzed for the purpose of measuring selected managerial characteristics. The selection of the technique to be used for a specific type of information was based upon the time required to obtain the information, uniformity in coding information, and the degree of detail retained in the recording process.

The selection of the question items to be included in the final questionnaire was based upon the following criteria: 1) Time required to obtain the information, 2) the anticipated ability of the technique to obtain the information and, 3) the anticipated relative usefulness of the information for describing managerial relationships.
The final questionnaire (see Appendix) required approximately two hours to administer. It included information relative to:

1. Size of farming operations;
2. Type of crop and livestock programs;
3. Value of assets and liabilities;
4. Income, age, education, and labor of the managerial complex;
5. Monetary and personal goals;
6. Leisure activities participated in by the family;
7. Manual skill abilities;
8. Extent and use of records;
9. Attitudes toward risk;
10. Recognition of both farm and non-farm opportunities; and
11. Decision making.

Thirty-one completed questionnaires were included in the final analysis. It became obvious during the interviewing process that some major revisions in the questionnaire and the sampling procedure would be required before the final sample could be drawn for fulfilling the objectives of the Ohio NC-59 project. Since this phase of the project is exploratory in nature, it was deemed advisable to restrict the sample size due to the relatively high cost per schedule and the limited usefulness of the pilot schedules in the final sample. It was believed that the additional reliability obtained by a larger sample would not warrant the added cost for the purpose of developing techniques.
The analytical techniques used include correlation analysis, regression analysis, factor analysis, analysis of variance, and graphic techniques.

The relatively small sample permitted graphic analysis to be effectively utilized for comparing many two-variable relationships. It also permitted observing general trends within the data which were suggestive of other relationships to consider when selecting variables to include in multiple regression equations.

The centroid method of factor analysis was used to select groups of variables which exhibited common relationships within the sample. A brief description of this technique is found in the Appendix.

Multiple regression procedures utilizing multiple hypothesis techniques were used for developing predictive equations from the variables suggested to be relevant and influential in managerial performance.

Description of Sample

In order to secure adequate information within a reasonable time limit with the research resources available, it was necessary to place tenure, type of farming, and geographical restrictions upon the sample during this exploratory phase. A sample representative of all tenure classes and types of farming would be necessary to satisfy the ultimate objectives of this study. A group of farmers for which complete inventory, financial, and technical performance data were available over a period of years would have been desirable. Unfortunately, however, no such group of farm records was available. Consequently, it
was necessary to obtain all the required information from the respondent at the time of the interview.

Owner-operators were selected because of the compactness of the managerial complex relative to other tenure classes. Full control of the basic farm firm by the farm-operator was essential. Cash or crop-share renting of additional cropland was permitted as long as the basic farm unit was owned by the respondent.

The individual owner-operator and his family have more complete control of decisions than other tenure classes. The power of final decision rests with the manager and his family. The banker and machinery dealer influence decisions but the farm operator can make the final choice within the framework of goals established by his family unit. Tenant and partnership arrangements involves another counterpart of the management complex with varying degrees of influence. The final decision may represent a compromise between two or more distinct goal complexes, or the dominance of one of the counterparts. Thus outside influence on the operator's final decision is at a minimum with the individual owner-operator.

Only farmers receiving 75 per cent or more of their livestock income from market hogs and less than $1,000 per year non-farm income were included. The non-farm income restriction was included to insure that the farm business was being operated as the primary source of family livelihood. Farmers from 25 to 65 years of age were selected for study.
A down-the-road sampling procedure was used in five southwestern Ohio counties. Clinton, Fayette, Greene, Highland, and Madison Counties were selected because of the relatively homogeneous land resource and heavy concentration of hogs. About one-fifth of Ohio's total market hogs are produced in these five counties which represents the southeastern fringe of the Corn Belt.

The topography within the portions of the counties selected ranges from level to moderately rolling. The soils are glaciated Wisconsin till of medium to moderately fine texture. They frequently have poor natural drainage but are moderately high in productivity, especially with the use of tile.

Cash grain, hogs, fat cattle, or some combination of these are the major farming enterprises in the area. Most of the hogs produced in the area are housed in portable units. Either two or four farrowings per year predominate with the summer farrowings almost always on pasture.

The sample included all qualified farmers within the topographical area selected who were willing to participate. Qualified respondents were informed of the interview time required and the personal nature of the information. Very few refused to cooperate.

During the screening process, interviewers observed superior economic performance among family partnership operations when compared to farms included in the sample.
CHAPTER III

REVIEW OF LITERATURE

Relatively little of the completed research has attempted to measure the managerial input on farms directly. Several studies have been made which dealt with various segments of the managerial complex. More recently several philosophical presentations have appeared concerning the nature of management and managers.

Ricardo left us with a theory of rent based upon variations in the productivity of the land resource. Returns to agriculture became associated with land productivity, since the land resource was a relatively large farm input. However, it was realized that there was considerable variation in the returns to farming that could not be explained by variations in land productivity.

H. C. Taylor noted that there was a variation in the productivity, or quality, of farm operators equivalent to that of land. Thus he proposed that the returns to a particular farm unit were a function of the "efficiency" of the farmer and the quantity of resources he commanded.¹

The economic efficiency of the farm unit became a focal point of agricultural investigations. Pond and Tapp attempted to demonstrate the effects the farm organization had upon efficiency of the operation. The human element was considered an important factor in planning the organization and in the operation of the farm business.

The speed and efficiency with which field operations can be performed depend upon the size and type of implement and power unit, the size and shape of fields, the intensity of culture, the condition of the soil or crop upon which the work is being done, the practice followed in performing the operations, and the managerial ability of the operator.\(^2\)

They suggested principles which might be used in planning the farm organization for efficient resource use. Among these was a plan for scheduling the work load to permit efficient use of the farmer's time and labor.

Wilcox, Boss, and Pond attempted to determine why some farmers were more efficient than others.\(^3\) Previous studies indicated the importance of the human element but did not indicate how to evaluate it.

\(^2\)George A. Pond and Jesse W. Tapp, *A Study of Farm Organization in Southwestern Minnesota*, Bulletin 205, The University of Minnesota Agricultural Experiment Station and U.S.D.A. Bureau of Agricultural Economics Co-operating, University Farm, St. Paul, Minnesota, November, 1923, p. 133.

\(^3\)Walter W. Wilcox, Andrew Boss and George A. Pond, *Relation of Variations in the Human Factor to Financial Returns in Farming*, Bulletin 288, University of Minnesota Agricultural Experiment Station in Cooperation with the U.S.D.A. Bureau of Agricultural Economics, University Farm, St. Paul, Minnesota, June, 1932.
Although this study explored various approaches to an evaluation of the managerial input, no conclusive relationships were found. They concluded that greater financial earnings were within the reach of most farmers and that there was "no magic formula" by which some farmers obtained greater financial earnings than others.4

Several other studies made during the 1930's were designed to determine the effects of selected managerial practices as related to income. Pond and Ranney evaluated the effects of the following practices and efficiency measures on farm earnings: 1) size of business, 2) choice of crops, 3) amount of livestock per 100 acres, 4) crop yields, 5) butterfat production per cow, 6) returns over feed from livestock other than cows, 7) labor efficiency, and 8) power machinery and improvement expense per productive man work unit. Using the performance of their sample as a base, they concluded:

For each additional factor in which a farmer attained better than average accomplishment, there was an average increase in earnings of nearly $300.5

In 1939, T. W. Schultz proclaimed:

Farm management research which claims more personnel and resources than any other branch of agricultural economics, seems to have reached an impasse. Wilcox and others have directed attention to phases of this situation. The

4Ibid., p. 43.

5George A. Pond and W. P. Ranney, Factors Causing Variations in Earnings Among Dairy Farmers in Southeastern Minnesota, Bulletin 314, University of Minnesota Agricultural Experiment Station in Cooperation with U.S.D.A. Bureau of Agricultural Economics, University Farm, St. Paul, Minnesota, December, 1934, p. 75.
criticisms which are levied against farm management studies are usually: (1) the research results presumably do not provide a basis for guiding entrepreneurial decisions when economic change confronts the farmer, and (2) they afford no way of relating the actions taken within the firm to that of the economy as a whole.®

We live in a dynamic world. Change is both rapid and inevitable. We cannot predict the future with sufficient precision to define an optimal organization, let alone achieve optimum performance within the organization.

The shortcomings of previous research charged by Schultz result in part from the theoretical framework within which management was viewed. First of all, the economic man concept was accepted as a criterion for performance of the firm. Secondly, a static analysis was made; i.e. performance was evaluated in terms of the existing organization of the firm.

Schultz proposed a new framework for evaluating management.

The decisions of the entrepreneur are carried out within the framework of the firm. Two interrelated decisions must be made, (a) the amount of the adjustment that is necessary and (b) the method for making the adjustment; that is, what to do and how to do it.

It is these adjustments of the firm that give us the key to what we need to look for in farm management research. To understand the basic nature of these adjustments is to know what is fundamental to the entrepreneurial problem in farming. Since the

existence of the firm of necessity arises out of and is dependent upon dynamic conditions, it would appear that both the size of the firm and the success of the firm must be determined within a framework that allows for 'time' and 'change'.

Schultz suggested three methodological devices to account for dynamics in farm management research: 1) price and technical expectations, 2) the production plan, and 3) the time span of the production plan.9

Chambliss recognized the dynamics of management in his statement:

Management implies both control and guidance of the affairs of an organization.9

He focused attention on the need for planning to achieve the goals of management which involve more than profit maximization.

The goal of all management, wherever found, is to provide, from the use of the resources employed, the highest degree of total satisfactions for the person or persons concerned.10

It should be pointed out that the personal satisfactions are relatively more important when dealing with the farm firm than when dealing with industrial or business corporations due to the extremely close

7Ibid., p. 574.

^Ibid., p. 577.


10Ibid., p. 9.
ACKNOWLEDGMENTS

I express my sincere thanks to Dr. Edgar T. Shandy my adviser, whose able guidance, criticism, and encouragement has been deeply appreciated.

I am grateful to Drs. J. Robert Tompkin and John H. Sitterley for their many helpful suggestions. Special thanks are given to Messrs. Bernard L. Erven and David A. Larson, who have given their time freely and willingly to permit depth probing of many ideas.

I especially wish to express thanks to my wife Betty, whose encouragement and sacrifice has made this endeavor possible.
interrelationship of the farm business and the home. The farm manager's actions are influenced more by personal considerations than those of the manager who is a part of a larger organization.

This explains in part why the economic performance criterion has been inadequate to evaluate the managerial input.

Much of the more recent research on the managerial function has centered around the incorporation of risk and uncertainty into decision and managerial behavior theory. Knight's attempt to relate risk and uncertainty to the economic process and to the function of management provided the foundation to build on.

The following excerpts depict Knight's concept of management.

...The principal fact which calls for exercise of the imagination is the internal organization of the productive groups or establishments. With uncertainty entirely absent, every individual being in possession of perfect knowledge of the situation, there would be no occasion for anything of the nature of responsible management or control of productive activity. Even marketing operations in any realistic sense would not be found. The flow of raw materials and productive services through productive processes to the consumer would be entirely automatic.

...If the conditions of life and the people themselves were entirely unchanging a definite organization would result, perfect in the sense that no one would be under an incentive to change. So in the organization of the productive groups, it is not necessary to imagine every worker doing exactly the right thing at the right time in a sort of 'preestablished harmony' with the work of others. There might be managers, superintendents, etc., for the purpose of coordinating the activities of individuals. But under conditions of perfect knowledge and certainty such functionaries would be laborers merely, performing a purely routine function, without responsibility of any sort, on a level with men engaged in mechanical operations.
With the introduction of uncertainty—the fact of ignorance and necessity of acting upon opinion rather than knowledge—into this Eden-like situation, its character is completely changed. With uncertainty absent, man's energies are devoted altogether to doing things; it is doubtful whether intelligence itself would exist in such a situation; in a world so built that perfect knowledge was theoretically possible, it seems likely that all organic re-adjustments would become mechanical, all organisms automata. With uncertainty present, doing things, the actual execution of activity, becomes in a real sense a secondary part of life; the primary problem or function is deciding what to do and how to do it. 11

Knight outlined four directions in which uncertainty exerted personnel selection and specialization of functions:

(1) an adaptation of men to the occupations on the basis of kind of knowledge and judgement;

(2) a similar selection on the basis of degree of foresight, for some lines of activity call for this endowment in a very different degree from others;

(3) a specialization within productive groups, the individuals with superior managerial ability (foresight and capacity of ruling others) being placed in control of the group and the others working under their direction; and

(4) those with confidence in their judgement and disposition to 'back it up' in action specialize in risk-taking.12


12 Ibid., p. 270.
Johnson and Haver functionally defined management as the "process of learning and adjusting. This definition is in keeping with the ideas of both Schultz and Knight. They further defined the functions of management as: 1) observation, 2) analysis, 3) decision making, 4) action taking, and 5) acceptance of economic responsibility.

Other researchers have since added a sixth function—that of problem recognition.

In a follow-up study by Johnson to test the five functions of management, Johnson concluded:

...research should be done on ways and means of increasing the skill with which the five managerial tasks (observing, analyzing, decision making, acting, and bearing responsibility) are performed.

...farm management research needs to be reoriented toward solving managerial problems of farmers rather than toward the problems of organizing and operating farms.

Johnson was not implying that organizing and operating farms are not managerial problems. He was saying that if we center our attention around these problems we tend to leave the manager out of the problem. We need to think in terms of solving the problems of adjustment as they develop from the focal point of the manager. Johnson also

13Glenn L. Johnson and Cecil B. Haver, Decision Making Principles in Farm Management, Bulletin 593, Kentucky Agricultural Experiment Station, University of Kentucky, Lexington, Kentucky, January, 1953, p. 7.

14Ibid., p. 8.

stressed the importance of subjective values of the individual in the
decision process. Much of the later work has been directed toward
understanding the individual manager.

The following five goals were found to be most important among
farmers in a study conducted by E. A. Wilkening and Donald E. Johnson:
(1) profit, (2) ease and convenience, (3) quality or standard of re-
sources or products, (4) keeping up with best farmers, and (5) re-
relations with others. Forty-five per cent of their respondents indi-
cated profit to be the most important consideration in all of the
fourteen types of decisions considered. They concluded:

These results support the need for considering non-
economic as well as economic factors in decision
making by farmers. While 'profit' was the main con-
sideration for most decisions, for some profit ranked
second to convenience. For others it was secondary
to norms of quality, prestige and relationship with
other persons. The concept of 'economic man' insuf-
iciently explains many actions of the farmer,
particularly decisions involving changing behavior
patterns, labor saving devices and relationships
with other farmers, dealers, or other persons.

Nielson conducted a study of goals and goal achievement of
Michigan farm families. He classified the goals into the following
six major categories.

16E. A. Wilkening and Donald E. Johnson, Goals in Farm Decision
Making as Related to Practice Adoption, Research Bulletin 225, Uni-

17Ibid., p. 6.

18James Nielson, The Farm Families... Their Attitudes, Goals and
Goal Achievement, Technical Bulletin 287, Michigan State University,
Agricultural Experiment Station, East Lansing, Michigan, 1962, p. 16.
Nielsen also found that 42 per cent of the farmers placed major emphasis on short-run goals while 45 per cent placed about equal emphasis on both long and short-run goals. Only 49 per cent of the farmers studied clearly verbalized their goals.\textsuperscript{19}

Meier studied the goals of farmers in Ohio.\textsuperscript{20} Goals were classified into five general categories.

Highest yielding crops or livestock were found to be most important while operating a large farm or having new or large machinery were least important within the group of goals relating to the farming operations.

Within the financial goal category, a satisfactory farm income, providing a college education for children, and being debt free were relatively important while owning a new automobile or leaving a large estate were least important.

\begin{center}
\begin{tabular}{|l|c|}
\hline
\textbf{Goal Category} & \textbf{Per cent of Farmers Emphasizing} \\
\hline
Security or owning a farm free from debt & 24 \\
High level of living & 24 \\
Farm production & 21 \\
Success or prestige & 16 \\
Average level of living & 8 \\
Farming as a way of life & 5 \\
No goals verbalized & 2 \\
\hline
\end{tabular}
\end{center}

\textsuperscript{19}Ibid., pp. 18-19.

\textsuperscript{20}Verlin R. Meier, \textit{op. cit.}
A neat appearing farmstead was important while goals relating to a new or modern home were relatively unimportant among the household and farmstead category. However, it must be pointed out that most of the farmers in the study had modern homes.

Participation in community activities was most important among the leadership goals. Being first in the community to accomplish something or to be a leader in community activities were least important. This indicates farm families desire to be an active part of the community but place relatively little value on leading or directing community affairs.

Meier's fifth category tended to reflect attitudes and values more than specific goals. None of the ten personal items considered appeared to stand out as most important among the group of farmers studied.

Straus undertook a study of farmers in the Columbia Basin Project to determine personal characteristics of the successful settlers. Straus developed a "Success Index" by assigning scores from one to five for each of the following success criteria:21

1. Farm income;
2. Percentage growth in net worth since settlement;
3. Absolute growth in net worth since settlement;

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(4) County agent's rating of operator's success in settlement;

(5) Operator's self-rating of his success in settlement;

(6) Operator's satisfaction with settlement; and

(7) Wife's satisfaction with settlement.

The "high success" group was represented by the upper one-sixth of the 210 respondents while the "low success" group was represented by the lower one-sixth.

Straus concluded:

"... the results of this study have failed to support the importance of a number of factors usually taken for granted as being importantly related to success in settlement. Among these are farming experience, especially irrigation experience, on the part of the operator; and farm rearing on the part of the wife. Similarly the data fail to support expectations concerning the relation of the wife's direct 'economic' contributions to success in new land settlement. Instead of these direct and tangible characteristics, the results of this study suggest that the crucial differences lie in more subtle attitudes and skills."

A significantly larger proportion of successful operators rated both field days and farm meetings higher as important information sources than did the low success group.

Little or no difference was found in the response of the high and low success operators to the following four question items. However,

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there was a significant difference in the response of the wives of the two groups. The question items were:

1. I have something of the pioneer spirit in me.
2. I have the long-term view of things.
3. I find it hard to make out with inadequate equipment and other facilities.
4. I tend to get discouraged when things go wrong.23

A significantly larger number of the high success wives answered "yes" to the first two questions and "no" to the last two questions than was true for the low success wives.

Hess and Miller undertook:

1. To determine the factors or conditions responsible for the deviation of the existing level of performance on farms from some 'feasible' standard of performance.
2. To determine reasons why operators have not taken the necessary steps or measures to improve their farm performance.24

Their sample for the study was comprised of 151 owner-operated dairy farms. Among their findings, which the authors admitted were far from fulfilling their stated objectives, were the following:

1. There was a significant difference in pounds of milk per cow, productive man work units, average capital investments, and labor


incomes between groups when farm managers were grouped according to their scores on technical knowledge dealing with the dairy enterprise.

2. The labor income response associated with improved knowledge was four times as great for high levels of capital investment as for low levels of investment.

3. There was a significant difference in labor income between high and low scores on the technical knowledge tests when farmers were grouped according to their educational level.

4. While low levels of capital investment were associated with low levels of labor incomes, unwillingness to borrow rather than inability to borrow was cited as the reason for low investments.

Information is a vital component of the decision making process. Sources of information and extent of use of these sources by farmers was a major component of the Interstate Managerial Survey conducted in 1954. Information was classified into six major types and farmers were asked to indicate the types of information most helpful in (1) organizing a farm, (2) operating a farm for profit, and (3) operating a farm for satisfaction. Analysis of this information by Johnson and Haver revealed the relationships shown in Table 1.\(^{25}\)

TABLE 1

Use of Information by Farmers

<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Per cent of Farmer Emphasis</th>
<th>Operating Farms for Profit Satisfaction</th>
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<tbody>
<tr>
<td></td>
<td>Organizing Farms</td>
<td>Profit</td>
</tr>
<tr>
<td>Price</td>
<td>1.6</td>
<td>26.0</td>
</tr>
<tr>
<td>Production methods</td>
<td>53.0</td>
<td>44.1</td>
</tr>
<tr>
<td>New production technology</td>
<td>0.1</td>
<td>18.1</td>
</tr>
<tr>
<td>Human</td>
<td>15.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Institutional</td>
<td>29.5</td>
<td>9.1</td>
</tr>
<tr>
<td>Home technology</td>
<td>0.4</td>
<td>1.3</td>
</tr>
</tbody>
</table>

Total 100.0 100.0 100.0

Before information can be sought and brought into a meaningful analysis of the problem, the problem must be clearly defined. Accepting Knight’s thesis that management derives its responsibility from adjustment problems created by changing conditions, problem recognition becomes an important segment of the decision process.

Lee and Chastain investigated problem and opportunity recognition by farmers.26 Forty per cent of the respondents indicated they saw no opportunities to make more money from their farms. Forty-one per cent of those who failed to recognize greater income potential said their farms were already being operated in the most profitable manner,

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but an analysis of these farm businesses failed to substantiate this. Ten per cent of the respondents indicated they had no problems. Lee and Chastain's analysis indicated that most farmers verbalizing problems failed to recognize the basic problems. They concluded as follows:

1. Farmers do experience difficulty in recognizing the problems and opportunities relevant to their business endeavors;

2. Adjustment has been retarded because of the difficulty experienced on the part of farmers in recognizing problems; and

3. Certain conditions and individual characteristics are related to the ability of farm managers to recognize problems and opportunities.\(^7\)

Age of farmers, formal education, off-farm experience and background are the conditions and characteristics which they found related to recognition of problems and opportunities.

Since management decisions involve adjustment to changing conditions, the manager's expectations for future conditions might be expected to influence his decisions. Tompkin and Sharples studied the role of expectations in farm adjustments. Among their conclusions were the following:

Farmers declared expectations are not a dependable indication of their adjustment of a farm organization or production. The operators say they would make certain production responses to changing price relationships but examination of their actual

\(^7\text{Ibid.}, \ p. \ 33.\)
responses to their own expected price changes reveals considerably less adjustment. The small amount of adjustment actually made to price expectations suggests that noneconomic considerations influence operators more than do moderate price changes.

Our investigations indicate that obstacles to adjustment to operators' expectations fall into two broad categories. These are economic and noneconomic. In the sample groups one or more of the following economic reasons generally accounted for the operators' failure to adjust:

1. The operator was not sure enough of his prediction accuracy to make a move. He retained what he considered a 'middle of the road' position.

2. The operator did not have control of sufficient resources to affect a proper change, and most operators admitted an aversion to borrowing money as a deterrent to adjustment.

3. The operator lacked precise knowledge of the input-output transformation function of alternatives, which frequently caused him to take no action.

4. Many operators had found from experience that their particular cost structure was such that changes in resource allocation in response to moderate price changes do not increase income sufficiently to stimulate effort to adjust.

The most common noneconomic impediments to adjustment to expectations were: (1) the operator's preference, (2) his desire for leisure time, and (3) the competition of the household for funds which could profitably have been invested in the farm business. These influences prevented consistency with monetary maximization principles.28

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Westermarck conducted a series of studies dealing with the human factor and success in farming.\textsuperscript{29} An attempt was made to relate mental ability and economic performance. Three individuals who had worked closely with the farm family during the study rated the farm operator and his wife separately on ten basic qualities thought to reflect mental ability. A "mental point" score was developed for the managerial complex by the use of a 5 point rating scale for ten basic qualities.

Westermarck used the following measure of economic performance as a criterion for success:

\[
\text{Coefficient of } \text{profitableness} = \frac{\text{Net Farm Income}}{\text{Imputed Value of Interest}} \div \text{Imputed Value of Entrepreneur's and Family's Labor}
\]

In his conclusions, Westermarck stated:

Logically, there should be a connection between the ability of the entrepreneur and economic success. . . .

. . . it will be observed that, with an increase in the mental points, the coefficients of profitableness also increase. However, examining the significances of the differences by means of the analysis of variance, it is noted that the difference is not even almost significant, although the tendency is clear.

\textsuperscript{29} N. Westermarck, Management and Success in Farming, Part III, Influence of Individual Advisory Services, Reprinted from ACTA Agriculturae Scandinavica, X : 4, 1960.

\textsuperscript{30} Ibid., p. 262.
The above exposition of the possible connection existing between ability and profitableness is, in a way, only a first approach to the quantitative exposition of the problem. No definite or certain results were achieved if for no other reason than that of the paucity of the material, but in the opinion of the author encouraging indications were obtained to the effect that the influence or effect of ability could be expressed in figures. 31

Pugh attempted to relate managerial ability of tenants to resource productivity using polynomial and Cobb-Douglas (power) functions. Using dollar income as the dependent variable to measure output, independent variables were selected by the Wherry-Doolittle technique. Tenant ability was subjectively rated by three different techniques developed by Blanchard. 33 Cobb-Douglas estimating functions were then fitted for different types of farming using the independent variables selected.

Pugh found that the improvement of predictability by the inclusion of an index of tenant ability in the equation was significant at the .20 or .10 probability level. The level of significance was dependent upon type of farming and the particular index used. The scoring system for managerial ability which yielded the highest level of significance was dependent upon type of farm. 34

31 Ibid., pp. 273-274.


33 Ibid., pp. 11-13.

34 Ibid., p. 75.
The inconsistency in the selection of the tenant managerial scoring system suggests inadequacy of the scoring systems used rather than inadequacy of the predictive model. Pugh's findings support the inclusion of the human element in predicting performance and emphasize the need for improved means of measuring the managerial input.

As a part of the Ohio project NC-59, Larson related executive managerial skills to income within the hog enterprise. The following operational skills and characteristics were considered:

1. Level of technical knowledge;
2. Ability to use technical knowledge;
3. Timeliness;
4. Attention to detail;
5. Recognition of priorities in the use of labor, capital, and equipment;
6. Problem recognition ability; and
7. Knowledge of his own farm business.

Farmers were rated on each item and stratified into three groups based on net income per sow.

Level of technical knowledge and knowledge of his own farm business proved significant at the .05 probability level by analysis of variance. Attention to detail, timeliness, and recognition of priorities exhibited F ratios of 2.13 or greater (3.35 required for significance at the .05 level). Considering the small sample used (N-28),

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35 David Arvid Larson, op. cit.
this would indicate these factors merit further consideration even though not significant at the .05 level.36

Rassmussen and Sandilands made a study of British and Irish farm accounts to determine applicable production functions.37 Utilizing variance analysis techniques they attempted to sort the variation in output into two groups (1) managerial variance and (2) random variance. Records for a four-year period were used. Rassmussen reasoned that the within-farm variation was due to random fluctuations (i.e., to weather, price, and other conditions beyond the manager's control) and that between-farm variation was due to differences in managerial ability. The total variance was reduced nearly one-half by using input-output data averaged over four years rather than for a single year. He assumed that the managerial variation was constant and the reduction in total variation was attributable to random variation.

Rassmussen recognized that managerial variation consisted of two main components:

1. The detailed composition of input groups
2. Choice of products (enterprises).

His analysis was confined to the first component, however.


37 Knud Rassmussen and M. M. Sandilands, Production Function Analyses of British and Irish Farm Accounts, University of Nottingham, Department of Agricultural Economics, Sutton Bonington, Loughborough, England, June, 1962.
Rasmussen concluded:

Because of the relatively small importance of combination of resources in relation to 'managerial' variation, it seems to the author that one is justified in rejecting the hypothesis that the better farmers do, in fact to a significant degree, choose other combinations than less able farmers. Had this been the case, one would have to assume that better farmers choose better combinations of resources and then one would have expected the influence of combination of resources to dominate that of 'managerial' variance. As it is, the author feels justified in assuming that there is no strong correlation between the farmers' 'managerial' ability and their choice of combination of resources, and therefore that the estimated production functions, which have been derived from INTERFARM regressions, do in fact give a reasonable estimate of CONSEQUENCES of INTRAFARM change in use of inputs. 38

Summary and Implications of the Literature

Early farm management studies conditioned thinking along the lines of efficient organizations, daily operations, and application of specific practices. Considerable emphasis was placed upon the development of efficiency measures.

Knight and Schultz were instrumental in shifting the thinking toward adjustment to change. This was an important step in farm management research because it shifted the emphasis from the firm to the individual who controls the firm.

Johnson and others investigated the decision making process. Chambliss was concerned with personal or noneconomic considerations in the decision process.

38 Ibid., p. 42.
While the studies reviewed demonstrated the importance of non-economic goals, they have reflected inadequacies of the theoretical frameworks and methods for assessing and evaluating managerial variables. Apparently goals are so closely related to value systems that our communication systems are inadequate to express these verbally. This adds to the difficulty of identifying and measuring these variables.

The literature has indicated in addition to vaguely defined goals, that farmers fail to recognize means of achieving success within the defined goals. Perhaps just as important is their lack of confidence in their judgments regarding recognized opportunities. An understanding of the manager and his relationship to the total managerial complex is needed.

Pugh demonstrated that a rating of managerial ability improves predictability of resource productivity. More effort is needed toward refinement of a procedure for rating individuals.

Several studies indicated characteristics and responsibilities of the manager which are related to performance, but they have also revealed our inability to measure and relate these in a precise manner. Rasmussen's approach might be used to sort farm managers according to performance. However, this requires a history of performance.

Research has confirmed the theory that management is an individuated process whereby the entrepreneur makes adjustment within the firm in accord with his interpretations of (1) his physical and
economic environment, (2) the wants and wishes of the total managerial complex, and (3) his own values, goals, and abilities. It has not reduced our need for developing a means of grouping individuals according to patterns of managerial behavior (1) for study of managerial processes to determine means of improving management, (2) to develop productivity coefficients, and (3) for vocational guidance.

The challenge remains to develop a theory of management sufficiently precise to describe the individual processes but broad enough to encompass a spectrum of individuals.
CHAPTER IV
ANALYSIS AND FINDINGS

The Conceptual Model

Desires of an individual are based upon many factors. Among these are resources available, present possessions (material and aesthetic), past achievements, cultural background, stage in family cycle, and the desires and attitudes of those with whom he associates. Individuals differ with respect to their desires for monetary and non-monetary satisfactions. Some individuals place a high value on things money will purchase. Others value highly the intangible items money cannot purchase.

In our economically oriented society, individuals emphasize monetary goals to some degree. Money provides the source of many of our necessities and satisfactions even though some cannot be purchased. The intensity or degree of economic motivation varies among individuals according to the relative importance of monetary and non-monetary items in their value systems. Economic motivation may then be used to relate individuals with different monetary and non-monetary desires, if a means of measuring the relative intensity of this force can be developed.

In developing a means of measuring economic motivation, individual differences must be taken into consideration. Some individuals
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have greater total desires than others. The proportion of monetary and non-monetary desires differ among individuals. Any specific item or combination of items produces a different amount of total satisfaction for one individual than for another. Monetary desires of individuals may be related more easily than non-monetary values since we have money as a common denominator. We leave the choice of items (quantity, quality, and combinations) to the individual to determine in terms of his own value system and the pricing mechanism. A difficulty arises in relating the non-monetary "values" one to another and to the monetary values. An adequate means of measuring total satisfaction is yet to be developed. We must concede that we, as individuals, sometimes experience difficulty within our own lives in making choices in the absence of dollar values. This is admitting that not only is quantification absent, but also that relative order is difficult to establish. These differences purport that measurement of economic motivation on the basis of specific items is inadequate, but to attempt to do so without specific items would ignore an important part of the individual's total personality.

If we accept the hypothesis that the farm manager attempts to maximize total satisfaction for himself and his family rather than dollar income, we may expect him to allocate his resources among both monetary and non-monetary producing activities. We may assume that he has sufficient resources at his command to expand either the monetary or non-monetary production activities to the point of diminishing marginal satisfaction but insufficient resources to totally
satisfy either his monetary or non-monetary desires. It follows that any quantity of resources allocated to one type of activity will reduce the total resources that can be used for the other activity. Further, total satisfaction will be maximized with his resources allocated among some combination of the monetary and non-monetary production activities. Thus it follows that non-monetary goals of individuals are important considerations in determining both economic performance and personal achievement.

Since most monetary producing activities also produce a certain amount of non-monetary satisfaction, we cannot precisely measure the quantity of resources "reserved" for non-monetary pleasures. For example, a beef fattening enterprise may provide both dollar income and personal pleasures for some individuals. They may, perhaps, feed the cattle at a financial loss or somewhat lower financial return than hogs would yield for the additional pleasure they receive from the cattle enterprise.

Due to our inability to quantify or establish relative order for many of the personal values of individuals, it would be presumptuous at this stage to define a criterion for managerial performance in terms of total goal achievement. However, we can measure the physical quantities of resources employed in monetary or economic production activities; and we can measure the monetary output of these activities. This will provide an economic efficiency index for the actual quantity of resources employed in economic activities.
Using economic efficiency as a criterion for managerial performance, we might expect economic efficiency to fluctuate with quantity and quality of resources employed, goals of the management complex, and the ability of the individual manager to combine resources to maximize total satisfaction. Quantity of resources, as used throughout this analysis, refers to land, labor, and capital. It is assumed that the quality of resources is compensated for in the price system when quantity of resources is measured in dollars. Managerial ability as used here then refers to the individual's potential for maximizing economic performance of the resources he has invested in economic activities considered in relation to his personal goals. Thus we are not measuring the individual's potential per se to maximize total output or total satisfaction from all resources commanded, but his ability to maximize economic performance as influenced by both his personal abilities and goals.

Managerial ability is technically one of the resource inputs of the farm business. However, since our objective is to quantify ability, we shall handle it as a dependent variable. It is assumed that all managers receive an equal rate of return for each unit of land, labor, capital, and management invested in the farm business. By assessing a dollar charge for inputs of land, labor, and capital the variation in residual returns to the entire bundle of resources would reflect variation in the management input among farms by this assumption. The following analysis is directed toward determining methods of selecting and measuring variables which influence or are related to economic efficiency.
Evaluation of Managerial Performance

Many different measures of economic efficiency are in current use among farm management researchers. Most of these measures are designed to evaluate one segment of the total farm business or one input-output relationship. They place emphasis upon one particular resource or one production activity.

In this study we are interested in the overall economic efficiency—the net effect of all activities on the effective use of the total resource bundle committed to economic activities. Because of the variation in total quantity and mix of resources committed to the farm business, the efficiency index must be sufficiently comprehensive to account for these variations.

A particular resource may be obtained by several different methods. Each method provides a slightly different bundle of services to the farm manager at a different cost to him. Determination of the most appropriate method of obtaining the use of resources is a part of the function of management. Since the economic efficiency index was selected as a criterion to reflect the influence of managerial ability, the means of measuring resource inputs must not be influenced by the combination of resources employed in the farm business. Likewise, the measurement of economic output must not be influenced by the combination of products produced, since these are partially a function of the resource bundle employed in the farm business.

We normally think of four basic factors of production: land, labor, capital, and management. We may think of the farm manager as
owning three basic resources which may be used for satisfying his
wants, particularly his economic wants. He owns some given amount of
managerial ability, his own labor (including family labor), and some
quantity of dollar purchasing power which may be used to employ the
services of land, capital goods, additional labor, and additional
management. The total quantity of resources he controls is dependent
upon how he employs his owned resources, and thus becomes a function
of management.

The farm manager "reserves" some portion of his total owned re-
source bundle for immediate consumption and non-monetary desires.
The remainder of this resource bundle he commits to the farm business
to generate monetary (and non-monetary) income for future consumption.
He may employ the entire dollar resource bundle committed to the farm
business to purchase land and capital goods. On the other extreme,
the manager may use his entire bundle of owned resources to hire the
services of a larger quantity of resources in the form of land, labor,
capital goods, and management.

Most farm business are organized by obtaining the services of
resources through some combination of these two extremes. A portion
of the owned resource bundle is used to purchase physical production
inputs and the remainder is used to hire the services of some larger
quantity resources. Thus management is rewarded in accord with the
manager's ability to maximize value of output per unit input and his
ability to command total resources per unit owned resources.
The economic efficiency index chosen as a criterion for managerial performance was that used by Westermarck:

Coefficient of Profitableness = \frac{\text{Net Farm Income}}{\text{Imputed Interest} / \text{Imputed Value of Entrepreneur's and Family's Labor}}

As a working formula, this was reduced to:

\[
E = \frac{N}{(.05)I / (1.25)L}
\]

where:

\(E\) = Economic efficiency index
\(N\) = Net farm profit reported on 1040F income tax form
\(I\) = Value of land and capital invested in the farm business
\(L\) = Man-Equivalent hours of family and operator labor employed in the farm business during the year.

Labor and capital inputs were reduced to annual inputs to be consistent with the annual output figure. One year is the shortest period of time which will permit a complete cycle of all costs and returns on farms producing both crops and livestock. It is also the shortest period of time for which most farmers summarize input-output information on their farms.

Labor was charged at the rate of $1.25 per hour which was the usual wage rate for full-time hired labor in the area when the hired family was provided with a modern home and the usual perquisites enjoyed by the farm family.

Equity capital was charged at 5 per cent which was less than the mortgage rate of interest being paid by respondents but more than the interest rate on government bonds.
Net farm income as reported on the 1040 income tax was taken as the returns to the owned resources. This figure represents total cash receipts minus total cash expenditures minus depreciation allowances as permitted by the Internal Revenue Service. Cash expenditures accounts for all hired services of resources. Depreciation allowances were included as an expense to adjust for variation in the owned resource consumption due to differing resource mixes. Information was not available to adjust for inventory change other than the depreciation allowance.

It is recognized that net farm income data for one year is subject to fluctuation beyond the manager's control. However, the farms included within the sample were located in a relatively small homogeneous land area with very similar production activities. Since all farms were subject to similar weather and price situations, the error from these two sources would be relatively small. The major sources of error in terms of the relative economic efficiency scores are change in inventory and luck (unusual disease losses or lack of disease losses).

While income data for a longer period of time would be desirable for establishing predictive coefficients, a coefficient based on one year's operation was considered adequate for purposes of evaluating methodological techniques.

Goal Orientation of Farm Managers

A set of eighteen goals was developed to determine the degree of economic motivation of farm managers. The goals included were
selected from those found to be important to farmers in previous studies. These eighteen goals were structured into three groups of six goals each. The first group consisted of economic goals which placed primary emphasis on the monetary performance of the farm business. The second group consisted of intermediate goals which required the consumption of dollar income or would have a direct influence on dollar income. However, the emphasis in this group was placed upon the material items rather than dollars per se. The third group consisted of personal goals which did not require the consumption of dollars and which would be expected to have no direct influence on dollar income or economic performance.

The goals included were selected as representative of attitudes of individual managers rather than specific goals of individuals. It may be observed that all the goals included in the economic and intermediate groups may not have a positive relationship with economic efficiency (see questionnaire, page 98 of Appendix). Some goals reflect a minimum loss attitude while others reflect a maximum gain attitude.

Respondents were given the six goals of a group on individual cards and asked to select the two goals that most nearly reflected his own goals. After he had selected two goals from each of the three groups, he was given the six cards selected and asked to rank them in order of their importance to him.

The respondents were not informed that they would be asked to rank the goals until after the selections had been made, thus the
Three groups of goals were selected independently of each other. Several of the respondents indicated they would have selected different goals had they known the three groups would be combined. Their reasoning was that if they achieved the goals selected from the economic group, they could also achieve those selected within the intermediate groups, thus making some other goals relatively more important. Several respondents also indicated that some goals not selected within a group were more important than those chosen from another group. These comments supported expectations concerning the nature of goals held by individuals.

Three primary reasons were responsible for using this method of evaluating goals: Ease and simplicity for the respondent's selection; ease and simplicity of evaluating the goals selected; it provides a reading on the relative importance of all three groups of goals for all individuals even though some groups may be relatively unimportant to some of the individuals. This latter was considered desirable for discerning patterns of goal structures within the group.

The frequency observed for the goals chosen by farmers is shown in Table 2.

Eleven of the 31 farmers interviewed selected one goal from each of the three classifications as being among the three most important to them. Twenty-six farmers included personal goals among the top three.
<table>
<thead>
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<th>Goal</th>
<th>Frequency Observed</th>
<th>Among Top 6</th>
<th>Among* Top 3</th>
</tr>
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<tbody>
<tr>
<td><strong>ECONOMIC</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obtain a farm income which will provide an above average level of living</td>
<td>16</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Have farm business paid for</td>
<td>11</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Obtain a high rate of return on your capital investment</td>
<td>11</td>
<td>62</td>
<td>7</td>
</tr>
<tr>
<td>To remain debt free</td>
<td>5</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>To accumulate savings in addition to the farm business</td>
<td>12</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Obtain a farm income sufficient to meet necessary cash expenditures</td>
<td>7</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td><strong>INTERMEDIATE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own a considerable amount of labor-saving equipment</td>
<td>16</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Have a modern home and furnishings</td>
<td>14</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Minimize dependence on others to perform farm operations</td>
<td>13</td>
<td>62</td>
<td>4</td>
</tr>
<tr>
<td>Own all new or nearly new machinery and equipment</td>
<td>5</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Be first in community to get farm jobs accomplished</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Have highest yielding crops or livestock in the community</td>
<td>13</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td><strong>PERSONAL</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participate in church and/or community activities</td>
<td>13</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Be a leader in church and/or community activities</td>
<td>5</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Be your own boss</td>
<td>19</td>
<td>62</td>
<td>12</td>
</tr>
<tr>
<td>Have a neat appearing farm</td>
<td>12</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Have time for personal hobbies</td>
<td>2</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Work with living things in open air</td>
<td>11</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

*Significant at .05 probability level ($X^2 = 9.30$).
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The two goals most frequently ranked first choice by farmers were 1) obtain a farm income which will provide an above average level of living and 2) be your own boss. Each of these were ranked first by seven farmers.

Six of the seven farmers who ranked "be your own boss" first, selected an economic goal as second most important.

Six of the seven farmers who emphasized farm income as most important selected either an economic or intermediate goal as second choice. Three selected "have a modern home and furnishings" and two selected "to accumulate savings in addition to the farm business" as second most important.

The only intermediate goal to receive a first choice rank among the farmers studied was "have highest yielding crops and livestock in the community." This goal was selected as first choice by four respondents. (The achievement of these farmers in terms of physical yields was below that of several farmers in the sample.) Four farmers selected the goal "participate in church and/or community activities" as first choice.

In general, the intermediate goals were secondary to both economic and personal goals among the farmers studied. Within the three most important goals selected by the respondents, economic goals were mentioned 43 times; personal goals, 31 times; and intermediate goals, 19 times. This difference was significant at the .05 probability level when tested by chi square. As a first choice goal, 15 farmers
selected an economic goal, 12 farmers selected a personal goal, and four farmers selected an intermediate goal.

These findings support the contention that farmers do place considerable emphasis on both economic and non-economic considerations. They further support the idea that the relative importance of these different types of considerations varies considerably among individuals.

Methods of Determining Economic Motivation

Four methods were used for ranking managers according to economic motivations. Method I involved developing a score for each individual by weighting each goal according to its relative importance to the individual and its relationship to dollar income. Economic goals received a value of 3; intermediate goals, 2; and personal goals, 1. Weights were assigned to the rank order of the goals given by individuals. A first place goal received a value of 6; a second place goal, a value of 5; etc.; and a sixth place goal, 1. These two weights were multiplied and the products summed for the six goals chosen to obtain the economic motivation score for each individual. The maximum attainable score for an individual was 50 and the minimum attainable score was 34 by this system.

The scores observed for the 31 observations ranged from 36 to 48.

Method II was similar to the above except it considered only the three most important goals, rather than all six.
The maximum and minimum possible scores for this method was 17 and 7 respectively. The observed scores ranged from 16 to 8. The rank order of respondents according to economic motivation determined by this procedure was identical to that determined using all six goals.

Since these two methods yield identical rank orders, the one involving only the first three choices is obviously the superior method due to its more efficient utilization of information.

Method III involved grouping the individuals on the basis of type of goal and order of choice. They were first sorted into economic, intermediate, and personal groups according to their first choice goal. These groups were subsorted according to the second choice goal, and subsorted a third time on the basis of their third choice goal. Seven groups resulted from this subsorting process.

The groups were scored 1 through 7 beginning with the highest level of economic orientation. A review of the total goal complex of the individuals included in each group affirmed that each individual included in any given class placed more emphasis on economic desires than the succeeding lower group and less emphasis than the next higher group.

Neither the second nor third methods provided economic motivation scores which were significantly related to economic performance. Inspection disclosed that both procedures included individuals in the "economic" group whose major goals did not include income maximization. Even though they had selected goals within the "economic" group, they
were more concerned with protecting their assets than increasing returns. As a consequence of the minimum loss attitude, even though the ultimate goal requires capital accumulation, economic performance may be expected to be low due to conservative resource use.

It may be concluded from this that goal selection on the basis of their direct, indirect, or non-relationship to the monetary unit is insufficient as a criterion for predicting economic performance, and also insufficient as a measure of economic motivation as it pertains to the "economic man" concept. Perhaps a procedure based upon the quantity of income an individual desires would be more successful for predicting economic performance.

In the absence of a relationship of economic motivation as estimated by the preceding methods, further analysis of the goal structures of individuals was made to determine how the manager related himself to the farm business.

The two goals most frequently ranked first choice were also most frequently ranked among the three most important, each being mentioned twelve times. Only two individuals included both of these goals among the three most important.

These two goals, "obtain a farm income which will provide an above average level of living" and "be your own boss" represent the extremes of the goals considered regarding the relationship of the manager to the economic process. The first directs attention
specifically toward control of the economic process. The second di-
rects attention specifically at individual freedom of the farm man-
ger. All other goals may be considered as incidental to or some 
compromise between these two extremes.

On this basis the sample might be stratified into three segments, 
representing different levels of economic motivation. (1) The eco-
nomic group would be identified by the inclusion of the "income" goal 
among the three most important, but excluding "be your own boss." (2) The intermediate group would be identified by the exclusion of 
both "income" and "be your own boss" or the inclusion of both goals 
among the three most important. (3) The personal (non-economic) 
group would be identified by the inclusion of "be your own boss" but 
excluding the "income" goal.

While this procedure does not provide a method of determining an 
economic motivation score for each respondent, it does provide a means 
of estimating economic performance at three levels of economic moti-
vation.

The procedure outlined above was the fourth method employed for 
ranking managers according to economic motivation. The economic, 
intermediate, and personal groups contained ten, eleven, and ten farms 
respectively. Using analysis of variance, the mean economic effi-
ciency scores for the three groups were not significantly different 
\( F=1.55; 3.34 \) required for significance at .05 level). However, 
using the one-tail t-test, there was a significant difference between
the means of the economic and personal groups at the .05 significance level ($t=1.73$; $1.70$ required at .05 level).

This suggests that even though this does not provide an adequate criterion for ranking farmers along an economic motivation continuum, the "income" and "freedom" attitudes are related to this continuum, if such exists. The problem remains, however, to identify the relationship of these attitudes to economic motivation and to identify the relationship of economic motivation to performance.

These findings support the contention that the "economic man" concept is not an adequate description of the population of farm managers, but is representative of only one extreme. It should be noted that the possibility exists that two distinct populations may exist—one population exhibiting the economic man concept in which economic motivation is related to the magnitude of dollar income goals, and a second population of managers exhibiting a "freedom" concept with economic efforts limited to some minimum acceptable level of income for which economic motivation would be related to the level of income which is acceptable. The modal responses on these two goals are even suggestive of such a possible relationship. This possibility merits further investigation.

In the absence of adequate data to further test this possibility, the later analyses have been made on the assumption that one economic motivation continuum is applicable to all farmers. The economic motivations scores developed by method III have been used. These scores
were more consistent with the enumerator's impression of the economic drives of the farm managers than the scores obtained by method II.

Six variables were selected which were believed to be related to economic motivation. The variables selected were believed to be important either through their influence on economic desires or their influence on achievement of desires.

The following variables were selected and fitted as a regression equation to determine their combined relationship to economic motivation as measured by method III:

\[ Y = \text{Economic motivation score obtained by method III} \]
\[ X_1 = \text{Net farm income goal ($1,000)} \]
\[ X_2 = \text{Operator's labor input (10 hour days)} \]
\[ X_3 = \text{Amount of time spent participating in active leisure activities (10 hours)} \]
\[ X_4 = \text{Net worth of family ($1,000)} \]
\[ X_5 = \text{Age of operator} \]
\[ X_6 = \text{Amount of indebtedness ($1,000)} \]

The relationship was significant at the .05 probability level with \( R^2 = .398 \) and \( \sigma_Y = 1.73 \). However, only two of the coefficients obtained for the equation were significant at the .05 level; \( b_1 \) and \( b_5 \). \( X_1 \) and \( X_5 \) were the only two variables significantly correlated with the economic motivation score as may be observed in Table 3. Using only variables \( X_1 \) and \( X_5 \) to estimate \( y \) yielded an \( R^2 = .289 \) and \( \sigma_Y = 2.74 \).

The Straus Rural Attitudes Profile Test was administered to a part of the sample. Due to extreme time pressures during the
interviewing process, it was eliminated when interview rapport was sluggish. The economic motivation scores obtained by this test had no significant relationship with scores obtained by methods II or III, nor with impressions received by the enumerators.

TABLE 3

Correlation Coefficients of Seven Selected Variables

<table>
<thead>
<tr>
<th>r</th>
<th>Y</th>
<th>X1</th>
<th>X2</th>
<th>X3</th>
<th>X4</th>
<th>X5</th>
<th>X6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>1.00</td>
<td>-.361*</td>
<td>-.126</td>
<td>.107</td>
<td>-.147</td>
<td>.373*</td>
<td>-.148</td>
</tr>
<tr>
<td>X1</td>
<td>1.00</td>
<td>.080</td>
<td>.026</td>
<td>.699*</td>
<td>.065</td>
<td>.252</td>
<td></td>
</tr>
<tr>
<td>X2</td>
<td>1.00</td>
<td>-.120</td>
<td>.136</td>
<td>.039</td>
<td>.343</td>
<td>.296</td>
<td></td>
</tr>
<tr>
<td>X3</td>
<td>1.00</td>
<td>.039</td>
<td>.039</td>
<td>1.00</td>
<td>-.101</td>
<td>-.181</td>
<td></td>
</tr>
<tr>
<td>X4</td>
<td>1.00</td>
<td>-.101</td>
<td>.101</td>
<td>1.00</td>
<td>1.00</td>
<td>-.182</td>
<td></td>
</tr>
<tr>
<td>X5</td>
<td>1.00</td>
<td>-.182</td>
<td>.182</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at .05 probability level.

Dollar Income Goals

Respondents were also asked their dollar goal for net farm income. Their stated goals ranged from $2,000 to $15,000. Net farm income ranged from $705 to $14,923. Dollar income goals and actual net farm income were significantly correlated at the .01 probability level (r = .831). Allowing a charge for equity capital at 5 per cent, their dollar income goals would provide returns to labor of $26 to $10,239. The actual returns to labor (after charging 5 per cent for equity capital) ranged from $-650 to $10,035.
The stated dollar income goals were also significantly related to economic efficiency at the .01 probability level \( r = .578 \).

The farm manager may be expected to take several factors into consideration in formulating his dollar income goal. Four regression equations were fitted to determine whether selected variables could be used to predict the net farm income goal. The variables selected were:

\[
Y = \text{Net farm income goal ($1,000)}
\]

\[
X_1 = \text{Net farm income ($1,000)}
\]

\[
X_2 = \text{Maturity in farm business ($1,000)}
\]

\[
X_3 = \text{Economic motivation score obtained by method III}
\]

\[
X_4 = \text{Operator's labor input (10 hour days)}
\]

\[
X_5 = \text{Amount of time spent participating in active leisure activities (10 hours)}
\]

The correlation coefficients for these variables are shown in Table 4.

**TABLE 4**

Correlation Coefficients of Six Selected Variables

<table>
<thead>
<tr>
<th></th>
<th>( r )</th>
<th>( Y )</th>
<th>( X_1 )</th>
<th>( X_2 )</th>
<th>( X_3 )</th>
<th>( X_4 )</th>
<th>( X_5 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( Y )</td>
<td>1.00</td>
<td>.76*</td>
<td>.72*</td>
<td>-.36**</td>
<td>.08</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>( X_1 )</td>
<td>1.00</td>
<td>.76*</td>
<td>.20</td>
<td>.30</td>
<td>.05</td>
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<td></td>
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<tr>
<td>( X_2 )</td>
<td>1.00</td>
<td>-.14</td>
<td>.13</td>
<td>.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( X_3 )</td>
<td>1.00</td>
<td>-.13</td>
<td>.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( X_4 )</td>
<td>1.00</td>
<td>-.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( X_5 )</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at .01 probability level.

**Significant at .05 probability level.
The following four regression equations were fitted:

(1) \[ Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + b_5 X_5 \]

(2) \[ Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 \]

(3) \[ Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_5 X_5 \]

(4) \[ Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 \]

Each of the four equations produced \( R^2 \) values which were significant at the .01 probability level. \( R^2 = .689; .671; .671; \) and .671 respectively for equations (1) through (4). The inclusion of variables \( X_4 \) and \( X_5 \) were not significant.

The following estimating equation was obtained from equation (4) above:

\[ Y = 4.7157 + .437X_1 + .0299X_2 - .3860X_3 \]

\( b_1; b_2; b_3 \) were significant at .05 probability level and "a" was significant at .01 level. \( \sigma_Y = 2.110 \).

Apparently present income, equity, and economic desires are important considerations to the farm manager in formulating his dollar income goal. Economic desires account for his wants and needs for income. Equity capital provides a measure of part of his resource bundle which has an alternative source of income. Present income would provide an estimate of his ability to manage economic activities. It is difficult to accept that farmers would ignore their labor input when formulating income expectations (assuming that goals are optimistic expectations). Apparently, if labor is considered, the farm operators include labor return as an annual salary rather than an
<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>76</td>
</tr>
</tbody>
</table>

Relationship of Actual and Estimated Economic Performance Scores
hourly wage; or they consider present income as an estimate of both management ability and labor input.

It may be anticipated that the amount and kind of leisure time activities participated in would be related to income, financial status, and economic goals of the individual. Information was obtained from respondents concerning the total amount of leisure time spent actively participating in activities other than the farm business operations. These were subdivided into activities on the part of the operator alone, family activities, and social activities. His desire for more leisure time activities was also obtained. No significant correlations were found with any of these measures and economic efficiency, net farm income, dollar income goals, net worth, or the economic motivation scores established by method III.

On the basis of the preceding analysis of goals, it may be concluded that the dollar income goal is the best indicator among those included in this study of economic motivation as it relates to economic performance.

The analysis suggests that there may be two basic patterns of farm business organizations in terms of the manager's relationship to the firm. One type would be organized about a profit maximization concept. The other would be organized about an individual freedom concept. If these two relationships exist, the effect of the manager's ability upon economic performance would differ considerably. For the economic group we might expect the performance to vary directly with the ability of the manager. For the individual freedom
group we might expect the managerial effort expended in the farm business to vary with the quantity of other resources available and the dollar income goal.

Further study of these relationships is needed.

**Factor Analysis as a Means of Variable Selection**

Two of the major problems encountered in evaluating managerial performance are selection of variables which are related to performance and the measurement of these variables in a meaningful manner. The centroid method of factor analysis was explored as a technique for determining groups of variables which were related and for identifying the variables which were most meaningful. The centroid factor analysis technique is briefly described on Appendix pages 90 and 91.

Forty-eight variables were coded and multiple correlation coefficients computed by the Pearson product-moment method. Using a centroid factor analysis programming technique developed by Robert J. Wherry, the 48 x 48 matrix of correlation coefficients was reduced to a 20 x 48 matrix. This matrix explained 90.6 per cent of the original matrix. Basically this process reduced 48 simple variables to 20 compound variables or "factors." A procedure was then used to independently rotate each of the 20 factors (vectors) to minimize the number of variables included in each factor.

On the basis of relationships exhibited in the final 20 x 48 matrix, five variables were recoded and combined into one, and eight other variables were eliminated. The process was repeated for the
new 36 X 36 matrix. A 12 X 36 matrix was developed which explained 77.3 per cent of the original 36 X 36 matrix. Part of the reduction in quantity of the original matrix explained was due to the relaxation of the error restriction. The 48 X 48 matrix was restricted to .05 maximum allowable residual in the final matrix compared to .10 maximum allowable residual for the 36 X 36 matrix.

In general, the second matrix yielded "cleaner" factors inasmuch as they tended to be more easily identified.

Since this study is designed to evaluate characteristics of the manager which may influence his managerial performance, a third matrix was developed which included only variables which could be scored on the basis of characteristics of the manager and the economic efficiency criterion.

Using the .10 maximum allowable residual criterion, the 25 X 25 matrix was reduced to 9 X 25 matrix which explained 68.7 per cent of the original matrix.

Table 5 presents the coefficients of the 25 X 25 matrix. Correlation coefficients of the $X_{ij}$'s are found in the upper right hand half of the matrix. The coefficients in the lower left hand half of the matrix are the residual elements of the $X_{ij}$'s not explained by the final 9 X 25 matrix. The diagonal values are the final communality coefficients ($h^2$) determined in the factor analysis process. This communality value may be thought of as the per cent of total correlation of the original variable explained by the nine final factors.
### TABLE 5
Correlation and Residual Matrix for Twenty-five Selected Variables

|   | X1  | X2  | X3  | X4  | X5  | X6  | X7  | X8  | X9  | X10 | X11 | X12 | X13 | X14 | X15 | X16 | X17 | X18 | X19 | X20 | X21 | X22 | X23 | X24 | X25 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| X1|  53  |  54  |  55  |  56  |  57  |  58  |  59  |  60  |  61  |  62  |  63  |  64  |  65  |  66  |  67  |  68  |  69  |  70  |  71  |  72  |  73  |  74  |  75  |  76  |  77  |  78  |
| X2|  54  |  55  |  56  |  57  |  58  |  59  |  60  |  61  |  62  |  63  |  64  |  65  |  66  |  67  |  68  |  69  |  70  |  71  |  72  |  73  |  74  |  75  |  76  |  77  |  78  |  79  |
| X3|  55  |  56  |  57  |  58  |  59  |  60  |  61  |  62  |  63  |  64  |  65  |  66  |  67  |  68  |  69  |  70  |  71  |  72  |  73  |  74  |  75  |  76  |  77  |  78  |  79  |  80  |
| X4|  56  |  57  |  58  |  59  |  60  |  61  |  62  |  63  |  64  |  65  |  66  |  67  |  68  |  69  |  70  |  71  |  72  |  73  |  74  |  75  |  76  |  77  |  78  |  79  |  80  |  81  |
| X5|  57  |  58  |  59  |  60  |  61  |  62  |  63  |  64  |  65  |  66  |  67  |  68  |  69  |  70  |  71  |  72  |  73  |  74  |  75  |  76  |  77  |  78  |  79  |  80  |  81  |  82  |

**Correlation and Residual Matrix for Twenty-five Selected Variables**
The variables included in the 25 X 25 matrix were:

\[ x_1 = \text{Economic motivation score determined by method III presented earlier} \]

\[ x_2 = \text{Economic efficiency index} \]

\[ x_3 = \text{Net farm income goal} \]

\[ x_4 = \text{Total value of farm business controlled} \]

\[ x_5 = \text{Number of hours operator labor devoted to the farm business} \]

\[ x_6 = \text{Age of operator} \]

\[ x_7 = \text{Number of years of formal education} \]

\[ x_8 = \text{Extent of formal agricultural training} \]

\[ x_9 = \text{Extent of records kept} \]

\[ x_{10} = \text{Extent of use of records in planning} \]

\[ x_{11} = \text{Extensiveness of insurance coverage} \]

\[ x_{12} = \text{Willingness to borrow money for the farm business} \]

\[ x_{13} = \text{Dominance of the manager in making farm decisions} \]

\[ x_{14} = \text{Sources of information used in making decisions} \]

\[ x_{15} = \text{Decisiveness of the manager} \]

\[ x_{16} = \text{Ability of the manager to recognize alternatives} \]

\[ x_{17} = \text{Extent of manual skills possessed by the manager} \]

\[ x_{18} = \text{Timeliness of machine maintenance} \]

\[ x_{19} = \text{Extent of machine maintenance performed} \]

\[ x_{20} = \text{Total amount of active participation in leisure time activities} \]

\[ x_{21} = \text{Extent of social activities participated in} \]

\[ x_{22} = \text{Quantity of leisure time desired} \]
\[ X_{23} = \text{Number of dollars additional income required to induce the manager to accept a non-farm job} \]

\[ X_{24} = \text{Relative importance of monetary and non-monetary satisfactions to the individual at the present level of income} \]

\[ X_{25} = \text{Interviewer's rating of the manager's ability based upon verbal response during the interview.} \]

Table 6 is the final 9 X 25 matrix. The \( X_{ij} \) coefficients (factor loadings) represent the part correlation coefficients of the original variables with the compound factors determined by the multiple correlation process. These part correlation coefficients are additive when squared to equal the communality (the per cent of total correlation explained by the nine factors). Analysis of each of the final factors after being rotated revealed the following:

The first factor might be called **Economic Orientation** since it is primarily composed of variables dealing with economic relationships. The significant variables included in this factor in order of importance are: (1) dollar income goal, (2) total investment controlled, (3) interviewers rating, (4) economic efficiency rating, (5) extent of machine maintenance practiced, (6) extent of record use in planning, and (7) decisiveness of the manager. The first five variables exhibited a positive relationship while the last two were negative. These variables may logically all be expected to influence economic performance in some manner.

The second factor may be identified as **Expediency**, the urge to get things done. The significant variables included in this factor in order of importance are: (1) decisiveness, (2) timeliness of
### Table 6

Factor Matrix for Twenty-five Selected Variables

<table>
<thead>
<tr>
<th></th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
<th>Factor 5</th>
<th>Factor 6</th>
<th>Factor 7</th>
<th>Factor 8</th>
<th>Factor 9</th>
<th>( \mu^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( X_1 )</td>
<td>-0.2150</td>
<td>0.2169</td>
<td>-0.1120</td>
<td>-0.0606</td>
<td>0.0765</td>
<td>0.0631</td>
<td>-0.649*</td>
<td>-0.0358</td>
<td>-0.0168</td>
<td>0.534</td>
</tr>
<tr>
<td>( X_2 )</td>
<td>0.6229*</td>
<td>-0.1269</td>
<td>-0.0265</td>
<td>-0.0075</td>
<td>0.2518</td>
<td>0.2563</td>
<td>0.9523</td>
<td>0.0278</td>
<td>-0.1163</td>
<td>0.530</td>
</tr>
<tr>
<td>( X_3 )</td>
<td>0.8965*</td>
<td>0.1103</td>
<td>-0.0161</td>
<td>-0.1036</td>
<td>-0.0533</td>
<td>0.0771</td>
<td>0.1537</td>
<td>0.1395</td>
<td>0.1173</td>
<td>0.997</td>
</tr>
<tr>
<td>( X_4 )</td>
<td>0.7577*</td>
<td>-0.0934</td>
<td>0.0955</td>
<td>-0.0392</td>
<td>-0.3095</td>
<td>-0.0574</td>
<td>0.1196</td>
<td>0.1568</td>
<td>0.0778</td>
<td>0.710</td>
</tr>
<tr>
<td>( X_5 )</td>
<td>0.1382</td>
<td>-0.0615</td>
<td>0.5598*</td>
<td>0.1025</td>
<td>-0.0353</td>
<td>-0.0415</td>
<td>0.0639</td>
<td>0.3284</td>
<td>-0.2082</td>
<td>0.561</td>
</tr>
<tr>
<td>( X_6 )</td>
<td>-0.0085</td>
<td>0.5431*</td>
<td>-0.0047</td>
<td>0.2146</td>
<td>0.1388</td>
<td>0.1493</td>
<td>-0.5462*</td>
<td>-0.0225</td>
<td>0.2993</td>
<td>0.678</td>
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<td>( X_7 )</td>
<td>0.2874</td>
<td>0.2131</td>
<td>-0.0844</td>
<td>-0.2877</td>
<td>-0.4554*</td>
<td>0.0417</td>
<td>0.5637*</td>
<td>0.0793</td>
<td>0.0519</td>
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<tr>
<td>( X_8 )</td>
<td>0.1260</td>
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<td>-0.1638</td>
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<td>-0.2038</td>
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<td>-0.1781</td>
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<td>( X_9 )</td>
<td>0.2981</td>
<td>0.0063</td>
<td>-0.1228</td>
<td>0.4880*</td>
<td>-0.2456</td>
<td>0.0265</td>
<td>-0.4266*</td>
<td>-0.3195</td>
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<td>( X_{10} )</td>
<td>0.4472*</td>
<td>0.3437*</td>
<td>0.3128</td>
<td>0.0953</td>
<td>-0.2132</td>
<td>-0.1785</td>
<td>0.0958</td>
<td>-0.3928</td>
<td>-0.0947</td>
<td>0.710</td>
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<tr>
<td>( X_{11} )</td>
<td>-0.0286</td>
<td>-0.0461</td>
<td>0.0123</td>
<td>0.1944</td>
<td>-0.0613</td>
<td>-0.3462*</td>
<td>0.4074*</td>
<td>-0.4483*</td>
<td>-0.0134</td>
<td>0.467</td>
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<tr>
<td>( X_{12} )</td>
<td>-0.1221</td>
<td>-0.1212</td>
<td>0.1231</td>
<td>0.0850</td>
<td>0.0178</td>
<td>-0.6492*</td>
<td>0.0625</td>
<td>0.0169</td>
<td>-0.0681</td>
<td>0.456</td>
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<tr>
<td>( X_{13} )</td>
<td>-0.0951</td>
<td>0.0752</td>
<td>-0.1335</td>
<td>-0.0350</td>
<td>-0.0428</td>
<td>-0.9122*</td>
<td>0.1743</td>
<td>-0.0373</td>
<td>-0.2587</td>
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</tr>
<tr>
<td>( X_{14} )</td>
<td>0.0653</td>
<td>0.0112</td>
<td>0.1068</td>
<td>0.0331</td>
<td>-0.6640*</td>
<td>-0.0674</td>
<td>-0.0949</td>
<td>-0.0675</td>
<td>-0.1771</td>
<td>0.783</td>
</tr>
<tr>
<td>( X_{15} )</td>
<td>0.3935*</td>
<td>-0.6737*</td>
<td>0.1977</td>
<td>-0.2381</td>
<td>0.1421</td>
<td>-0.0975</td>
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<td>( X_{16} )</td>
<td>0.1534</td>
<td>0.1269</td>
<td>0.1594</td>
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<td>-0.0793</td>
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<td>0.2119</td>
<td>-0.1234</td>
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<td>0.705</td>
</tr>
<tr>
<td>( X_{17} )</td>
<td>-0.1497</td>
<td>0.2078</td>
<td>0.7529*</td>
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<td>-0.0359</td>
<td>0.0936</td>
<td>0.1936</td>
<td>-0.0874</td>
<td>0.1571</td>
<td>0.728</td>
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<tr>
<td>( X_{18} )</td>
<td>0.2149</td>
<td>0.6604*</td>
<td>0.2618</td>
<td>0.0049</td>
<td>0.0281</td>
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<td>-0.1051</td>
<td>0.0559</td>
<td>-0.1385</td>
<td>0.620</td>
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<tr>
<td>( X_{19} )</td>
<td>0.5321*</td>
<td>0.3922*</td>
<td>0.1026</td>
<td>0.0365</td>
<td>-0.1811</td>
<td>-0.0274</td>
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<td>-0.0768</td>
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<tr>
<td>( X_{20} )</td>
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<td>-0.2100</td>
<td>-0.0470</td>
<td>-0.3355*</td>
<td>0.0016</td>
<td>-0.0413</td>
<td>0.0247</td>
<td>0.0057</td>
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<td>0.196</td>
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<tr>
<td>( X_{21} )</td>
<td>-0.1166</td>
<td>0.0379</td>
<td>0.1377</td>
<td>0.1230</td>
<td>-0.1356</td>
<td>-0.2493</td>
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<td>( X_{22} )</td>
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<td>0.0169</td>
<td>-0.0892*</td>
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<td>0.0956</td>
<td>0.0577</td>
<td>0.0328</td>
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<td>( X_{23} )</td>
<td>0.3831*</td>
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<td>0.0094</td>
<td>-0.0943</td>
<td>0.1203</td>
<td>-0.1077</td>
<td>0.0710</td>
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<td>0.2927</td>
<td>-0.1873</td>
<td>0.1452*</td>
<td>0.0282</td>
<td>-0.1225</td>
<td>-0.4673*</td>
<td>0.3828*</td>
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<tr>
<td>( X_{25} )</td>
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<td>0.0232</td>
<td>-0.1521</td>
<td>0.2816</td>
<td>-0.6646</td>
<td>-0.2376</td>
<td>-0.0937*</td>
<td>-0.3723*</td>
<td>0.812</td>
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Net Contribution to \( \mu^2 \):

|          | 0.1381 | 0.0718 | 0.0582 | 0.0888 | 0.0934 | 0.1711 | 0.0506 | 0.0637 | 0.0470 | 0.687 |

*Significant at .05 probability level.
machine maintenance, (3) age of operator, (4) extent of record use in planning, and (5) extent of machine maintenance practiced. Both extent and timeliness of machine maintenance were negatively correlated with the other significant variables. Four of these variables relate to making decisions and putting the decision into effect. The desire to follow through and put decisions into effect may be expected to be related to age or stage in life cycle.

The third factor may be called the Labor-Skill Complex. The only two significant variables in this factor were (1) manual skill level and (2) operator's labor input, which were positively correlated.

The fourth factor may be named Leisure Time since it possessed a factor loading of .9355 for the total active leisure time variable. The other two significant variables included in this factor were desire for leisure time and extent of records kept. The latter was negatively correlated with the other two variables indicating that record keeping competes with leisure time.

The fifth factor was identified as General Knowledge. The significant variables included were (1) sources of information used in planning, (2) ability to recognize alternatives, (3) formal agricultural training, (4) years formal education and (5) relative importance of monetary and non-monetary satisfactions at present income level. This latter indicates that education increases awareness of the individual's surroundings and consequently increases his desires.

The sixth factor may be identified as Independence. The three significant variables were (1) dominance of the manager in making farm
decisions, (2) willingness to borrow and (3) extent of insurance coverage. The more independent the operator tended to be in decision making, the less he was willing to borrow money or purchase outside insurance.

The seventh factor was named Motivation. The significant variables in order of importance were (1) economic motivation, (2) education, (3) insurance coverage, and (4) age of operator. These factors were positively correlated except for age.

The eighth factor identified was named Farm Preference. Significant variables were (1) number of dollars additional income required to induce manager to accept a non-farm job, (2) relative importance of monetary and non-monetary satisfaction at present income level, (3) extent of insurance coverage, (4) extent of records kept, and (5) extent of record use in farm planning. Insurance coverage and record keeping decreased as farm preference increased.

The ninth factor was identified as Personality. The three significant variables were (1) extent of social activities, (2) interviewer's rating, and (3) relative importance of monetary and non-monetary at present income level. The first and third indicate personal traits of the individual. The interviewer's rating was in a large measure based upon personality of the manager.

The largest number of variables with significant factor loadings on any one factor was eight and the least number was two. A better understanding of the relationships of the significant variables included within a factor could probably be attained by an extension of
the factor analysis process employing only those variables which were significant within a given factor.

Analysis of the independent variables as they related to the synthesized factors revealed the following relationships:

Seven of the 25 variables loaded significantly on two separate factors and three variables loaded significantly on three separate factors. These 10 independent variables were related to eight of the nine factors.

The extent of record use in planning was significantly related to economic orientation, expediency, and farm preference. The inferred direction of the relationship was positive for the first two factors and negative with farm preference.

Extent of insurance coverage was significantly related to independence, motivation, and farm preference. The inferred direction of the relationship was as independence and farm preference increased the amount of insurance coverage decreased. Insurance coverage increased as economic motivation increased.

Relative importance of monetary and non-monetary satisfactions was significantly related to general knowledge, farm preference, and personality.

The variables which exhibited a significant relationship with two separate factors were (1) age of operator with expediency and motivation, (2) years of formal education with general knowledge and motivation, (3) extent of records kept with leisure time and farm preference, (4) decisiveness of manager with economic orientation and
CHAPTER I
INTRODUCTION

The concept of the firm is an important element in economic theory. The firm may be defined as a construct for the purpose of producing a good or service to satisfy the wants and needs of humankind. In industry we usually think of the firm in terms of the production of one or a combination of tangible products such as pig iron or automobiles. In business we may think of a service such as laundry, or legal advice. We organize governmental firms to provide such services as protection and coordination of individual activities for group welfare.

The management function within the firm is similar whether it provides a tangible good, an intangible service, or a combination of both. The production process of the good or service carried on within the firm involves the acquisition of resources or raw materials, transformation of these resources into a desired form or product, and disposition of the product according to wants or needs. The force or adhesive which binds the firm together is management.

Management is the human element within the firm which interprets the wants and needs for its products or services, organizes the firm, initiates the production process, makes the decisions, and bears the responsibility for the firm and its activities. The manner in which
expendiency, (5) extent of machine maintenance practiced with economic orientation and expendiency, (6) number of dollars additional income required to induce the manager to accept a non-farm job with economic orientation and farm preference, and (7) the interviewer's rating of the manager's ability with economic orientation and personality.

The factor analysis technique was successful in grouping relationships in a meaningful manner. The data available to this study was not adequate to develop scores for the factors delineated to permit their inclusion in a predictive scale. However, it is believed that the insight gained from this analysis has provided a basis for collecting data in a more concise form.

The factor analysis technique was limited in application to determining the relationship of factors to economic performance per se. This is primarily because the mechanical procedures involved attempt to explain an entire matrix of correlations in the absence of a dependent variable and the nature of the data used. The data included variables of widely diverse character and crude measurement indices. Logic is an important element in the interpretation of factors delineated. With the use of improved measurement for variables and limiting the number of variables included in a matrix to those which have exhibited meaningful relationships within a factor should permit this technique to yield further understanding of the relationships involved within each of the factors delineated. Such analysis should prove useful for further refinement of variables related to managerial performance and also permit greater understanding of the total managerial complex and how it functions.
This technique should also find further application in the selection of specific question items to include and how to relate responses in the development of management aptitude tests.

With availability of electronic data processing, the factor analysis technique may be a very powerful tool for sorting meaningful relationships. The present limitations of this technique are in part due to our inability to quantify and group variables which relate to relatively few characteristics.

Economic Performance Prediction
by Least Squares

Multiple regression analysis was used to determine the combined relationships of selected groups of variables identifying personal characteristics of the farm manager to economic performance. Sixteen variables were selected and used in various combinations for fitting regression equations to predict economic performance. Variables $X_1, X_3, X_4, \ldots X_{25}$ as used in this analysis follow the same notation as defined previously on pages 67 and 68.

A regression equation was fitted using the following sixteen independent variables: $X_1, X_3, X_4, X_5, X_6, X_{10}, X_{12}, X_{13}, X_{14}, X_{15}, X_{16}, X_{17}, X_{19}, X_{21}, X_{23},$ and $X_{25}$. Correlation between the predicted and actual values of $Y$ (economic efficiency) were significant at the .05 probability level. $R^2 = .754$ and $\sigma_Y = 29.3$. However, only two coefficients were significant at the .05 level and three were significant at the .10 probability level. This equation yielded a larger $R^2$ than any other equation fitted.
The minimum standard error of estimate was obtained with the following estimating equation: 

\[ Y = 265.49 + 0.512 Y_3 - 0.168 X_4 + 0.300 X_5 - 1.107 X_6 - 14.231 X_{12} - 19.545 X_{13} - 9.376 X_{15} - 12.784 X_{16} + 11.916 X_{19} + 1.007 X_{21} - 1.556 X_{23} - 22.810 X_{25}. \]

The actual and predicted values of \( Y \) were significantly correlated at the .01 probability level, \( \sigma^2 = 26.7 \) and \( R^2 = .738 \). Statistically significant coefficients were obtained for \( a; b_{13}, b_{16}, b_{21}, b_{25} \) at the .05 level, and for \( b_3 \) at the .10 level.

Reducing the estimating equation to the five independent variables which were significant in equation (5) above retained a \( \sigma^2 = 28.3 \) and \( R^2 = .592 \). The following estimating equation yielded statistically significant correlation between predicted and actual values of \( Y \) at the .01 level. The relationship of actual and predicted values of \( Y \) are shown in Figure 1. 

\[ Y = 182.4 + 0.468 X_3 - 17.973 X_{13} - 9.246 X_{16} + 0.848 X_{21} - 13.902 X_{25}. \]

All coefficients were significant at the .05 probability level except \( b_{25} \) which was statistically significant only at the .20 level.

The five independent variables included in this latter equation were \( X_3 = \) net farm income goal; \( X_{13} = \) dominance of the manager in making farm decisions; \( X_{16} = \) ability of manager to recognize alternatives; \( X_{21} = \) extent of social activities participated in; and \( X_{25} = \) interviewer's rating of the manager's ability. Prediction was not significantly improved by the inclusion of additional variables.
Fig. 1...Relationship of Actual and Estimated Economic Performance Scores
Variables $X_3$, $X_{13}$, and $X_{21}$ were respectively the most significant variables in determining the factors identified as Economic Orientation, Independence, and Personality. $X_{16}$ was the second most important variable in determining the General Knowledge factor, second to sources of information. The interviewer's rating of managerial performance was significant in the determination of both Economic Orientation and Personality.

This suggests that these four "factors" or characteristics of the manager are quite important to economic performance. Perhaps the refinement and quantification of these factors would improve predictability of economic performance over that attained by the five specific variables since these factors are more comprehensive than the specific variables included.

Ability to recognize alternatives was the most difficult among the five variables to score. Questions 27, 28, 30, 65a and 65b were used as the basis for scoring this variable. Each question was scored as follows:

- 0 = no concept
- 1 = vague concept, but unable to give specific illustrations
- 2 = limited, but specific illustrations
- 3 = demonstrated understanding of concepts involved.

The scores achieved for each of these five questions were summed to provide a single score for the alternative recognition variable.

Since this variable is closely associated with the General Knowledge
factor, perhaps quantification of the General Knowledge factor would provide a more accurate estimate of the individual's ability to recognize alternatives than attempts to measure this variable directly.

It has been demonstrated by this analysis that statistically significant estimates of economic performance may be obtained from a relatively small number of variables. It has also been demonstrated that economic performance of a manager may be predicted from personal characteristics alone, with no knowledge of the farm business he controls.

It may be expected that a much lower standard error of estimate would be attained by the use of a history of income data in the establishment of coefficients to be used in the estimating equation. Sufficient accuracy of prediction was achieved to encourage further refinement of the "factors" to be included in the estimating equation and determination of the appropriate coefficients to be used for prediction.
CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

Management is the human element within the firm which interprets the wants and needs of society, organizes the firm, initiates the production process, makes the decisions, and bears the responsibility for the firm and its activities. Theory of the firm has been developed around the "economic man" concept of a manager. While this concept has been useful in developing theories of the production firm and its processes, it has not provided sufficient understanding of the managerial processes. An understanding of the managerial processes and the management complex is prerequisite to improving the functioning of these processes.

The goals and objectives of management include non-monetary activities as well as monetary activities. Theories of management should include both monetary and non-monetary values of the manager if an adequate understanding of the managerial processes is to be developed. Our lack of understanding of the management processes is currently dampening our progress toward increased resource productivity. The management input must be quantified before we can determine the proper quantity and combination of resources to combine with management for optimum resource use.
Many researchers have attacked the managerial input from various directions in recent years. The research project of which this study is a part, is directed toward the development of a scaling device which may be used to predict managerial performance of individuals with or without previous managerial experience. This study was designed to develop methodological procedures which may be used in the development of a predictive scale.

Data used in this study was collected by personal interview from 31 owner-operators in southwestern Ohio. Farms were homogeneous with respect to tenure, soil type, topography, and type of farming.

Managerial ability was defined as the individual's potential for maximizing economic performance within the farm business as influenced by his personal abilities and his goals. This permits using economic performance as a common denominator to compare individuals but recognizes that the goals of the individual will influence performance as well as his abilities. Economic efficiency was used as a criterion for managerial performance. Economic efficiency was measured as an input-output ratio. The output was measured as annual net farm income. Inputs were measured as an interest charge for equity capital invested in the farm business plus a charge for the annual labor input. Differences in managerial ability were reflected by variation in the economic efficiency ratio.

A set of eighteen goals were structured into three groups representing economic, intermediate, and personal values. Economic goals were dominant among the group of farmers studied. Intermediate goals were secondary to both economic and personal goals.
Two patterns of goal complexes were observed. One group appeared to place dominant emphasis on monetary income. Another group appeared to place dominant emphasis on individual freedom. The remainder of the sample was an admixture of the two.

Four methods of ranking economic motivation on the basis of goal patterns were evaluated. Goals were weighted according to rank order to the respondent and its direct, indirect, or non-relationship to the monetary units in methods I and II. These weights were multiplied and summed to obtain an economic motivation score for the individual. Method I included the six most important goals and method II included the three most important goals to the individual manager. Methods I and II gave identical rank orders. Method III involved grouping managers according to both type of goals and rank order of goals. These groups were then assigned scores according to the relative importance of monetary items. This method provided economic motivation scores consistent with enumerator appraisals. The fourth method grouped farmers on the basis of the dominance of "economic man" and "freedom" concepts in their goal complex. This method suggested a more complex relationship than a single economic motivation continuum. The scores obtained by method III were used as a measure of economic motivation in the remaining analyses.

Net farm income goal, labor input, leisure time activities, net worth, age, and amount of indebtedness were found to be significantly related to economic motivation scores when fitted in a least squares regression equation. However, only the net farm income goal and age
provided coefficients in the estimating equation which were significant at the .05 probability level. Dollar income goals were significantly related with actual net farm income and economic efficiency.

Net farm income, equity in the farm business, and economic motivation scores were found to explain 67.1 per cent of the variation in dollar income goals when fitted by the least squares method. Labor input and leisure time activities added only 1.8 per cent to the total explained variance when included with the preceding three variables.

Leisure time activities and goals were not found to be significantly related with any of the following variables: (1) economic efficiency, (2) net farm income, (3) dollar income goals, (4) net worth, or (5) economic motivation scores.

Dollar income goals were found to be the best single indicator of economic efficiency among the different methods of evaluating economic motivation considered.

The centroid method of factor analysis was used to identify variables which were related and to group these variables into meaningful "factors". This multiple correlation process reduced 25 independent variables to nine factors which described the "farm manager." These factors were: (1) economic orientation, (2) expediency, (3) labor-skill complex, (4) leisure time, (5) general knowledge, (6) independence, (7) motivation, (8) farm preference, and (9) personality. These nine factors are logically sound and represent a step toward identifying management components which are quantifiable.
the management function is apportioned among individuals and carried out within the firm varies considerably with the organizational structure of the firm. To illustrate, contrast a sole proprietorship family farm with General Motors Corporation. While the number of individuals involved and the extent of responsibility or control exercised by each individual within the managerial complex is significantly different, the functions of management with regard to the production process are similar and must be performed by the managerial complex.

Management begins with the formulation of goals. These goals are established through a process of assessing (either consciously or unconsciously) the wants and needs of society in general and the entrepreneur specifically. For a corporation such as General Motors this function would be performed by the board of directors who represent the shareholders. The general goal may be some minimal rate of return on investment in the short run with some consideration of the share of the market for profits in the long run. The achievement of this monetary goal requires an evaluation of wants and needs of individuals in society to determine what production activities the firm may carry on to best achieve the monetary goal.

The goals or policies established by management are dynamic. They may be tempered with changes in society and changes within the managerial complex. The goals established by the initial board of directors of the corporation would reflect more of the personal values of the group at the onset. As they move to acquire additional resources to achieve these goals, they bring more individuals into
Sixteen independent variables identifying various characteristics of farm managers were combined in various combinations in a series of least squares estimating equations to predict economic performance of the farm manager. An equation including 12 of the variables provided the minimum standard error of estimate and explained 73.8 per cent of the total variation in economic performance.

The following five variables explained 59.2 per cent of the total variation in economic performance when fitted by least squares: (1) net farm income goal, (2) dominance of the manager in making farm decisions, (3) ability of the manager to recognize alternatives, (4) extent of social activities participated in, and (5) enumerator's rating of the manager's ability. The addition of more variables did not improve predictability of the economic efficiency scores significantly. These five variables were important determinants of the following four "factors": (1) economic orientation, (2) independence, (3) general knowledge, and (4) personality.

Conclusions

Previous studies have suggested and this study has added support to the importance of non-monetary goals to the manager in the conduct of business affairs. The relative importance of monetary and non-monetary goals differ considerably among farm managers. Some managers place primary emphasis on economic or monetary goals while others are dominated by personal goals. These personal goals appear to be centered about a concept of "freedom" or "independence." Goals dealing with material items were of secondary importance.
The two basic types of goal patterns exhibited by individual managers in this study are highly suggestive of two populations of farm managers in terms of how they relate themselves to the farm business. One group dominated by monetary goals, with their focal point on dollar income, relate themselves to the farm business as a controlling element, or a manipulator of the farm business. This is the typical economic man concept with the farm business representing only a means to an end. These individuals, then, may be expected to conduct business affairs in the typical "economic man" concept within their knowledge and ability heritage. Thus, economic performance would vary directly with the ability of the manager.

The second group, dominated by an individual freedom concept, find themselves being restricted in terms of freedom by a dynamic agricultural system. To them, the farm business is a means whereby they may obtain the monetary income required to meet necessary obligations within society, and yet be free from unnecessary dictates of other individuals. Thus, their control of the farm business is limited to producing some minimum quantity of monetary income within an organization that permits the manager a maximum of freedom or personal pleasures. It is the author's opinion that this group experiences a greater restriction of freedom as a result of their lack of control of the farm business.

Pressures created from competitive forces keep the individual striving from a disadvantageous position to earn the minimum acceptable monetary income. Perhaps one explanation of the dominance of the
freedom attitude is that this freedom has never been fully achieved. Freedom has been achieved from direct influence of others but not from the drudgery of obtaining the necessities of life. Managerial effort expended by this group may be expected to vary with both quantity of resources available and the dollar income goal.

The direct, indirect, and non-relationship of goals to the monetary unit is an insufficient criterion for economic motivation—at least for predicting economic performance. Magnitude of monetary goals is perhaps the best single indicator we have of economic motivation at present.

Defining managerial performance as economic efficiency of the owned resources invested in the farm business permits goals of the manager to become a part of management. While this procedure does not permit evaluating total satisfaction of the individual derived from his total resource bundle, it does provide a means whereby personal goals are extracted as an influence on the conductance of business affairs.

Monetary goals are optimistic expectations of performance and are closely related to past performance. Equity capital and economic desires also influence monetary goals.

Most farmers do not establish monetary income goals sufficient to provide for payment of both labor and capital at market rates, indicating that farmers are willing to accept a lower rate of monetary return. Apparently this difference represents part of the costs the farm manager is willing to pay for the non-monetary satisfactions he derives from farming.
Generally, farmers who spent the most time with farming activities also spent the most time actively participating in non-farm leisure activities. Higher rates of economic performance were observed for farmers spending the greater amount of time in both types of activities. This suggests that some individuals use their time more efficiently than others whether it be work or play. Participation in active leisure time activities did not reduce time spent on farm activities. However, leisure time was found to be inversely related to the extent of records kept by farmers.

Economic Orientation, Independence, General Knowledge, and Personality of the manager are important characteristics which influence his economic performance. Refinement of these factors and development of measurement techniques should improve predictability of managerial performance significantly. Further refinement, particularly of measurement technique, for the factors labeled Expediency, Motivation, and Farm Preference may provide increased understanding of how the farm manager formulates decisions and why he makes "irrational" choices from the economic point of view.

The use of the factor analysis technique has provided a basis for collection of data in more concise form. This technique should provide invaluable assistance in identifying relationships within the factors identified in this study, as well as aiding in selection of question items and the development of scoring techniques for management aptitude tests. Relatively few variables dealing with personal characteristics of managers are needed to predict managerial performance with least squares estimating equations.
Statistically significant estimates of sufficient accuracy have been obtained in this study to encourage refinement of variables to be included in estimating equations. The refinement of variables and development of estimating equation coefficients requires a relatively large sample covering a wide spectrum of managers if these are to have validity for large segments of the farm population.

Recommendations

Further study needs to be done on the relationship of the farm manager to the farm business. The primary goals of the farm manager appear to be a logical beginning point for determining this relationship. A study should be designed which includes a broad spectrum of managers to determine the extent and nature of the two basic attitudes found among farm managers in this study. Emphasis needs to be placed upon identifying the individual farm manager with either the "independence" or the "economic" attitudes. Assuming these attitudes are important to economic performance, we might expect the role of the manager to be quite different for these two types of managers. The study should permit identifying the role of the manager as the manager sees it. This is a difficult task due to our limited ability to communicate with farm managers. However, I believe our understanding of management processes will improve with our ability to project our thoughts into the farm business as the farm manager see it.

Further study is needed of the "factors" identified in this study. Refinement is needed as well as identifying the component elements within the factors and measurement techniques.
A large sample of farmers representing several types of farms, tenure classes, age groups, and resource availability levels is needed to develop coefficients to be used for predicting economic performance. A history of financial data is needed to establish population norms for economic performance. This study should provide for measuring comprehensive variables such as Economic Orientation, Expediency (urge or drive to follow through), Independence, Personality, and General Knowledge.

Two important characteristics which have been identified with economic performance but have been elusive to measurement are timeliness of operations and ability to recognize problems, alternatives, and opportunities. Timeliness is closely related to the factor previously referred to as expediency. Ability to recognize alternative courses of action is closely associated with knowledge and thought processes. Further research needs to be directed toward measurement of these two important characteristics and identifying their relationship to economic performance.

Another area for future investigation is the diffusion of ideas among members of the managerial complex. Family partnership operations provide an opportunity for investigating the diffusion of ideas and the interpersonal relationships involved in management processes.
APPENDIX
The basic assumptions underlying the factor analysis technique are:

1. A particular quality or characteristic is neither dependent upon a single undifferentiated variable nor upon a chaotic conglomeration of separate abilities. A particular characteristic may be influenced by a combination of several independent variables. Also a particular independent variable may influence more than one characteristic or quality to be predicted.

2. Each particular characteristic or factor to be extracted will involve only part of the total number of variables included. Two or more factors may involve the same combination of independent variables, but the relative importance of the variables will differ among factors.

3. When the factors are not correlated with each other, the correlation between any two independent variables is equal to the sum of the products of the weights for those factors which are common to the two variables.

4. The independent variables included in a factor are additive in determining the factor.

5. Each observation or subject included possesses all factors considered.

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6. The weights of variables obtained for each factor are an average of varying weights for individual observations, and hence are limited in prediction of a specific individual.

The centroid factor analysis technique is essentially a multiple correlation process which begins with a matrix of simple correlations and seeks to explain this original matrix with a minimal number of relationships or "factors". The first factor selected represents an average of all relationships included in the matrix. Each succeeding factor is selected on the basis of its ability to explain the resulting unexplained residual elements.

In general, the results of factor analysis may be used for three purposes: (1) to determine the minimum number of independent variables required to account for a given set of data, (2) to determine how much of a particular independent relationship is measured by a specific variable, and (3) to select variables for inclusion in a regression equation to predict a specific variable.

The factor analysis technique is limited in its ability to identify characteristics which will predict a specific variable. This results from the attempt of this technique to explain the entire matrix in the absence of a dependent variable.
1. How many sows did you keep in 1961? ________ 30-45 ________

2. What breed are they? __________________________

3. Are the ________ Grade or ________ Purebred?

4. Does the sale of breeding stock account for a major part of your hog sales? ________YES ________NO ________

5. How many replacement gilts did you buy last year? ________

6. How many replacement gilts did you raise last year? ________

7. How many times did you farrow each year? ________ 2 or more ________

8. How many feeder pigs did you sell last year? ________ None or few ________

9. Approximately what was the average weight of feeder pigs sold? ________

10. How many feeder pigs did you buy last year? ________ None or few ________

11. Approximately what weight of feeders did you purchase? ________

12. How many fat hogs did you sell last year? ________

13. What was the average weight of fat hogs sold? ________

14. 

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