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Project Manager Selection: The Decision Process

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ABSTRACT

Several executives with responsibility for
selecting project managers in a government research
laboratory were interviewed to investigate the pro-
cess of making the selection decision. Actual
people and situations were discussed. The inter-
view data make it clear that the process of select-
ing project managers is an understandable and des-
cribable process even though it is carried out in
an informal and mostly subconscious manner. A model
of the decision process is presented. Data from a
limited test were in accord with the model. The
pattern found in the selection process has possible
application to improvement of the particular decision
process studied and also to the more general under-
standing of decision processes.

PROJECT MANAGER SELECTION: THE DECISION PROCESS

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Recent research on the decision process has been advanced by the use of computer programming to simulate the process. Writing a program for a computer demands that men think about what they are doing with clarity and precision, and that they express these thoughts in equally clear and precise language. One of the first statements of the possibilities inherent in computer programming techniques for simulating thought processes was by Newell, Shaw, and Simon (1958). Their initial goal was to program a computer to solve some theorems of symbolic logic (from Whitehead and Russell's Principia Mathematica). They observed that such a program would have to use heuristics and that the machine (or more basically, the program) would have to "think" in somewhat the same fashion as humans. They found that when a program was written which would prove most of the theorems, it exhibited the same logical thought pattern as human subjects who were asked to "think aloud" while solving some of the same theorems. But they noted that:

> We wish to emphasize that we are not using the computer as a crude analogy to human behavior--we are not comparing computer structures with brains, nor electrical relays with synapses. Our position is that the appropriate way to describe a piece of problem solving behavior is in terms of a program: a specification of what the organism will do under varying environmental circumstances in terms of certain elementary information processes it is capable of performing. This assertion has nothing to do-- directly--with computers. Such programs could be written (now that we have discovered how to do it) if computers had never existed. A program is no more, and no less, an analogy to the behavior of an organism than is the differential equation to the behavior of the electrical circuit it describes. Digital computers come into the picture only because they can, by appropriate programming, be induced to execute the same sequences of information processes that humans execute when they are solving programs (p.153).

A significant step in applying this new approach was made by Clarkson (1962) who studied the decision process of a trust officer in a bank selecting a stock portfolio for investment. Using extensive interviews and tape recorded protocols, he constructed a model and computer program which simulated the decisions made by this trust officer to a high degree of accuracy. Given the requirement to invest a given amount of money and the purpose of the investment (growth, income or some combination thereof), Clarkson's program instructed the computer to choose essentially the same investment portfolio as was chosen by the bank officer. In addition, Clarkson programmed the machine so that the output was in English language statements rather than a numerical readout. The statements "made" by the computer in selecting its portfolio were compared to statements made by the trust officer (in the recorded protocol) when he made his portfolio selections. Since it is virtually impossible to distinguish between the output of the computer and the "output" of the trust officer, it can be said that Clarkson's program meets a modified form of Turing's Test (1956). The original form of Turing's Test proposed that a human interrogator sit in one room, a human respondent in another, and a computing machine in a third. The interrogator asks questions (written rather than oral) and the human and machine respondents give written replies. If the interrogator cannot tell whether the machine or the human is answering his questions, then the machine has passed Turing's Test and, at least in some sense of the word, can be said to "think". In Clarkson's work the test is made somewhat less stringent in that the "interrogator" is restricted in the questions he can ask.

THE SELECTION DECISION

The decision considered in this study is the selection of project managers in a government research laboratory. In the studies of Newell, et. al. and Clarkson, the items involved in the decision were fairly tangible and could be considered, at least loosely, as being reducible to numbers. The prime question of this study is whether or not such an approach will work when the "items" considered by the decision maker are people and where each selection of a project manager seems to involve many new variables, both technical and human. Therefore the question to be answered is whether or not an understandable and describable pattern can be found in the process of selecting project managers.

DATA

Several key people who are involved in selection of project managers in a large government research laboratory were interviewed. Six were interviewed quite intensively and tape recordings were made of several of these interviews. About a dozen additional people were interviewed less intensively. Most of these people had been involved in recent selections of managers of large projects; some small projects were also discussed. They were asked to discuss their most recent selections. In almost all instances actual people and situations were discussed. Some of those interviewed were franker than others, but almost all opinions were illustrated by specific actual occurrences.

No attempt was made to keep the interviews on a rigid path; any statement that seemed interesting was pursued. However the following list of questions was covered:

1. Do you have any current projects for which you are trying to select a project manager? If not, then what was the most recent project?

2. When did you first realize that the project was going to come into being and that a manager would have to be appointed?

3. At what time did you start considering specific individuals for managers?

4. How many people did you believe might be qualified for this job?

5. In what sequence did you consider the people?

6. What was your general process for selecting?

7. What were the reasons you thought those people might be suitable?

8. In what order were these reasons considered?

9. What were the reasons for rejecting people?

For this study, a project was defined as a research task that had a reasonably well defined end object (usually a hardware item) and completion date. Also, the work had to involve several technical disciplines and several organizational units at the laboratory. The project manager is the individual given prime responsibility and authority for execution of the project. Further descriptions of what a project manager is and what he does are given by Gaddis (1959) and Osborne (1962); these descriptions are for industrial concerns but they also apply reasonably well to a government laboratory.

A MODEL OF THE SELECTION DECISION PROCESS

Based on data obtained in the interviews, a model of the decision process was constructed in the form of a series of flow diagrams (Figures 1-3). Most of the specific details are implied, rather than explicitly described, since the model is intended as a general description rather than a verbatim

reproduction of the decision makers' thought processes. Some of the aspects of the model are illustrated by typical data obtained in the interviews; these remarks have been slightly altered to preserve the anonymity of the interviewees and of the people they discussed.

It was found that the steps in the selection process were not carried out, for the most part, consciously or deliberately by the decision maker. In no case was any sort of written check list or procedure used. And the steps that were consciously followed were not routinized to any degree. In spite of these facts, the processes of the different decision makers were remarkably uniform; differences were slight and, for the most part, reflected not so much basic differences in procedure as differences in certain detailed aspects of that procedure. Other investigators have found that there are three aspects to a decision maker's processes: a memory which stores information on factors in the process, a set of basic information processes which operate on the data stored in memory, and a set of rules which describe how these processes are to be used. These elements are the important building blocks of this model and their presence will be obvious to the reader.

Selection of Potential Candidates

Before a decision maker can select a manager for a project, he must have a list of people from whom to choose. A description of the process for generating this list is shown in Fig. 1. The list is generated by observing people perform in their jobs and by reviewing their capabilities.

> You want a man who has demonstrated by his past history that
> he has these capabilities required of a project manager, pre-
> ferably on some major project so you will have a guide on how
> he performs on this type of job.

Each time he has contact with people, he re-evaluates their attributes.
This re-evaluation will not be complete and often only one facet of their
attributes will be considered.

> The picture of the man is made from observations made in a
> random sample of incidents. But you still get a good line
> on a man if the process is done over enough time.

The picture that is stored on the man is seldom a detailed one and
it is up-dated after an "observation" of the man.

> Such things are on your mind and you integrate all of them
> in your mind when you make a selection. You remember that
> so and so is a good project engineer. You draw conclusions
> about these people in your contacts with them and you keep
> your conclusions up to date.

Implied is the idea that candidates are measured not only against
their own past performance, but also against some "standard". The decision
makers, by observing how well people do their jobs generate a list of qual-
ities that make for "good" and "bad" project managers.

The forming of these lists and observing and ranking of people's attri-
butes is done in large measure independently of and prior to selection of
project managers. Whether or not the decision maker has a project job in
mind for the person being observed, he has need for such data in considering
promotions in line positions or in giving raises.

Project Definition

A flow diagram of the project definition phase is shown in Fig. 2. The
principal concerns in this phase are the decisions as to the technical needs
of and the priority of the project. The technical needs come closer to dic-
tating the selection of the project than any other item.
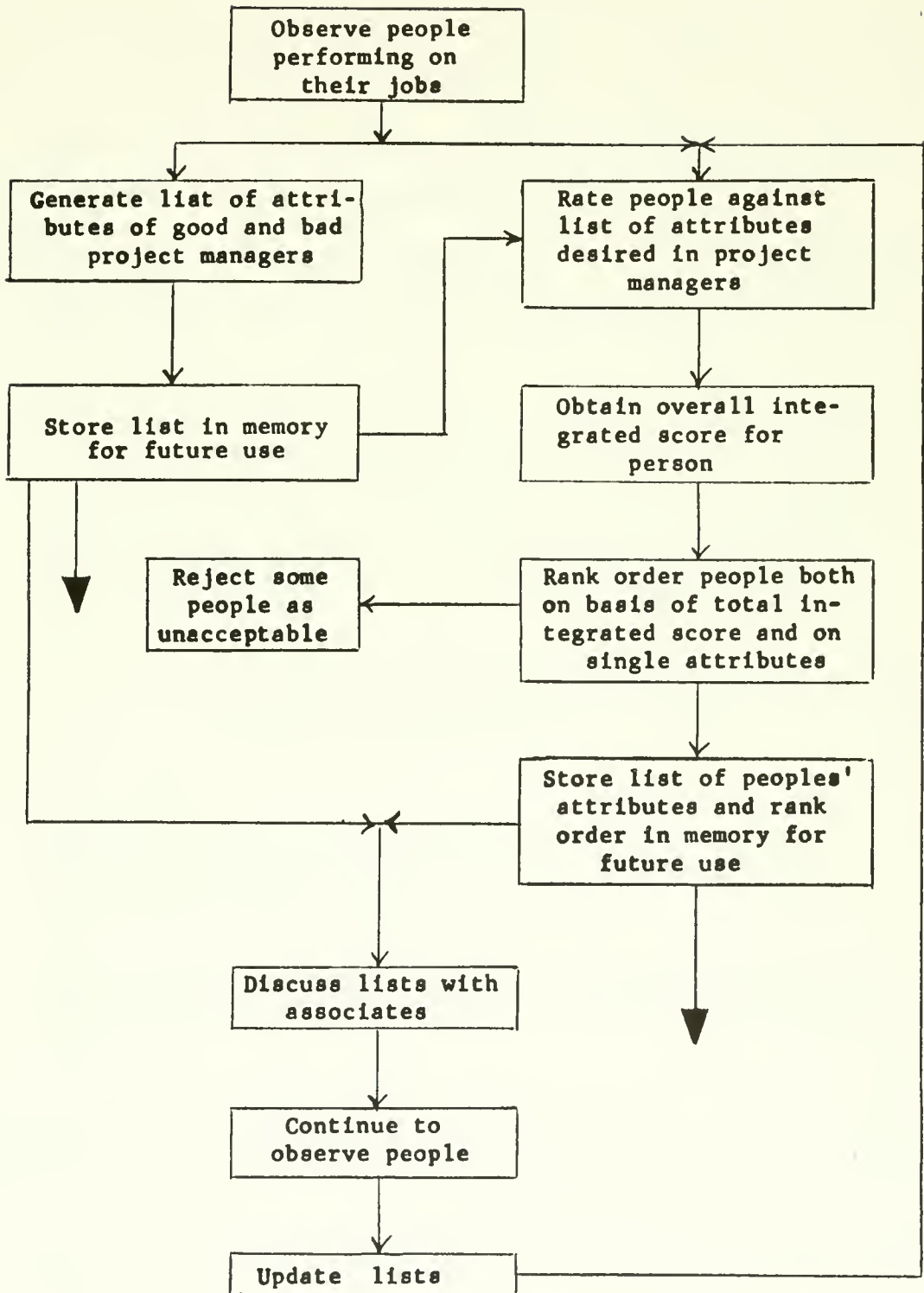
Figure 1. - Flow diagram for generating lists of potential candidates.

In contrast with the candidate list generation (Fig. 1), this phase is often carried on, at least in part, at a fairly conscious level and, at times, in quite formal fashion in discussion and review with associates. Parts of the process, such as technical and other qualifications required in a manager, are determined from data stored in the decision maker's mind as a result of the activities described in Fig. 1.

A project manager cannot be chosen before the project is defined.

> If the nature of the project isn't defined, you can't select the proper project manager; the project defines the man.

The project priority determination also affects the decision.

> You have to make trade-offs on availability. This doesn't mean that a man has to be free, but only that you can make a trade-off between the project that he is on and the new project that is coming up. You have to make a decision as to whether the merit of the new project is such that you want to take him off the old job and put him on this new project.

This phase also includes the possibility of rejecting the project, particularly on the grounds that one of the decision maker's "own" people cannot do the job.

> First of all we certainly look within our own organization. These people know the other people in the laboratory, they know where to go for help.

> You must have firsthand knowledge of the man; for this reason you would seldom pick an outsider. You probably would turn down a project if you thought one of your own people couldn't handle it.

There are pragmatic reasons for considering only one's "own" people, and competitive reasons one would rather turn down a project than consider an outsider. Of course, the idea of who are one's "own" varies with the hierarchical level of the decision maker. And the size and importance level at which the manager is chosen.
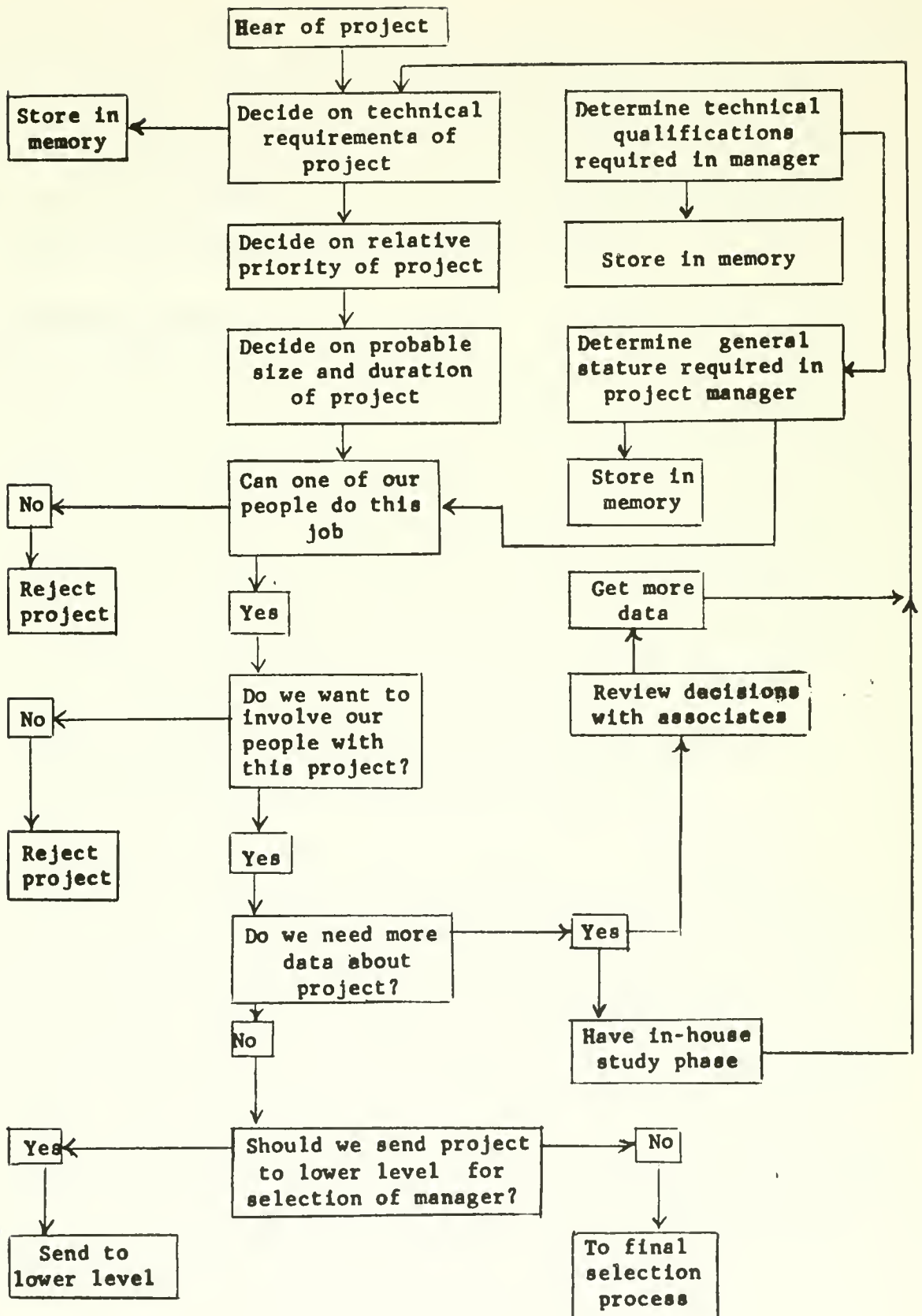
Figure 2. - Flow diagram for Project Definition Phase.

The feedback loops shown in Fig. 2 may or may not be involved in any specific selection. On projects that are large or vaguely defined, and particularly on projects that are generated within the laboratory, there may be several trips through these loops. This cycling, and the study-phase step, are used to define the project more sharply.

Final Selection Process

The final step in the process, the selection phase (Fig.3), is undoubtedly the most subjective phase of all. None of the decision makers seemed to have a conscious thought pattern for arriving at their actual choice of a project manager. No good description of this phase was given by any of the decision makers. Therefore, in the flow diagram of Fig. 3, more than in the other phases, some of the steps in the process are based on inference rather than discrete data acquired during the interviews.

> There is a thinking period while you are considering the
> project and people; this is when people are eliminated.
> You think about it for quite awhile and then say, "How
> about him for the job?"

In this phase most of the detailed differences in procedures were found. The differences were found in different decisions by the same decision maker more than in differences between different decision makers. These different procedures are labeled in Fig. 3 as routes A, B and C.

Route B is the one that most decision makers seem to use; this is the route where an "initial probable choice" is apparent. Based on the data stored in his memory about potential candidates, the decision maker performs an immediate matching of candidate and project as soon as the project description phase is completed.
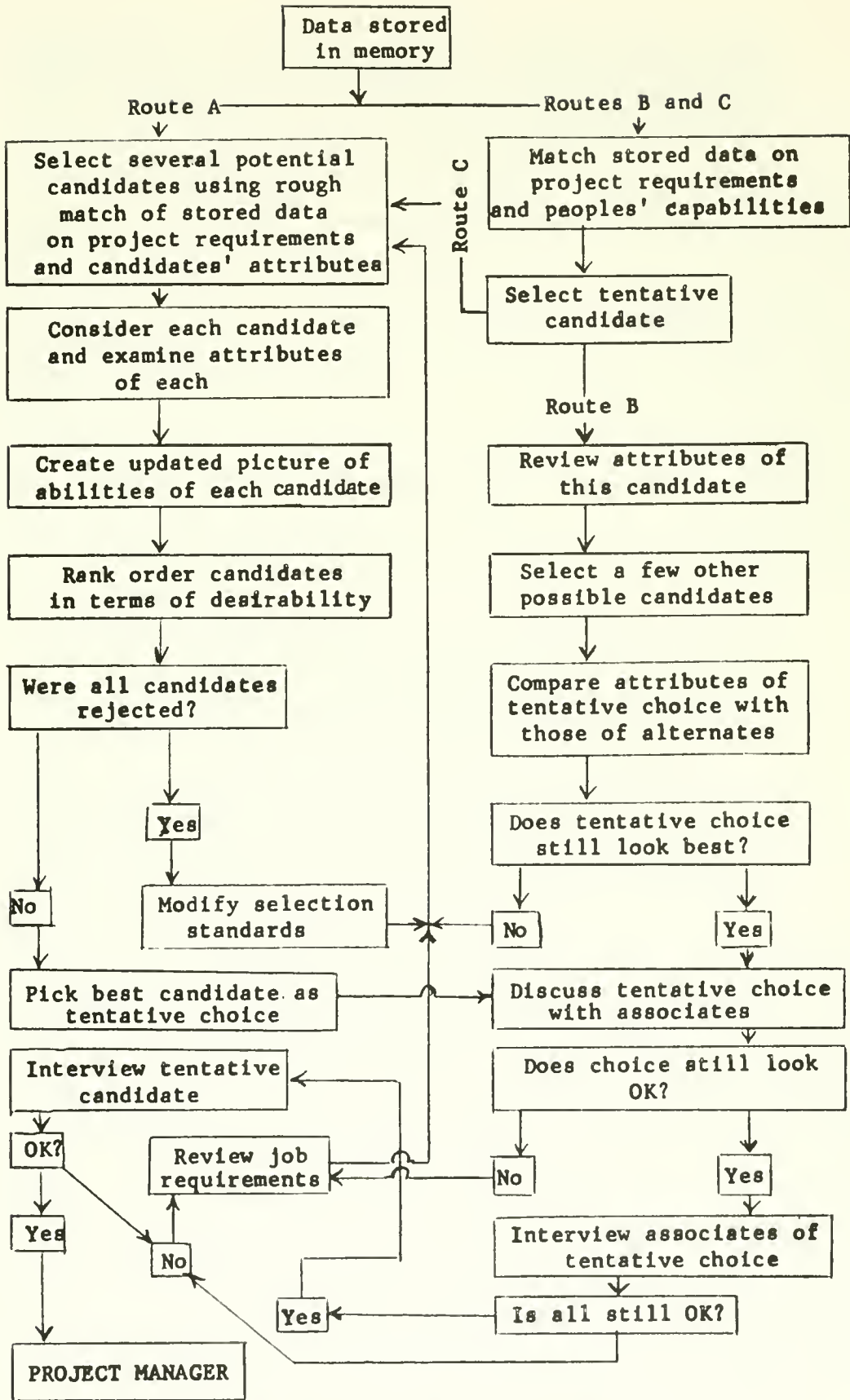
Figure 3. - Flow diagram for final choice selection.

> On project X, the technical problems dictated the research
> division that the man must come from. When people from
> that division were considered, the further requirement that
> Y type of experience was needed made us ask who from that
> division has the most of that type of experience. And
> immediately these questions yielded Mr. Z.

After tentatively selecting one man, the rest of the effort on route B

is a justification of the "initial probable choice." The justification

procedure may be conscious or not. The justification procedure may be

consciously and deliberately, then route C is followed. It would not be

unreasonable to say that route C is just a repetition of route B; the

two routes, B and C, are distinquished in order to differentiate between

processes that are largely unconscious and those that are fairly deliberate,

conscious and semi-formal.

> I always deliberately consider a few other cases even if
> I am not seriously considering these other people. This
> always introduces a few other characteristics for you to
> measure a man against. You insure that your selection is
> good by mentally balancing him against other people.

> Selecting a project manager is sometimes similar to the
> process of writing a man up for a raise. You know the
> man deserves a raise, but when you sit down to make the
> write-up, you have to stop and think of the exact details
> if why he does.

Route A could be called the "logical" or "correct" route and several

decision makers claimed to follow such a procedure all of the time. There

is some evidence to indicate that route C is actually the path followed

when the decision maker thinks he is following route A. There is probably

an element of preselection in all choices. But most decision makers would

consider this to be a "bad" or "unfair" procedure and would, therefore,

claim to follow route A. An "initial probable choice" does not seem to

be "bad" necessarily, particularly if the decision maker is "honest" and

"rational" and does indeed provide for the possibility of "changing his mind".

> We had a number of candidates in the back of our minds. We
> got the job lined up and then got down to cases to choose
> people. There were a goodly number of candidates and the
> first act was to eliminate the people who were too busy. So
> you look and find people who have come to the end of a job
> or who may be at loose ends temporarily--this probably
> narrows it down to two or three--maybe four people. Then
> you have got to go to work on the four to find out which
> one would likely do the job best.

Changing one's mind probably never happens prior to discussions of tentative choices with associates of the decision maker. These discussions are quite limited in number (in this study, usually one or two peers and subordinates). The associates of the potential candidate who are interviewed are also quite few in number and they are usually subordinates of the decision maker. The purpose of these interviews is usually hidden from the men interviewed.

When the candidate himself is interviewed, he is usually told that he is being considered for the job and that the purpose of the interview is to establish whether or not he wants the job, and whether or not there is some personal factor that would preclude his accepting the job (or being acceptable).

> I interview the man and find out whether he has an interest
> in this particular job and whether I feel that he would
> motivate the project. I found if there is some personal
> factor in his life which would require that he doesn't
> travel or that he not put full effort into the job. If
> you find out that he does have the proper personal in-
> terest in the job, then he is the man--he is your candi-
> date. If you find out that there is some doubt after
> you interview him, like the personal factor or that he
> doesn't have a particular interest in this type of job
> or if you feel that he doesn't want to push himself too
> hard right now, then you take the second candidate you
> picked.

Attributes Desired in a Candidate

The way in which the decision makers described in the attributes desired in a project manager varied, but their descriptions can be reduced to the following list of questions. The three categories in which the attributes, or skills, are placed was suggested by Katz (1955).

Technical skills:

1. Does the man have sufficient technical skill in the major field of interest in the project?

2. Does the man have sufficiently broad technical abilities and background to be adequately conversant with all of the technical disciplines involved in the project?

3. If the project is to be done with the services of a contractor, does he have appropriate experience in negotiation and administration of contracts?

Human skills:

4. Can he establish a team effort through his abilities to work with people, command respect, and establish esprit de corps and enthusiasm?

5. Can he communicate his ideas and delegate responsibility for execution of these ideas?

6. Is he a good judge of people and can he properly utilize and weigh the opinions of experts?

7. Does he have sufficient aggressiveness and drive?

Conceptual skills:

8. Can he properly plan the work of both himself and others?

9. Can he properly assess and co-ordinate the various requirements of broad areas of activity?

10. Can he make timely decisions and establish the proper balance between thought and action?

For major projects this might be called a list of minimum attributes--if the man doesn't have them he is not likely to be considered a promising candidate for the job of project manager. For minor projects one or more

attributes could be missing, particularly if it was thought there was a potential for development of them. Smaller projects sometimes are used as training opportunities for people who appear to be capable of taking on larger responsibilities in the future.

But different projects require different weighting of these attributes. And for the same project, different decision makers may weight different attributes differently. For example, a decision maker who is primarily concerned with schedules and costs might weight the factors of planning and co-ordinating abilities or contract administering experience more heavily than technical ability. A decision maker who is more concerned with mission performance requirements would likely put the emphasis in reverse order. However, all the decision makers interviewed said that all of these attributes were required, although their way of describing the attributes varied.

The list of attributes sounds somewhat idealistic, but it was obvious during the interviews that the attributes as described by the decision makers were considered by them to have definite and useful meanings.

TESTING THE MODEL

Time constraints prevented testing the model by asking all of the decision makers if they agreed that it did indeed provide a description of their thought process. Portions of a preliminary version were discussed with some of them and no significant exceptions were taken. An additional limited test was carried out in the following manner.

A hypothetical project was invented, along with four hypothetical people who were candidates for the position of manager of this project.

Four decision makers at the laboratory where the original data were obtained were asked to rank order these candidates in order of desirability. They were also asked to describe their thought processes as they made their selections.

The data obtained in these descriptions was not in conflict with the model. Hence, a limited but successful test of the model was obtained.

One portion of the test however, did fail. It was predicted that all four decision makers would rank one candidate as the best and one man fourth. This part of the prediction was validated. It was also predicted that two of the decision makers would weight technical competence more heavily than contract experience and that two would do the reverse and, therefore, would reverse the ordering of their middle two selections. This prediction failed. Analysis of the remarks indicates that the prediction failed because the descriptive material did not convey the intended differences in attributes of these candidates. Apparently, some of the differences in the technical and human skills of these two candidates were so large that the decision makers were unable to discriminate on the basis of other and more subtle differences in their contracting and technical skills. It was concluded therefore, that the failure of the prediction was due to the description of the candidates' attributes rather than to a failure of the model itself.

CONCLUSIONS AND IMPLICATIONS

It is concluded that the process of selecting managers is a decision process that can be understood and described. While the model outlined here is only a modest step toward a complete description of the process,

it is a valid general description that is lacking only in aspects of how some of the details are handled; for example, how a hierarchical ranking is given to detailed aspects of attribute requirements.

With the results presented, there is a basis for attempting to improve the selection process. One simple way would be to add some formal and structured procedure to the process to insure that no steps or qualified candidates are overlooked.

The most fruitful area for future research probably would be an investigation of alternative methods for the selection process, particularly in attribute determination or in attribute requirements. We do not know if the present method is a "best" method, or indeed if there is a single "best" method. It may very well be that the attributes we think are required for a project manager are not all essential ones, or that there are perhaps other attributes equally or more important. Experiments in which other than the "best" candidates are chosen would be very useful. Such experiments would be difficult to perform, not only because of problems in control and in measurement of results, but also because it would be difficult to persuade a decision maker to follow different procedures. Revised procedures might select an unsuccessful project manager. But it should be noted that the present process does not always produce success. In a sense, the present method is the end result of a series of non-controlled experiments.

The results of this study give support to the idea that decision processes which appear to be prima facie examples of situations that are too unstructured to permit effective study can be described by carefully looking for underlying patterns. Management decisions frequently are regarded as deep, dark unknowables. But this may be true only to the extent that we do

not systematically try to understand them. This study suggests that we can understand such decisions and that there are means for testing our understanding. A vast, largely unexplored, field seems open for research with this approach.

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