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A Systematic Approach to Consulting

for City Administration

by

Yoram Rosenberg ✓

January, 1972   584-72

MASSACHUSETTS
INSTITUTE OF TECHNOLOGY
50 MEMORIAL DRIVE
CAMBRIDGE, MASSACHUSETTS 02139

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Abstract

In recent years there has been an increasing trend toward recruiting research organizations to help in the solution of problems faced by city administrations. This paper deals with the question of how to view such a consulting process. It suggests a conceptual framework and discusses it's implications and uses. This systematic view of consulting was employed in examining an actual case of an organization consulting various departments of a city administration, and the lessons drawn from this exercise are presented. Finally, the research and application potential of this approach is discussed.

A SYSTEMATIC APPROACH TO CONSULTING FOR CITY ADMINISTRATION

Outline

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VI. SUMMARY

A Systematic Approach to Consulting for City Administration

I. Introduction

I would like to begin this paper by giving you
some of the background of my research project. A little more
than a year ago I started to consider the question of what
may effect the successful outcome of a consulting effort for
a city government. In particular I was interested in the
work of the New York City Rand Institute for the City of
New York. At that time the Institute, which was established
in 1968 by the Rand Corporation and the City of New York,
was consulting nine city departments and agencies in
Housing, Health, Fire, among other areas.[1]

I started by familiarizing myself with literature
dealing with client-consultant relationships and found
that success was attributed to a great range of factors
including, among others, the consultant's age,[2] the power base
of the individual inviting the consultant,[3] the nature of
communication between the client and the consultant,[4] and
the complexity of the task.[5] Subsequently, I conducted
lengthy interviews with people both in the city government
and in the consultant organization. Transcribing hours of
tape recordings, I developed a list of well over one hundred
factors which were mentioned as possible determinants of
success. Those included, for example, support from the Mayor
and the unions, availability of resources and professional
expertise on the part of the client.[6]

Between the literature and the insights of the
people involved, I was clearly in trouble. The number of
variables was more than may be considered in any reasonable
research project. I had to come up with some scheme to
meaningfully order and classify all those variables.
I needed a framework which would enable me to characterize
the consulting relationship. A framework which would be
sufficiently general to apply to a diversity of consulting
relationships, and sufficiently flexible to encorporate all
those variables I referred to. The conceptual framework which
I developed to meet this need is the subject of this paper.
I will procede in a minute to describe and discuss it.

The framework guided me in designing the research
and in developing a questionnaire. I administered this
questionnaire to more than one hundred people in the city
and at the Institute and collected data regarding 53
consulting efforts, which I would refer to as "studies,"[7]
conducted for eight different city departments. Using the
data so collected, I will demonstrate how the framework could
be used to describe the consulting relationship and to
analyze determinants of its success. Subsequently, I will
draw on that data and illustrate its implications regarding
the particular case investigated. Last, I will mention the
potential of this approach to researchers, as a stepping stone
to a model of the process, for example, and to practitioners,

by providing them with guidance in planning their
relationship with either a client or a consultant.

I called the paper "A Systematic Approach to
Consulting" because I believe that it represents an orderly,
methodical approach which may be applied by different parties
in a variety of consulting situations.

II. The Framework

As I have stated, I needed a framework
which would enable me to describe any variable which ought to
be considered in a consulting relationship as well as to
discuss and predict the effects the variables would have on
each other. This calls for a conceptual framework which
can fulfill the following three requirements:[8]

1. Define a set of elements that, while common to a
    broad range of consulting relationships, are defined
    in sufficient detail to permit differentiation
    between states of the environment.

2. Serve as a basis for description of processes as
    well as elements - provide a means of describing
    interactions between elements.

3. Be based on measurable entities amenable to
    quantitative description and validation.

A consulting relationship may be described in many
diverse ways. We seek to describe it while using the smallest

number of clearly distinguishable elements. Having a
mutually exclusive and collectively exhaustive set of
elements, in which each element is necessary but not
sufficient to describe the consulting process, would fulfill
this requirement. In order to identify a "necessary" element
we have to pose the question - "the absence of which element
would make it impossible to uniquely describe the system
at hand?" In order to identify an "insufficient" element
we have to pose the question - "could this element be used
alone to fully describe the system?"

The elements which meet all these requirements are
the "client," the "consultant" and the "problem" which the
consultant is contracted to solve, as shown in Figure 1.

Each of the elements represents a group of
variables. The variables which are represented by each of
the three elements are:

1. Client characteristics: all those attributes which
    the client has, regardless of the particular consultant
    or the particular problem involved. (For example -
    the size of the client organization; the prior
    experience of the client.)

2. Consultant characteristics: all those attributes
    which the consultant has, regardless of the particular
    client or the particular problem involved. (For
    example - the image of the consultant organization;
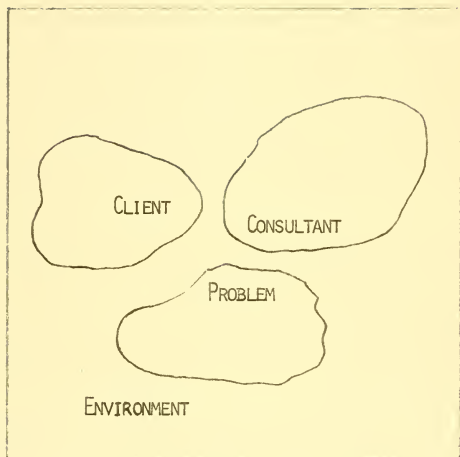   the resources at its command.)

FIGURE 1 : BASIC ELEMENTS OF THE CONSULTING SYSTEM

3.   Problem characteristics: all those attributes
     which are unique to the problem the consultant is
     engaged to solve, regardless of who the client or
     the consultant are.

Everything outside of those three elements will
be considered as the "Environment." However, as the need
arises, we may add elements from the "environment" to the core
set. Elements like "another consultant," "another client,"
"another problem," "the public," "the Mayor," etc., may be
added as well.

Looking again at the three elements, we notice that,
while each makes its own peculiar contribution to the
description of the system, we may gain greater insights by
examining their intersections as well. This is shown in
Figure 2.

Sets 1, 2, 3 and 4 were described in
Figure 1. Set 4 could be subdivided into several
parts, as discussed before, and each of those could
intersect with any of the other seven sets. However, for the
sake of simplicity this will not be done in this discussion.

Once the three major elements - the client, the
consultant, and the problem have been defined, we can
discuss the dynamic processes involving these elements.
The framework could be used to describe the "process" as
well as the "structure" of the consulting system. In particular,
with respect to each of the previously described sets, we may

CLIENT
1

CONSULTANT
2

7

5   8   6

3
PROBLEM

ENVIRONMENT   4
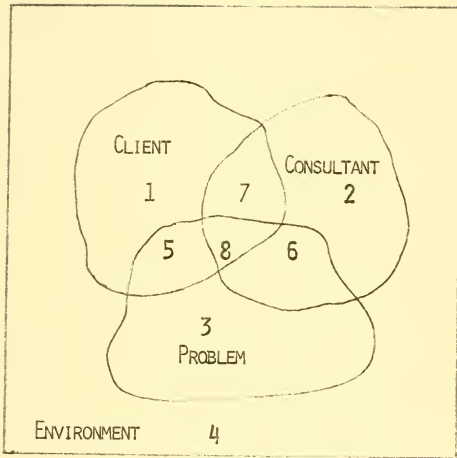
● STRUCTURE RELATIONS

● PROCESS RELATIONS

FIGURE 2: CLASSIFICATION SCHEME FOR RELEVANT VARIABLES

discuss both the structure and the process aspects. With respect to set 1, we may discuss characteristics of the structure of the client organization as well as characteristics of the process by which it interacts within itself (for example, communication flows; decision-making procedures). The same could be done with respect to the consultant. With respect to the intersects of two elements (for example, set 7, the intersect of the client and the consultant) we may also discuss structure and process relations. Structure relations would consist of comparing the two intersecting sets with respect to what they are. Examples of structure relations would be - saying that one set is less, or more, or the same, or larger, closer, older, etc., than the other. Process relations would relate to how the two intersecting elements interact. Table 1 provides some examples for this classification scheme.

Let us take inventory before we proceed. So far we have done the following:

> First - Identified elements of the system, each of which is necessary and insufficient.

> Second - Identified intersections of the sets represented as system elements.

> and Third - Divided each of the resulting sets into structure and process relations.

Table 1: Examples of the Application of the Classification Scheme

Set #	Description	Relationship	Variables
1	Client	Structure	Financial condition of the organization (wealthy)
		Process	Type of decision-making process (participative)
2	Consultant	Structure	Size of organization (small)
		Process	Type of communication set (star)
3	Problem	Structure	Magnitude of funds involved (large)
		Process	(Problem may be with a process, i.e., inventory control)
4	Environment	Structure	The Trade Union's power
		Process	The application of public opinion
5	Client & Problem	Structure	The skills called for by the problem vs those available to the client (no match)
		Process	How the problem (i.e., inventory control) affects the remainder of the client organization
6	Consultant & Problem	Structure	The consultant's prior experience in solving this type of problem (large)
		Process	How the consultant proceeds to solve the problem
7	Client & Consultant	Structure	Familiarity; Similarity; Likeness in size
		Process	Type and frequency of communication between them
8	Client & Consultant & Problem	Structure	Skills the consultant has vs those the client has vs those called for by the problem
		Process	Client-consultant joint decision making on the problem

The framework presented so far represents the general case. Further differentiation is possible to fit the needs of a particular investigation into the consulting relationship. Such differentiation would take the form of further characterization of the basic subdivisions (for example - by the direction of the process relations).

The framework, to the extent that it has been developed so far, may be useful in two important aspects. The first is the aspect of <u>system formulation.</u> The framework may assist the client and the consultant who are setting up a relationship, by directing their thinking to important variables, which they might not have otherwise considered (i.e., set 5, the intersect of the client and the problem which is generally neglected in the literature). The second is the aspect of <u>system analysis.</u> For example: we may carry out a sensitivity analysis or an analysis of variance, and find that variables which originate from a particular classification (i.e., process relations in set 7, the intersect of client and consultant) account for most of the system's behavior. Or, for example, we may find that the system is generally more sensitive to structure relations than it is to process relations. If we consider a situation where we discover that several of the variables examined seem most important and then, by using the framework we find what those have in common, it would greatly enhance our understanding. For example, if we find that variables originating from set 5 seem important, we can focus attention on exploring this particular set. We would also know that that set represents the variables which we have to watch closely during the system's operation.

Let us call all the variables which could be
described by use of that portion of the framework discussed
so far the "initial variables." They include all those
variables which can be most directly manipulated (but not
always very easily) such as the size of the organization,
resources, frequency of communication, and so on. Any
resource, condition, attribute, mechanism, etc., which may
affect the consulting process, would be considered to be an
initial variable. These variables characterize the system's
structure and processes.

The system has a function, a purpose, and the degree
and fashion of the attainment of the system's purposes
could be evaluated. The variables which are associated with
this evaluation will be called the "end-result variables,"
since they are associated with the end result of the functioning
of the system. In other words they could be called measures
of success. These variables can be least directly manipulated.

I suggest that the initial variables do not affect
the end-result variables directly, but rather through a
group of variables which I would call the "intermediate
variables." The intermediate variables are affected by the
initial ones and in turn affect the end-result variables.

The intermediate variables are task-oriented levels
of "knowledge," "motivation," and "activity." They were
chosen as intermediate variables because they serve as
"gate-keepers" for success. In order for a person (or an

organization or any combination thereof) to accomplish a task
successfully, he has to <u>know</u> what to do, he has to <u>want</u> to
do it and he has to actually <u>do</u> it. If any of those is
below a certain critical level, the task will not be
successfully accomplished. More precisely, the intermediate
variables are defined as follows:

<u>Knowledge</u> - the extent to which the concerned party is aware
of what it has to do in order to accomplish
the task.

<u>Motivation</u> - the extent to which the concerned party is
committed and eager to carry out the activities
necessary for the accomplishment of the task.

<u>Activity</u> - the extent to which the concerned party actually
carries out the activities necessary for the
accomplishment of the task.

For example, if the task is for us to implement the
recommendations presented by the consultant, we have to know
that this is the task we are supposed to accomplish. If our
knowledge had been deficient - for example, if we didn't
know that we were supposed to bring about implementation, or
we didn't know what to implement or how to go about it,
chances are we wouldn't have done it. Likewise we had to
possess the desire and commitment to implement. If we had not
felt sufficiently committed (because we did not see any
benefits in it, for example) we may have neglected it.
Finally, we had to actually implement. Anything which would
have hindered our carrying out this activity, from strong

resistance from personnel affected by the change to lack of the required resources, would have prevented the successful accomplishment of the prescribed task.

In light of this discussion I maintain that any initial variable would affect at least one of the three intermediate variables, if it is to have any effect upon success. The effect may be to either increase or decrease the level of any intermediate variable, either facilitate or hinder it. Thus, we can classify initial variables not only according to what they <u>are</u> (for example, characteristics of the client) but also according to what they <u>do</u> (for instance, all variables which increase the client's motivation). In reality each of the levels would be affected by many variables, either reinforcing or contradicting each other, resulting in some level which is in dynamic equilibrium.[9] The addition or removal of any initial variable may upset the equilibrium and result in a new level.

We may talk of the levels of knowledge, motivation and activity of either the client or the consultant. The intermediate variables of each party would affect each other and the intermediate variables of the other party (for example, the extent of the client's knowledge may be affected by the extent of the consultant's knowledge).

So far we have considered the variables involved in the consulting process, and divided them into groups called initial, intermediate and end-result. In order to

complete the framework we have to add the dimension of time.

We may consider the task of carrying out a study as taking place at one indivisible instant, or we may attempt to subdivide the process into periods and phases. By dividing the process into several phases we achieve a picture of greater resolution. It was found that the most elementary division was that which distinguished among three phases. As the need arises, and circumstances permit, any of those phases could be further subdivided. The three basic phases were Conceptualization (which is the formulation of what is to be done), Design (which is the development of that which is called for), and Implementation (which stands for implementing or using that which was developed in Design).

Now we are finally ready to put the framework together, as is done in Figure 3.

The framework is a grid which is enclosed by two dimensions. Along one dimension the variables associated with the consulting process are presented; the other dimension represents the time in which they are to be considered. When we separate those by the parties concerned - the client and consultant, we obtain a three dimensional grid.

Different initial variables are associated with different phases of the task, and a particular initial variable may have different effects on intermediate variables of different phases (i.e., hinder one and facilitate another). By differentiating the groups of variables and the phases of the task accomplishment, we are able to be more precise in our
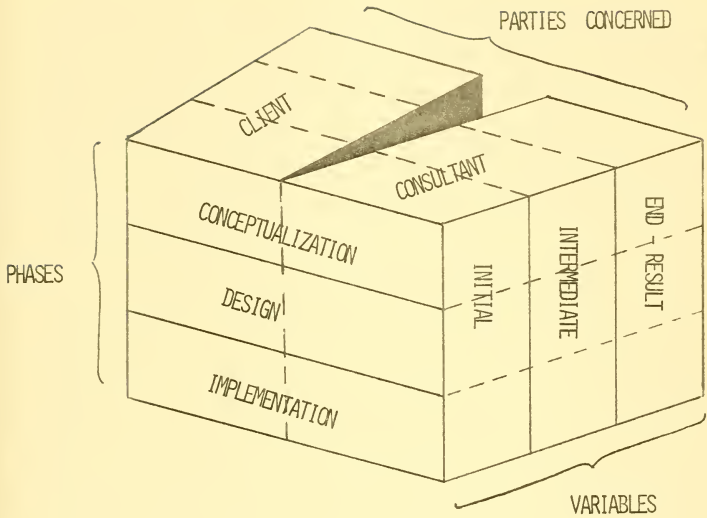
FIGURE 3: THE FRAMEWORK

description and analysis of what affects what, how and why. For example, we may find that the Mayor's involvement would cause an increase in the client's motivation in Conceptualization, and an increase in the consultant's activity in the Design phase (by making more funds available) but have a decreasing affect on the client's motivation in Implementation.

The framework presented enables further differentiation to provide better focus on aspects which are of particular interest to its user. For example, I found it useful to distinguish between the "doer" and the "non-doer". The "doer" is that party which carried most of the load in a particular phase. Several combinations of sequences were thus possible, describing who the doer was in each phase (for instance, the consultant being the doer in the Conceptualization and Design phases and the client the doer in Implementation). In other settings the cooperation between client and consultant may be so tight that it would be impossible to distinguish one as the doer. In other cases it may happen that the consultant alone carried the load from beginning to end, and thus only he would be considered the doer.

III. Uses of the Framework

The framework enables us to describe and analyze the consulting relationship in a variety of ways. For example, we may analyze how the different initial variables

affect each other and how they affect the end-result
variables; we may analyze how the initial variables in each
phase affect the intermediate variables in that phase; and
so on and so forth.

In addition to the analysis of the interactions
among the variables, we may also analyze differences.
One dimension along which we could measure differences is
time. For example, we could describe how the three
intermediate variables vary from phase to phase. Other
differences which may be analyzed are differences between
the client and the consultant (i.e., is success in a certain
phase higher when the consultant is doing it, or when the
client is?) We could examine differences between the doer
and the nondoer in each phase, with respect to their intermediate
variables. Likewise we could distinguish between the client's
and the consultant's perceptions of different variables (i.e., to
what extent do the two agree on problem characteristics, or
on the extent of success).

The list of the types of analysis which are possible
when viewing the process by use of the suggested framework,
could be carried further. However, I hope the discussion so
far suffices to impress the point of what could be done. I
will now briefly illustrate the uses with two examples. In
both examples, we will consider the particular case in which
the consultant is the doer in all three phases.

The first example is presented in Figure 4. It
shows how the process could be characterized by tracing the
changes over time in the intermediate and in the end-result
variables.

The letter K stands for the intermediate variable
"knowledge" of the doer, W stands for the doer's "motivation"
and D for his "activity." KC stands for the nondoer's (the
client in this case) knowledge and WC for the nondoer's
motivation. S stands for the measure of success. The numbers
are part of a one-to-seven scale which was used to measure those
variables, and which extends, for the intermediate variables,
between   "much less than was necessary" (1) to "as much as
was necessary" (7).

On the left we notice the intermediate variables of
the doer (which in our example was the consultant in all
three phases). We notice, for example, that his motivation
is high in the Design phase and is the lowest in Implementation.
This was very much in line with the nature of the particular
consultant organization being considered, which at the time was very
enthusiastic about developing models and systems, but less so
about getting those models actually implemented and used.[10]
Likewise, we note that the consultant, in Conceptualization,
carried out a much greater percentage of the activities
necessary in that phase than he did in Implementation.

When we shift our attention to the client (which is
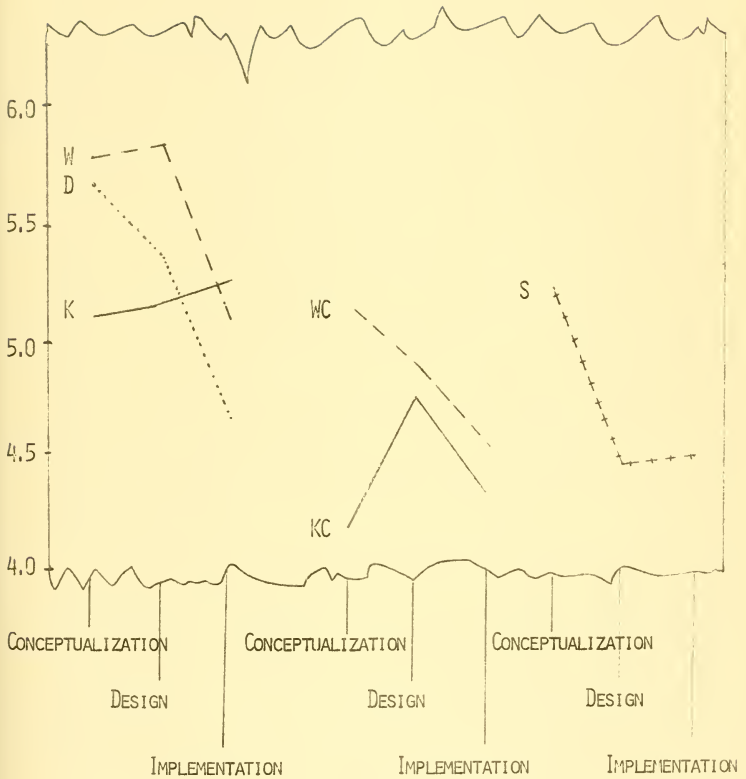the nondoer in all phases in the example we follow), we would

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FIGURE 4: CHANGES WITH TIME

see his intermediate variables traced in the middle of the
chart. (Since he is not the doer, his curve of D is missing).
Some of the interesting points we may note about the client
are that his level of motivation is consistently lower than
the doer's, and it is consistently declining. Likewise,
his level of knowledge is lower than the doer's. It peaks
in Design since in that phase the consultant usually held
a briefing to present the results of his work to the client.

The level of success is shown on the right-hand
side. We note that Conceptualization is the phase which was
most successfully accomplished, of the three phases. As a
note of interest I would add that when I compared the client
and the consultant in the role of the doer in each phase,
it turned out that Conceptualization and Design were more
successful when the consultant was the doer, and
Implementation was more successful when the client was the
doer in that phase.

Having traced what happened, we are naturally curious
as to why it did happen in this way. To answer this question
we may conduct an analysis of causal relationships. A model
of causal relationships for the particular case where the
consultant is the doer in all three phases is the second
example of the uses of the framework and is presented in Figure 5.

The variables presented here are the same ones
presented in the previous chart. The number "one" stands
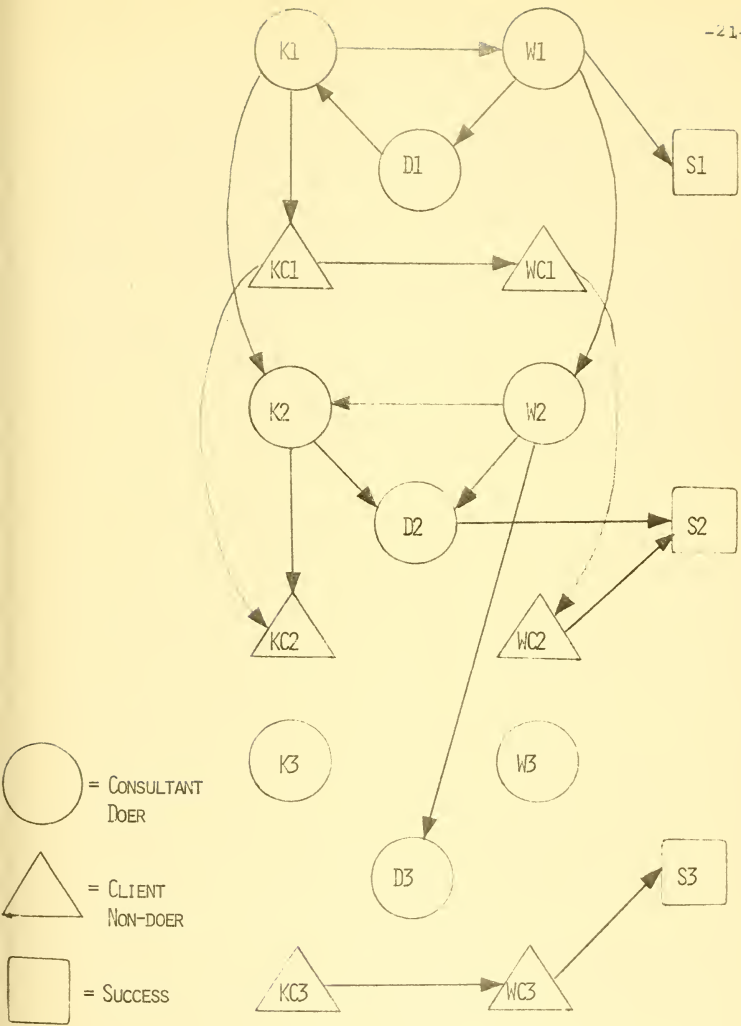for the Conceptualization phase, "two" for Design and "three"

FIGURE 5 : CAUSAL MODEL OF THE CONSULTING PROCESS (CONSULTANT DOER)

for Implementation. The lines show the existence of an
association between the two linked variables and the arrows
show the direction of causality.[11] For example, motivation
leads to activity, in Conceptualization and Design.

Some of the more interesting aspects of this model
are presented below:

- In Conceptualization learning takes place (D1 causes
  K1) while in Design the consultant already knows what
  to do and his knowledge guides the design activity (K2
  causes D2).

- The consultant's motivation and knowledge in Design
  are affected by their respective states in the previous
  phase, but not so in Implementation.

- The client's motivation in Design is affected only by
  his own previous level of motivation, and is unrelated
  to his knowledge in the present phase.

- The consultant's knowledge, motivation and activity
  in Implementation are completely unrelated to each
  other. The little he does in Implementation is a
  "hangover" from his motivation in Design rather than a
  result of motivation to implement.

- Success in Conceptualization depends only on the doer -
  the consultant. In Design it depends on both parties
  and in Implementation only on the client! The
  consultant as doer in Implementation has no effect on

success in that phase. This may explain why success
in Implementation is higher when the client is the
doer rather than the consultant.

We could continue to explore the links, but I hope
that the point of the model's uses has already been made.
Similar models may be developed for the various combinations
of doer and non-doer at each phase. For the sake of
simplicity only the intermediate and the end-result variables
are included in this model. However, the model may be
expanded to show how various initial variables affect the
consulting relationship.

I do not presume that identical models would
result in consulting relationships in other settings, and
even if we were to investigate the same setting later in
time, we might detect deviations from the earlier model.
However, I do suggest that an investigation such as was
described, and the development of models of this type, could help
us identify major strengths and weaknesses, which need to
be corrected, in the relationship being examined.

IV. Implications of the Findings in the Example

What can we learn about the particular consulting
relationship which was illustrated in the example, and what
lessons could we draw from the analysis?

As an illustration, let us consider the implications
with regard to two specific issues - the division of labor

between the client and the consultant, and the communication
between the two parties.

By division of labor I mean the extent to which
both parties participate in the activities in any of the
phases. It may vary from not doing a thing to doing everything
that has to be done. Judging only from the evidence
presented,[12] we would suggest that we may leave the consultant
to be the principle doer in Conceptualization, since success
depends only on him and since we noted that Conceptualization
was the most successful phase.

In the Design phase, success depends on both parties. We
note that success is affected by the doer's activity and by
the client's motivation. The doer's activity was declining
with respect to Conceptualization and so was the client's
motivation. The client's motivation was unaffected by the
consultant. Hence we would suggest greater involvement of
the client in order to affect his motivation which in turn
would affect the success of Design. The success of Design
has to be increased.

In Implementation, success depends only on the
client and therefore we would suggest that he should be the
prime doer in that phase. We note as well that he fulfilled
the role of doer in Implementation more successfully than
the consultant does.

On the issue of communication between the client
and the consultant we note that they communicate in both

Conceptualization and Design, but not in Implementation.
Hence, since success in Implementation depends on the
client, it is essential that when the consultant is the doer
in Implementation he communicate with, and thus affect, the
client. At present the consultant has no effect on the client
in Implementation and thus no effect on success. When we
examine the strength of the associations between the
consultant's and the client's knowledge we find that the
association in Design is twice as strong as in Conceptualization.
This was also reflected in the fact that the client's
knowledge peaked in Design. Hence, the link in Conceptualization
is not as strong as in Design and some formal mechanisms have
to be introduced to facilitate the flow of information. Since
the consultant's level of knowledge was higher than the client's,
at all times, the direction of the necessary flow is primarily
from the consultant to the client.

V. Research and Application Potential

So far I showed how particular lessons may be
deduced from the analysis regarding possible and necessary
improvements. However, in order to assist policy decisions,
we need a model which could be run and tested under various
simulated conditions. Having discovered the basic relationships
which underly the model, we may then want to experiment with
it so as to find out what effect various variables, and
values of variables, would have.

The tool for such a simulation is available. This
is Industrial Dynamics which was developed by Forrester.[13]
The choice of intermediate variables as levels of
knowledge, motivation and activity is particularly useful
when applying the Industrial Dynamics modeling technique.
The first steps in this direction were undertaken, and the
next step would be the actual development and testing of a
model based on the one presented in the last chart.

Even without such a model, practitioners may benefit
from the framework by being able to better identify their
needs. For example, by testing various initial variables
consultants may develop a "profile" of the problems which
they are best able to deal with as consultants. Such a
profile may help them in planning their consulting relationship
and in deciding on whether or not to accept particular
consulting assignments.

VI. Summary

As a concluding remark I would say that in this
paper I tried to outline the need for a framework for the
characterization of the consulting process, proposed a
particular one and showed some of its uses. The strength of
the suggested framework lies in the fact that it is specific
yet broad enough to cover any consulting relationship. It
is flexible and allows any user to carry it to the level of
detail which is most suitable for his purposes.

The essence of the framework is the distinction among initial, intermediate and end-result variables and the differentiation of the process of consulting into the phases of Conceptualization, Design and Implementation. The initial variables are any factors which may affect the consulting process and which can be directly manipulated. They are grouped by the basic element with which they are associated (the three basic elements of the consulting system are defined to be the client, the consultant and the problem to be solved). The intermediate variables can not be directly manipulated and consist of the levels of the task oriented knowledge, motivation and activity of the parties concerned. The end-result variables are the measures of success.

As a demonstration of the usefulness of the framework it was shown how it could be employed to describe the consulting relationship and how it could provide insights regarding determinants of success in consulting. It was suggested that a dynamic computer-based model could and should be developed, utilizing the notions incorporated in the framework.

Footnotes

1
For Rand's account of the Institute's activities see
the 1969 Rand Annual Report, pages 24-27 and the New York City
Rand Institute, First Annual Report (New York: New York City
Rand Institute, 1970.) For the city's account of the
Institute's activities and their benefits to the city see
the text of Hayes' (former Director of the Budget in New
York City) memorandum on consulting contracts, as published
in The New York Times on July 3, 1970.

2
As discussed in Daccord, Jacques F., "Management
Consultants: A study of the Relationship between
Effectiveness and Several Personal Characteristics,"
unpublished Master Thesis (Sloan School of Management,
MIT, June 1967).

3
As discussed in Tilles, S., "Understanding the
Consultant's Role," Harvard Business Review, 1961, pp. 87-99.

4
As discussed in Havelock, R.A., Guskins, M., Frohman,
M., Havelock, M.,Hill, and I. Heber, Planning for Innovation
(Ann Arbor, Michigan: ISR, 1969).

5
As discussed in Rogers, Everett M., Diffusion of
Innovation (New York: Free Press of Glencoe, 1962).

6
Additional determinants of success are listed in works
published by the principal participants. The consultant's
side is presented in a paper by the President of the
Institute during the period discussed in the paper: Szanton,
Peter L., Working with a City Government, Rand's Experience
in New York (The New York City Rand Institute, 1970), RM 6236.
The client's side is presented in a paper by the Director
of the New York City Bureau of the Budget, who oversaw the
consultant's introduction to the client. See Hayes, Fred,
Fred Hayes talks about Program Analysis and PPBS in New York City
(Washington : The Urban Institute), #108-72.

7
The consulting relationship may be considered on
several levels. Unless otherwise indicated, I will deal
with it on the level of the individual study. However,
the discussion is just as applicable to any other level of
aggregation.

8
   Based on Amstutz, Arnold, "City Management - A problem
in Systems Analysis," MIT Sloan School of Management Working
Paper #317-68, 1968.

9
   Based on the concepts of forces and force fields
developed by Kurt Lewin, as discussed in his book Field Theory
in Social Science, edited by Cartwright, Darwin (New York:
Harper, 1951).

10
   It should be remembered that the discussion is based
on a group of studies and that the findings for any one
particular study could have been different. Also, this
should not be taken to reflect on the present latent
preferences of the consultant organization.

11
   The relationships were derived and verified by
analyzing the correlation coefficients with the procedures
for causal inference outlined in Blalock, Hubert M, Jr.,
Causal Inferences in Nonexperimental Research)Chapel Hill,
The University of North Carolina Press, 1964).

12
   The actual analysis covered many more aspects and
yielded somewhat different conclusions.

13
   As discussed in his books - Forrester, Jay, Principles
of Systems (Cambridge: Wright Allen Press, Inc., 1968), and
Urban Dynamics (Cambridge: MIT Press, 1969).

HD .J.