Should Knowledge of Management Be Organized as Theories or as Methods?

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"If you wish to know, learn how to act."
Heinz von Foerster

Abstract

The philosophy of science has traditionally assumed that knowledge should be organized in the form of theories. From theories propositions can be deduced that can be tested in experiments. Most propositions deduced from theories take the form of if-then statements. For example, if variable A increases, what happens to variable B, assuming that all other variables are held constant? However, an alternative way of organizing knowledge, in the form of producer-product relationships, was proposed by the philosopher E.A. Singer, Jr. and advocated by two of his students, C. West Churchman and Russell L. Ackoff. Whether to structure knowledge in the form of theories or methods is related to the question of whether there is a fundamental difference between the natural and the social sciences. As opposed to Karl Popper's doctrine of the unity of method, this paper argues that structuring knowledge in the form of methods is appropriate in applied fields, particularly in management where a large part of the task is to achieve agreement among a group of knowing subjects on an appropriate set of actions.

1 Philosophical Positions in a School of Management

More than most academic papers, this paper requires an explanation of the social context that gave rise to it. I teach the course in the philosophy of science for doctoral students in the School of Business and Public Management at The George Washington University. This course in the philosophy of science is the only course in philosophy that many of these students will have before receiving their "doctor of philosophy" degree. What we tell our students in this course is that before becoming a doctoral student, they read books, acquired knowledge and used it to accomplish various tasks. However, in a doctoral program students are expected to contribute to the knowledge in their fields. So, what is knowledge? How is it organized? How does one make a contribution to knowledge?

As one would expect, different faculty members answer these questions in different ways. In order to help the doctoral students understand the various points of view that they will encounter in their careers in the doctoral program, I have presented a diagram depicting my conception of the major points of view among the faculty in the school of management at GWU. The lower left part of Figure 1 shows that there are basically three groups that struggle for influence within the doctoral program. Faculty members can be placed in one of these three groups depending on how they answer two questions.

The first question is, "Is there a difference between the natural sciences and the social sciences?" Karl Popper said no. He proposed the doctrine of the unity of method and asserted that the same methods that were developed for the natural sciences could also be used for the social sciences. This is the majority point of view among faculty members within the school of management at GWU. Faculty members in the Department of Finance feel particularly strongly that Popper's view of the construction of knowledge should guide dissertation research. A smaller, but vocal, group of faculty members claims that there is or should be a difference between the natural sciences and the social sciences, because social systems consist of knowing subjects. Most of these faculty members teach either organizational behavior or public administration. Although those who say no to the first question are the majority among the faculty in the school of management, those who say yes have been in control of the doctoral program. Consequently, students have been encouraged to be innovative and to experiment with methods of research. As a result we have had a wide variety of types of dissertations.

However, a second question can be asked of those who believe there is a difference between the natural sciences and the social sciences, namely, "Should the philosophy of science be disregarded?" Most of the faculty members who answered yes to the first question also answer yes to this question. They have been influenced by Paul Feyerabend [1988]. They claim that

the classical philosophy of science was developed for understanding physical systems. But since we are attempting to understand social systems, consisting of knowing and competing subjects, the philosophy of science has little to contribute. One might then ask what these faculty members would put in place of the philosophy of science to guide doctoral students in understanding the nature of knowledge, the testing of theories, etc. They have little to say on this subject other than to point to the literature that depicts the wide variety of research done in the social sciences [Morgan, 1983]. Personally, I answer no to the second question. I feel the appropriate response to the limitations of the present philosophy of science is to expand it by adding a new dimension – the amount of attention paid to the observer. I have written about this point of view, which is often called constructivism or second order cybernetics in several papers [Umpleby, 1990, 1992, 1997].

The lower left part of Figure 1 presents the view I held of the philosophical debates within the doctoral program in the school of management until recent months. However, I teach other management courses besides the philosophy of science. I teach the history of management thought, quality improvement methods, systems thinking, and cross-cultural management. In the 25 years I have been teaching management I have learned practicing managers have very little interest in theories. Theories seem remote and abstract relative to their immediate concerns.

There are two ways to interpret managers' lack of interest in theories. One may choose to believe the academics are correct in structuring knowledge in the form of theories, and managers are not intellectually inclined. Or, one might decide managers know best how to structure knowledge to fit their purposes, and philosophers have not yet explained how managers do this. Although managers often have very little interest in theories, I find they are usually quite interested in methods. Their eyes light up when presented with a method they feel they can use right away to improve the performance of their organizations.

Nevertheless, most of the knowledge we teach in management courses is presented in the form of theories. Doctoral students are taught they should learn the theories in their fields and test a theory in order to make a contribution to knowledge. However, the great interest in methods among practicing managers and their lack of interest in theories has led me to ask whether management knowledge should perhaps be organized in the form of methods rather than theories. So I have added an additional question at the top of Figure 1, "Should management knowledge be organized in the form of theories or methods?" Traditionally the answer has been theories. Several reasons for this choice can be given. First, theories are the way the philosophy of science says knowledge should be constructed. Second, academics are expected to develop theories. There are journals for specialized management fields. Faculty members must publish in these journals in order to be promoted. Third, structuring knowledge in the form of theories is the way to win approval and legitimacy among colleagues in the university outside the school of management. The creation and testing of theories is the way the university in general operates, at least those fields that think of themselves as sciences. And management is often viewed as applied social science.

If one chooses to answer "methods," to the question at the top of Figure 1, an additional question could be, "Should methods be constructed to aid decision-making by individuals or to help groups arrive at consensus on a course of action?" In the field of management there is an extensive literature on both choices. Methods to aid decision-making by individuals include decision trees, mathematical analyses, computer simulations, expert

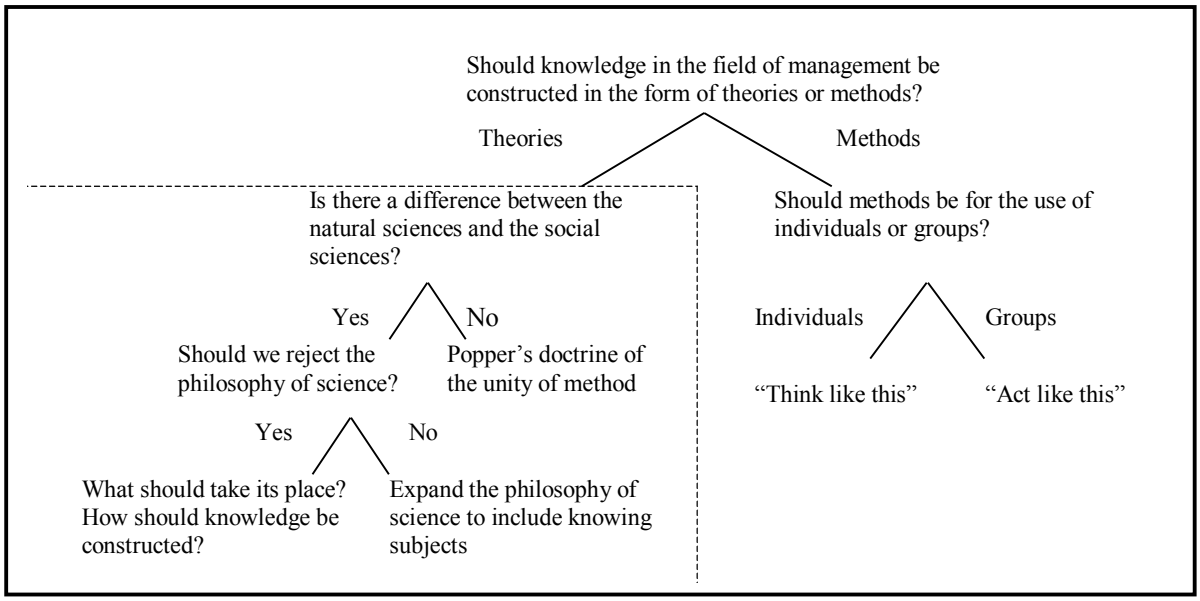

Figure 1. Questions to guide the construction of knowledge of management

systems, etc. Methods to help groups of people arrive at consensus on a course of action include a variety of team building, group process, and planning methods. The fact that a large literature on management methods already exists tends to support the legitimacy of creating management knowledge in the form of methods.

2 Quality Improvement Awards

There is another factor that has contributed to my interest in methods as an alternative to theories. In the past twenty years quality improvement methods have become widely accepted in the United States, Europe and other countries, following their successful application and further development in Japan [Walton, 1989]. Several quality awards have been established – the Deming Prize in Japan, the Baldrige Award in the US, and the European Quality Award in Europe. The criteria in these awards have been adopted as a model of management by many corporate executives, government officials and other managers. The successful implementation of these criteria requires the use of methods. Basically the criteria say, "In order to manage an organization well, do these things." The results have been impressive. A portfolio of award winning companies consistently outperforms major stock indices. The widespread acceptance of a set of methods as the best available model of management by public and private sector managers in several countries is strong evidence for the merit of structuring knowledge of management in the form of methods.

The criteria in the quality awards are reviewed each year and questions are added or removed by the judges to reflect current thinking on best practices. For example, a recent addition to the Baldrige Award is a question on whether the firm has an inventory of its information technology – hardware and software. Most likely this question is a result of the year 2000 computer problem. In contrast to university courses, which separate management knowledge into a variety of disciplines with an ever-expanding literature, these awards present an integrated, finite description of how management should be done. Executives in public and private organizations seem to favor an integration of knowledge in the form of methods whereas professors of management generally develop knowledge in the form of diverse, usually unconnected, theories.

Within universities the idea that management knowledge should be constructed in the form of methods, resulting from consulting practice, rather than theories, published in peer-reviewed journals, has had to struggle against the larger, more well-known literature in the philosophy of science on theories. Whereas theories can be tested by experiments using widely accepted statistical standards, methods are accepted, rejected, or modified based on experience documented in stories, anecdotes, and case studies. The financial performance of companies is another way of evaluating various methods of management.

3 A Philosophy of Methods

If one decides that methods are the appropriate way to structure knowledge of management, what philosophy should guide the development of knowledge in the form of methods? For example, how are methods tested? Suppose someone invents a method of strategic planning, such as Ackoff's interactive planning [Ackoff, 1981]. One person tries the method and has good results. This supports the feeling of confidence in the utility of the method. But a second person tries the method and has poor results. Why? How can the cause of the poor results be identified? Was the method flawed? Was the person's understanding of the method incomplete? Were the general management skills of the person underdeveloped? Was the method not suitable for the particular organizational culture?

Is there a philosophical literature to guide us in the selection of methods and the testing of methods, similar to the large literature on the testing of scientific theories? As it happens, there is a literature that proposes an alternative to the philosophy of science. Edgar Arthur Singer, Jr. was a philosopher at the University of Pennsylvania. He had two very capable students – C. West Churchman and Russell L. Ackoff. Singer noted that the philosophy of science suggests that knowledge be constructed in the form of if-then propositions – if the experimenter does A, then the experimenter should observe B, assuming all other variables are held constant. As an alternative to cause and effect, Singer suggested producer-product relationships [Singer, 1941, 1946]. The example usually cited is an acorn and an oak tree. In order to produce an oak tree, an acorn is needed. But much more is needed – soil, water, sunlight, and a favorable climate for several years. The acorn is necessary to produce an oak tree, but it is not sufficient. Churchman and Ackoff tried to interest their philosophical colleagues in Singer's theories [Churchman and Ackoff, 1950; Churchman, 1971]. They had little success [Churchman, 1979]. However, they found that business people were quite interested in their ideas. Both Churchman and Ackoff moved from departments of philosophy to departments of management. Ackoff in particular developed a series of methods to guide his consulting activities. William Roth, a student of Churchman and Ackoff has further developed the ideas of Singer, Churchman and Ackoff [Roth, 2000].

Most philosophers of science have emphasized cause and effect relationships and if-then propositions. They use analysis and reductionism to understand complex systems. Knowledge is presented in the form of theories. Singer, Churchman and Ackoff on the other hand emphasize producer-product relationships and necessary conditions. They refer to synthesis as much as to analysis and to expansionism in addition to reductionism. Expansionism means looking up to larger categories to establish meaning rather than down to more narrow categories. In their practical writings Churchman and Ackoff presented knowledge in the form of methods rather than theories.

Colleagues of Churchman and Ackoff who shared this view were Fred Emery and Eric Trist. Other management writers such as Beer [1986] and Checkland [1981] have also developed methods. Presently a few management schools are basing their curricula upon the idea that management knowledge should take the form of methods more than theories [Baburoglu, *et al*., 2000].

4 Science One and Science Two

Let us assume for the moment that these two ways of structuring knowledge, either as theories or as methods, can be regarded as two forms of science, where science is interpreted broadly as structured and tested knowledge. Before we look at the two conceptions of science, let me first distinguish two kinds of propositions that exist within both versions of science – theoretical propositions and methodological propositions.

Assume for a moment that within the classical conception of science there are two kinds of propositions. An observer states theoretical propositions to describe the system observed. These propositions set forth cause and effect relationships. The propositions may be mathematical or merely verbal. The theoretical propositions are what we mean when we refer to a theory of some referent system. The second set of propositions describes how the scientist should interact with the system observed in order to arrive at the theoretical propositions. These methodological statements explain how to collect data or, more generally, how to test theoretical statements. The methodological statements set forth procedures. These statements are not a scientific theory. The methodological statements are what we mean when we refer to "scientific method."

Normally we would say that the theoretical statements describe what we think we know whereas the methodological statements describe how we should act in order to test our knowledge. Both sets of statements exist in the mind of an observer or actor but are also made explicit in the form of theories and methods.

The physical sciences tend to emphasize theoretical statements. In the physical sciences most of the effort is focused on developing, ideally, mathematical models of the behavior of observed systems. Methodological statements -- how data is collected -- are less problematic and usually receive less attention. However, in the social sciences the emphasis is often reversed. How an observer obtains data receives a great deal of attention. There is much discussion of experimental groups and control groups and how the experimenter can eliminate or at least reduce the changes in the observed system caused by the experiment itself. Hence in the social sciences methodological statements often receive as much attention as theoretical statements. This different emphasis in the social sciences is related to the fact that quantitative theories, such as one finds in the physical sciences, are difficult to create in the social sciences, at least outside the field of economics.

Despite their differences over whether to emphasize theory or methods, both of these cases (the natural sciences and the social sciences) can be regarded as examples of Science One. In each case the result of inquiry is theoretical statements. Methods are just a means to the end. In Science One the observer and the system observed are separate. The observer is outside the system observed, and the purpose of the methodological statements and procedures is to reduce, and if possible to eliminate, any effect of the observer or the experiment on the system observed. The goal is to acquire knowledge. This knowledge may later be used to change some system, but the role of the scientific observer is merely to observe unobtrusively.

Aspects	Science One	Science Two
Philosophy	Cause and effect	Producer-product
Form of knowledge	Theories	Methods
Observer	Outside the system observed	Part of the system observed
Causality	If-then	Necessary conditions
Perspective	Reductionism	Expansionism
Orientation	Analysis	Synthesis
Approach	Observation	Participation
Activity	Description	Prescription
Goal	Reliability of knowledge	Agreement or acceptance
Application	Forecast	Create or design
Criterion	Reproducibility	Usefulness

Table 1: Two Conceptions of Science

But suppose we push the relative emphasis between theoretical statements and methodological statements even farther and imagine that the purpose is to develop methods whereas the theoretical statements (the description of the system observed) will be different for each organization studied. Call this case Science Two (see Table 1). In Science Two the observer is not separate from the observed system but rather is a part of the observed system. Furthermore, the objective is not so much to accumulate knowledge in the form of theories but rather to change a social system. The scientist ceases to be merely an observer and becomes also an actor and participant. The growth of knowledge is measured not only by mathematical models of cause and effect relationships in observed systems but also by improved methods for interacting with the people and organizations the observer or actor is trying to influence. The purpose of observation expands to include intervention, and the aim is not only to develop theories but also to be an agent of social change. More emphasis is therefore placed on the observer's conception of himself/ herself and on what actions are considered appropriate and

Science One	Science Two	Law
Scientists are highly educated. They have special training.	Managers sometimes have education in management. They need leadership skills.	Lawyers and legislators generally have a legal education.
Knowledge is codified in the form of theories.	Knowledge is embodied in the form of methods.	Experience is codified in laws and court judgments.
Knowledge is developed using scientific methods.	Knowledge is developed through experience, consulting practice.	Laws and precedents result from elections, legislation, and court appeals.
The purpose is to describe how the world works.	The purpose is to help people work together to achieve common goals.	The purpose is to achieve political stability and to protect human rights.
Knowledge is preserved in scientific literature and taught in science courses.	Methods are learned and passed on by using them.	People are expected to obey laws. Laws are enforced by the police and courts.
Theories are steps in an endless search for truth.	Methods aid coordination, production of goods, and conflict resolution.	A body of laws, precedents, and judicial interpretations assure political and social stability.
Theories change through testing, experimentation, and invention.	Methods change through imitation, experimentation, and innovation.	Laws are changed through the political process.
Theories are accepted as the best available explanation of observations.	Methods are accepted as a means to improve group performance.	Laws are obeyed partly out of desire for a stable society and partly out of fear of punishment.

Table 2: Three Types of Knowledge

useful. Methods, rather than theories, are what are transferred from one situation to another.

One way to understand Science One and Science Two is to contrast them with the legal system (see Table 2). Whereas Science One was originally developed to help us understand the natural world, Law was developed over many centuries to help people create stable societies that protect individual liberties. Science Two has been developed, mostly in recent decades, in an effort to make large organizations more effective in accomplishing their purposes. Science Two contains some features of Science One (e.g., knowledge is developed through experimentation) and some features of Law (e.g., the purpose is to regulate large social systems).

An epistemological justification for the change from Science One to Science Two is provided in the literature on second order cybernetics. This literature creates an epistemology based upon neurophysiology. The claim is that every observation is made by an observer, that observations independent of the characteristics of the observer are not physically possible, and that a "reality" is constructed by each individual based on his or her experiences [von Foerster, 1981; von Glasersfeld, 1987]. Since each individual's experience is limited, other people are necessary to test our views of "reality." "Objectivity" is replaced by "shared subjectivity." By working together people are able to create new kinds of organizations and societies.

5 Conclusion

I am proposing that knowledge in the field of management should be organized in the form of methods rather than theories. I call this form of knowledge Science Two, because I view it as a way of structuring knowledge that is an extension of earlier conceptions of science. Science Two encompasses Science One in that knowledge of "how the world works" is incorporated in Science Two. However, Science One presents knowledge in the form of hypotheticals: If variable A increases, then variable B will increase, assuming all other variables remain unchanged. Science Two presents knowledge in the form of injunctions: If you want these results, act in this way. Furthermore, calling this way of knowing Science Two, rather than action theory or a philosophy of action or a philosophy of methods, emphasizes that this is a way of knowing that is an alternative to the classical philosophy of science. Science Two is a way of developing knowledge for fields that include knowing subjects, just as Science One is a way of developing knowledge for fields that usually do not include knowing subjects. I believe that we shall more readily create more human lives and more human worlds if we emphasize the role of the subject, the observer, or the actor in the creation of knowledge rather than assuming, as some conceptions of science assume, that the presence or absence of knowing subjects makes no difference in how knowledge is developed and organized.

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