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Contingency Theory: Science Or Technology?

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Abstract

An answer to the research question, 'Is Contingency Theory Science or Technology?' is proposed in this paper. Contingency theories and a contingency perspective are popular among researchers in organization theory and design. They are based on the idea that a proper fit between contingency variables and organizational design parameters will result in the highest performance. Does the identification of a 'contingency theory' consisting of a set contingency variable/design parameter matches constitute scientific theory or prescriptive technology? Justifications are made for these theories as science, technology and both. The conclusion presented is that a contingency theory is both science and technology, but often ineffective as technology because it is not applied. General recommendations are made for researchers to increase emphasis on (1) multiple rather than single contingencies and (2) explanations of relationships.

1.0 Introduction

Contingency theory is considered a dominant, theoretical, rational, open system model at the structural level of analysis in organization theory (Scott, 1992). The basic assertion of contingency theory is that the environment in which an organization operates determines the best way for it to organize. The research question, 'Is Contingency Theory Science or Technology?' asks whether these matchings of organizational and environmental characteristics are scientific theories or a technology for managers to aid them in making decisions.

Contingency theory is addressed first. The general concept is presented along with a brief history and explanation of each of the major types of contingency theories. The research question, 'Is Contingency Theory Science or Technology?' is addressed in the next section. Justifications are given for each point of view, science, technology and both. This is followed by an answer to the research question. The paper concludes with recommendations for researchers.

2.0 Contingency Theory

Basic concepts. The position of the organizational theorist is that "the best way to organize depends on the nature of the environment to which the organization relates." (Scott, 1992: 89) Contingency theory has two basic underlying assumptions: First - There is no one best way to organize. Second - Any way of organizing is not equally effective. (Galbraith, 1973).

Organization theorists can identify many different characteristics and the organization, and they define organizational performance in various ways. These researchers try to identify a match between the characteristics of the environment and those of the organization that lead to high performance. This match is called 'fit', the better the fit the higher the performance. Such a match is called a 'contingency theory'. In using the term 'contingency theory' we

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do not mean to immediately define such matches as science. Indeed many researchers have avoided this issue by using other terms such as 'contingency perspective', 'contingency view' and 'contingency approach'.

History. One of the first contributions of research using a contingency approach was establishing the distinction between 'mechanistic' and 'organic' forms of organization and management. (Burns & Stalker, 1961) The mechanistic form was associated with a stable environment and routine technology. The organic form was associated with an unstable or turbulent environment and changing technology. A continuum was suggested with organic and mechanistic as the extremes with any individual organization falling somewhere in between. A subsequent study showed that different types of technology or technical systems make different demands on an organization. These demands are met through the appropriate structure. (Woodward, 1965) These early theorists indicated any of several different forms could be used by an organization under its given conditions. Although certain organizational forms were shown to be advantageous, there is no guarantee that an organization can find the optimal form and it is ultimately a matter of strategic choice. Other researchers found that the size of an organization could explain many characteristics of its structure. (Pugh, Hickson, Hinings & Turner, 1968) The contingency approach was further refined when it was shown that subunits of the organization might have different sub-environments indicating the need for differing forms of organization. (Lawrence & Lorsch, 1967) The term 'Contingency Theory' was coined and with the addition of the concepts of differentiation and integration of sub-units the contingency approach gained interest and acceptance.

Environment, technology, age and size emerged as the primary contingency factors. Researchers often defined additional contingency variables or divided the primary factors. Mintzberg (1979) identified 11 contingency variables, 4 dealing with the environment, stability, complexity, diversity and hostility. Mintzberg also identified design of positions, design of superstructure, design of lateral linkages and design of decision-making system as structural design parameters. Researchers again often defined additional structural parameters such as Khadwalla (1971) who identified 8 structural parameters. Researchers separated 'Strategic contingency theory' from 'structural contingency theory'. Strategic contingency theorists emphasize the importance of choice and add an intermediate, strategic process. They emphasize the roles of power, politics and individual goals and objectives. Power is both an outcome and determinant providing "participants further advantages in the political struggle because of their structural position" (Pfeffer, 1981: 226). Recent work is addressing multiple contingencies, seeking higher degree of explanation of relationships and attempting integration with other theories (Pennings, 1992). A contingency approach can and has been used to study many areas within organization management, as well as other sciences. The usefulness of this approach is reflected in organization theory textbooks, which often adopt a 'rational-contingency perspective' (e.g. Daft, 1992).

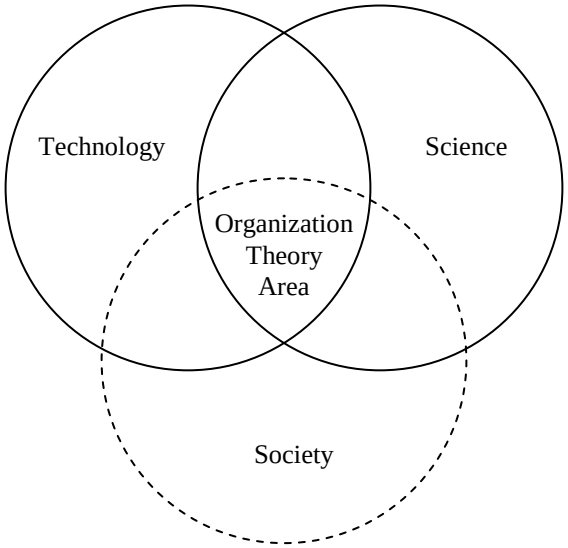
Problems. Over the years, correlations between many environmental conditions and organizational design characteristics have been found. One criticism of the contingency approach as practiced by many is that causation is assumed but not explained. The assumption is that because a set of environmental conditions and organizational design characteristics were found to be correlated that this is the best fit. Organizations with inferior fits have been selected out by a process of survival of the fittest. Some organizations can exist for extended periods with a poor fit because the industry is profitable enough to support a company operating suboptimally. Others survive because the government or the larger organization of which they are a part subsidizes them. The assumption also does not take into account ‘fashion’; risk-averting managers do what others do if it seems to work even when other potentially better solutions exist. Correlation between environmental conditions and organizational design characteristics without considering effectiveness indicates selection not fit. (Drazin & Van de Ven, 1985)

Other problems with contingency theory are the assumptions that relationships between variables are linear and effects are symmetrical. (Schoonhoven, 1981) Some relationships between technology, structure, environment and effectiveness may be linear and others curvilinear. These problems are increased when multiple contingencies and measures of effectiveness are considered. Interaction effects and tradeoffs may occur that are not captured by examining single context elements. (Gresov, 1989)

3.0 Is Contingency Theory Science or Technology?

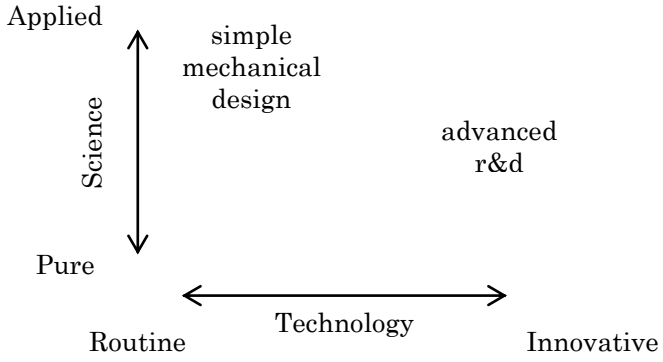
Contingency theory as both science and technology. Science, technology and society can be considered as three intersecting circles (Holton, 1986). Organization theory and design tend to fall somewhere in the intersection of the three (figure 1). Contingency theory is a part of organizational theory and falls within this intersection.

Figure 1 - Technology, Science and Society



Science is concerned with increasing knowledge, technology is concerned with design (Grove, 1989). The scientist seeks to find new knowledge; the engineer tries to put knowledge to work. (Furnas & McCarthy, 1971) These are not mutually exclusive ideas. Contingency theory has elements of both science and technology and is used by scientist, engineer and manager. Contingency theories involve a process of scientific inquiry and a body of knowledge, and the findings of contingency theory research can be used by organizations as an aid to design. A survey of the various contingency theories would find them with characteristics of both science and technology.

Figure 2 - Technology and Science



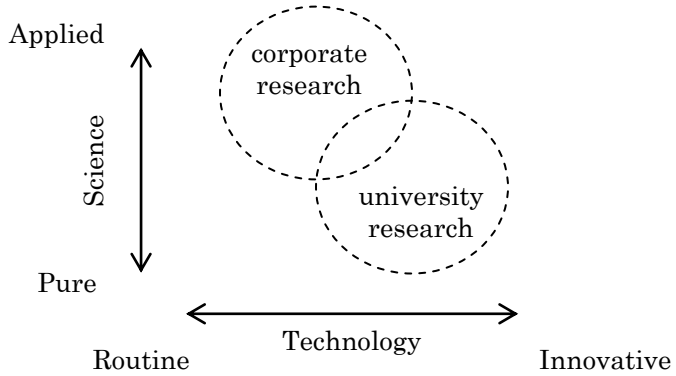
One way to visualize the relationship between science and technology is to establish a 'space' with axes of science and technology (figure 2). Science would range from 'pure' science to 'applied' science. Technology would range from 'routine' to 'innovative'. Development and design projects can be placed within this space. For example, simple mechanical design work would fall into the applied science and routine technology area, whereas advanced research and development would be innovative technology with a combination of pure and applied science. Our focus becomes, 'where does contingency theory fall within this space?'

Contingency Theory as Science. Contingency theory clearly is science. Science can be considered as either a process of inquiry or an organized body of knowledge. Contingency theory involves both. The problems addressed by the science of organizational theory are variants of "How can we improve the productivity of organizations?" For contingency theory, the version of the question is "What combination of factors are associated with superior performance?" Development of contingency theory involves a line of inquiry to find the effectiveness of various combinations of characteristics and factors. The research involves choosing, defining and measuring the characteristics, factors and effectiveness criteria. It also involves analyzing the data and drawing conclusions. This is a process of scientific inquiry.

The product of the inquiry process is a body of knowledge. Individual contingency theories are the product of a process of scientific inquiry. Contingency theory in general can be considered a body of knowledge.

Contingency theory is the work of research scientists. Peer reviewed scientific journals publish their findings. Is it applied or pure research? Contingency theory falls between the two. Although the research may not be in direct response to problems identified by corporate executives, it deals with performance and productivity, areas of primary interest. Being developed primarily by academics and not by research and development teams does not immediately make it pure research. In our science/technology space corporate research and university research can be seen to overlap, with corporate research being more applied science, but less innovative technology (figure 3). As more and more university research is being sponsored by industry the distance between the centers of the distributions is narrowing.

Figure 3 - Corporate and University Research

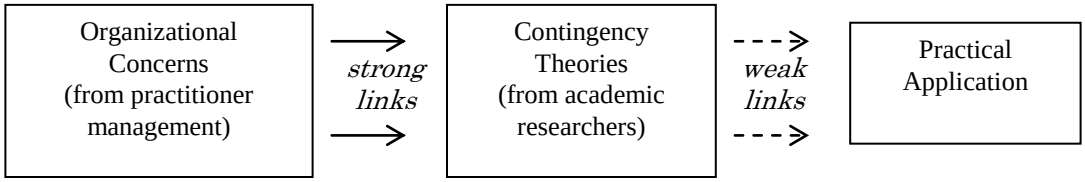


Contingency as Technology. Technology was referred to as the "set of solutions developed by a human group to satisfy its needs, as it defines them" (Rabey, 1989: 168). Contingency theory is knowledge, when applied it makes the organization have a more efficient transformation process. Organizations are a human group and the application of contingency theory helps to satisfy its needs. In this respect it fits the definition of technology.

"Red sky at night, sailors delight. Red sky at morning, sailors take warning." This old rule was passed on from generation to generation. It told sailors what weather to prepare for. Sailors made preparations consistent with

an accepted proper fit between readiness and weather conditions. The best preparation was contingent on the sky conditions. This example shows how some technologies developed by early craftsmen were much like the modern contingency approach. A contingency theory prescribes to managers the fit between variables that will result in optimal effectiveness. The theory is developed by observation and evaluation of various combinations. The craftsmen developed rules as to what combination of materials, designs and methods would best accomplish a task. These rules were developed by observing how well different combinations work. The difference is that the individual craftsman was taught rules by his mentor, developed his own rules and passed them down. Those that formulated the rules applied the rules. Contingency theories are proposed by managers or by researchers. They are then developed by organizational researchers and used by managers. This difference can be attributed to the change in division of labor and to the scale of the projects. When the craftsman was the dominant form of production there was little or no division of labor and the craftsman was the manager. Modern organizations have highly specialized jobs and managers. The division of the jobs done by different people in a modern organization is much like the division of tasks done by one individual craftsman. The skills required to develop contingency theories are different from those required to manage an organization, therefore it makes sense to separate this task from managers and give it to research scientists with the appropriate skills. The scale of the problem of organizational design is very large. Because development of contingency theories requires observing more than one organization, it seems natural that this function is not only separated from management, but from the organization. The university allows for researchers to observe many organizations in a setting independent of any one organization. Universities often develop technologies that find their application outside the universities.

Figure 4 - From Problem to Solution



The failing of contingency theory as technology lies in its application (figure 4). Contingency theories are often clear and concise and can easily be converted to rules and guidelines. In practice there is often no attempt to apply them. There are many possible reasons for this failure in application. The theory may be of such a large scope that only the very highest level of the organization can consider applying it. Such theories may involve characteristics that cannot be changed within the planning horizon of the organization or involve a commitment of resources and a risk that the organization is unwilling to take. It may be that multiple contingencies exist and the different contingency theories prescribe contradictory actions. It may be that the theories never get back to management in a form that they accept and can apply. To accept contingency theory as technology there would have to be a stronger link between the problems of concern in organizations, the contingency theories, and their practical application.

For a technology to be effective it must be used. The fine china on display in a china closet may be beautiful but as long as it is never used it is ineffective as a plate. As a technology contingency theory is a tool for prescribing actions. For it to be considered effective technology, the prescribed actions must be taken.

4.0 Conclusions

Is contingency theory science or technology? Both. Contingency theory is applied social science and deed all applied science is both science and technology. Contingency theory strongly meets the criteria to be considered science, but weakly meets the criteria to be considered technology. This is because the theories do not find their way into practical application. The typical initial idea as conceived by the scientist or manager can initially be considered both science and technology. The scientific development of the theory usually gives it much more validity as science

but only a small amount of additional value as technology. The technological or practical potential of most theories is not reached.

Contingency theory appears to be a potentially powerful tool for improving performance in organizations. The relationships are often much simpler, easier to understand and more elegant than those of many other types of theories. They often address issues and factors of a larger scope, scale and impact than other theories. This simplicity and grand scope give contingency theory its great apparent potential, the potential of developing simple decision rules that have a large-scale impact on an organization's performance. However this potential goes largely unrealized.

There are several possible reasons why the theories do not reach their potential as technology, such as the lack of explanatory power in the theories, the effects of multiple contingencies, risk avoidance and difficulty of application. "Contingency theory is not a theory at all, in the conventional sense of theory as a well-developed set of interrelating propositions". (Schoonhoven, 1981) The concept of appropriateness of fit is vague. Without the explanatory power as to how the relationships work, it may be difficult to determine how to apply the theories to new situations. The existence of multiple contingency factors may further complicate the analysis, especially if several theories indicate different fits. Even theories that take multiple factors into account often cannot predict what response will lead to high performance if a new situation has a previously unobserved combination of contingency factors. It becomes difficult to predict interactions between the factors or determine which relationships should take precedence if the relationships are not understood.

Managers might choose not to apply contingency theories because of a perceived is risk. Managers might choose to copy other organizations rather than apply rules derived from contingency theories. They might be unwilling to take the risk that the rules might be inadequate, especially in changing conditions. Applying theories instead of copying what others do might seem like trial and error, and as such is considered too risky, time consuming and costly. Indeed, many contingency theories might reflect nothing more than the fashion of the industry. The leading companies might be copying each other and ironically the superior performance is unrelated to what they are copying.

Some contingency theories might be overwhelmingly difficult or impossible to apply. Superior firm performance sometimes is revealed to be associated with certain combinations of organization age, size, structure, environment and industry characteristics. These findings might have some value in making predictions or provide some insight into the relationships between variables. Realistically their value to the corporate decision-maker is suspect because it might be infeasible to make the changes necessary to achieve a better fit. It usually is very difficult to grossly change an organizations size or structure, even more difficult to significantly change the environment and industry, and completely impossible to change the age of an organization.

Recommendations

Contingency theory has unrealized application potential. The key to unlocking this potential lies not in better ways to apply the existing theories but in developing theories that are easier to apply. Better theories can be developed if researchers address the issues presented. There should be attempts made to integrate contingency theories with other types of theories to find explanations of why a fit is best and establish the causal relationships involved. The explanations would help in determining the application potential of a theory in a specific situation and help sell the theory to managers. Research emphasizing multiple contingencies would lead to theories that better represent the real world where factors are not held constant. Understanding the dynamics of multiple contingencies would also help in analyzing new situations with previously unencountered combinations of contingency factors. Analytical techniques such as spline regression and neural network analysis can be used to find complex relationships between multiple contingencies

Although experimentation to test the theories is largely infeasible, close contact with decision-makers in organizations could yield useful information. The value of a theory is often measured in terms of its predictive

power. In contingency theory this has meant how well a theory predicts what will be found when the past or present is examined. Coordination with organizations will allow some limited testing of predictions of what will happen, with an emphasis on the future not the past. Coordination with organizations can also help steer researchers towards the areas where managers are most likely to use the theories.

If researchers consider the potential applications when developing contingency theories, they may develop theories that can be more effectively applied. When applied, the resulting performance increases will lead to greater managerial acceptance of such theories. This in turn will lead to greater corporate cooperation with universities, an increase in research opportunities and the establishment of a cycle of research and application that mutually benefits both universities and industry.

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Notes