How to Use Models of Organizational Decision Making?

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Abstract: When explaining organizational decision making, there is often an implicit assumption that an organization makes decisions based on rational principles. However, there are situations in which rationality cannot explain all phenomena. Moreover, even a single organizational decision can be subject to heterogeneous interpretations depending on the model used in an analysis. This paper examines the significance of the models of organizational decision making as an analytical framework by referencing classic studies by Allison (1971) and Lynn (1982). Allison (1971) and Lynn (1982) use multiple models to explain organizational decision making in an effective manner. However, the method in which they use these models differs. Allison (1971) analyzes the Cuban Missile Crisis using three models, and provides three different interpretations concerning decisions made by the U.S. and Soviet Union. In other words, Allison uses more than one model to analyze a single phenomenon to explain the event from different perspectives. On the other hand, Lynn (1982), who explains the decision-making process of Japanese and U.S. steelmakers by analyzing their adoption of new technology, chooses a single model for each company. In providing an analysis, Lynn compares several models and selects the one that is likely to have the most

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explanatory power. To provide an analysis of organizational decision making in an effective manner, it is necessary to remember the importance of models as an analytical framework and then decide whether to adopt Allison’s method (the use of multiple models that provide explanations from several perspectives) or Lynn’s method (an explanation using the most optimal model). It is important to decide which method to use based on the purpose of the analysis.

Keywords: organizational decision making, modern organization theory model, garbage can model

Introduction

When analyzing organizational decision making, there is often an assumption that an organization makes decisions based on rational principles. However, there are situations in which rationality cannot explain all phenomena. Moreover, even a single organizational decision can be subject to heterogeneous interpretations depending on the model used for analysis. This paper introduces two classic studies to examine the significance of models of organizational decision making as an analytical framework, and discusses how these models are used.

This paper discusses separate studies such as Allison (1971) and Lynn (1982) that provide detailed analyses of their respective subjects. Allison analyzes the Cuban Missile Crisis of 1962, while Lynn examines the introduction of new technology by Japanese and U.S. companies in the steel industry. Allison and Lynn both use multiple models to explain organizational decision making in an effective manner. However, the way in which they use these models differs.

1. Allison (1971) analyzes the Cuban Missile Crisis, a single
phenomenon, using three models: rational actor model, organizational process model, and governmental politics model.

2. Lynn (1982), with regard to the introduction of new steelmaking technology, compares the modern organization theory model with the so-called garbage can model as they are applied to each company. Lynn then selects the most optimal model to explain the decision-making process of each company.

The following is an overview of the two studies with particular attention paid to the differences in the manner in which they use the analysis models.

**Allison’s (1971) Model**

The U.S. and Soviet Union, nuclear powers with the abilities to annihilate each other, were closely competing over Cuba for 13 days in October 1962. Those who study international political issues seek to explain the decision-making process of the U.S. and Soviet Union during the crisis. In particular, they want to determine how the two countries moved to the brink of nuclear war, and how they managed to retreat from the situation.

Allison (1971) suggests the following three models to explain the event.¹

1. Rational actor model
2. Organizational process model
3. Governmental politics model

(1) **Model 1: Rational actor model**

The first model, which Allison (1971) calls the rational actor

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¹ Allison (1971) calls these models as a “conceptual lens” or “framework.”
model,\textsuperscript{2} assumes that the decisions made by the U.S. and Soviet Union were based on rational principles. (In other words, the U.S. and Soviet Union were rational decision makers.)

This section discusses the missile deployment in Cuba by the Soviet Union, which triggered the Cuban Missile Crisis, and explains why the Soviet Union decided to deploy missiles on the island using this model. Allison (1971) suggests five hypotheses to answer this question.

1. Bargaining Barter: The Soviet Union built a missile base in Cuba to use it as a bargaining chip to win concessions from the U.S. to withdraw its missile base in Turkey.
2. Diverting Trap: The Soviet Union deployed missiles as a diversion tactic to confuse the U.S. government.
3. Cuban Defense: The Soviet Union deployed missiles to defend Cuba against an attack by the U.S.
4. Cold War Politics: The Soviet Union deployed missiles to weaken other countries’ trust in the U.S.
5. Missile Power: The Soviet Union attempted to double its missile capacity to achieve parity with the U.S.

According to Allison (1971), these five hypotheses, which assume that the Soviet Union acted based on rational decision making, explains some facts on which these theories were built. However, upon closer inspection, there are certain aspects of the event that these hypotheses cannot entirely explain. For example, if the missile deployment was intended as a bargaining chip, the costs and potential risks of the action were too high. Cuban Defense (Hypothesis 3) fails to explain the fact that the type of missiles deployed was inappropriate for this purpose. According to Allison, Missile Power (Hypothesis 5) has the most explanatory power. This

\textsuperscript{2} Allison (1971) also calls this model the “classic model.”
hypothesis seems to be more convincing, and provides answers to the questions above. However, it may not be able to solve the following inconsistency:

The Soviet Union camouflaged the missiles while they were shipped to Cuba. However, no measures were taken to hide the missiles at the construction site on the island even though it was obvious that the U.S. reconnaissance planes would take pictures. The missiles, for instance, could have been hidden underground to avoid detection. The missile base was built in the same manner as that constructed in the Soviet Union. No attempts were made to hide the fact that it was a missile base.

The rational actor model does not explain why the Soviet Union has taken such an inconsistent action.

(2) Model 2: Organizational process model

Allison (1971) then introduces a model that focuses on the organizational process, particularly, organizational routine. This organizational process model can explain the apparent inconsistency in the Soviet Union’s action mentioned above.

The final decision to build a missile base in Cuba was made by the Presidium of the Supreme Soviet. However, it is possible that detailed tactics were left to individual organizations to determine. The standard Soviet operation where nuclear weapons were involved required the retention of highly classified secrets. This operation was indeed a highly classified action. As a result, each organization ended up doing only what it could do. In other words, these organizations took action based on their organizational routine. Thus, the action, when viewed in totality, appeared to be inconsistent.

At that time, the Soviet military intelligence called Glavnoye Razvedyvatelnoye Upravlenie (GRU) was responsible for missile transport. The missiles were secretly loaded, unloaded, and transported to the construction site because maintaining secrecy was
the GRU’s organizational norm. However, it was the Air Defense Command that built the base after the weapons and equipments were delivered to the construction site. For the Air Defense Command, the construction of the missile base was simply a technical issue, part of an organizational routine just as any other base construction projects in the Soviet Union. Hiding missiles underground, camouflaging them, or changing the construction pattern were not part of the Air Defense Command’s routine operations.

(3) Model 3: Governmental politics model

The third model Allison (1971) uses to analyze the Cuban Missile Crisis is the government politics model. This model considers decision making within an organization (government) as “bargaining games” among leaders involved in policy decisions. Analysis of the Cuban Missile Crisis using this model shows an aspect not revealed by the other two models.

For example, in response to the missile deployment of the Soviet Union, the U.S. implemented a naval blockade. At first glance, it appears as though this action was based on a rational decision chosen from among several different alternatives, including a military invasion of Cuba. In reality, however, that was not the case. According to data collected by Allison (1971), the decision to impose a naval blockade was a result of political bargaining among the actors involved. Many different factors came into play, including a conflict between President John F. Kennedy and air strike advocates in the ExCom. In addition, inaccurate information about the chances of success of an air strike and the President’s political position were considered.

(4) Allison’s use of models

These three models developed by Allison (1971) are further analyzed, with particular attention paid to their use as an analytical
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framework. The first model, the rational actor model, explains decisions or actions of a large organization under central control, such as a country or government. This model presupposes the rationality of the organization. The rationality here refers to consistent, value maximization within specified constraints. It is used in the same sense as a “rational choice” or “rational decision” in economics, statistical decision theory, or game theory.

The second model, the organizational process model, examines actions of an organization as a whole. Actions are considered as an output of collective subsystems based on organizational routines or standard patterns of behavior. The rational actor model, which considers an organization’s action as that chosen by a unitary, rational decision maker, may lose sight of the fact that organizations often consist of loosely allied subsystems or that these subsystems act independently of each other. Therefore, the organizational process model focuses on routine operations of subsystems, which are compositions of a larger organization, and considers how these subsystems interact with each other.

The third model, which Allison (1971) calls the governmental politics model, focuses on a group of decision makers. This model considers actions by an organization (government) as bargaining games among those involved in policy decisions. In other words, players involved in policy decisions do not typically engage in a single issue; they must simultaneously deal with a variety of problems. Moreover, they do not have a consistent set of strategic objectives. They instead have heterogeneous goals at the national, organizational, and personal levels. According to this model, therefore, government decisions are a result of pulling and hauling among the players involved.

Allison (1971) uses these three models to provide three different interpretations on the decisions of the U.S. and Soviet Union concerning the Cuban Missile Crisis. According to Allison, the three
models complement each other and no one model is better than the others. A different model simply produces a different interpretation. Therefore, instead of interpreting a phenomenon from only one perspective, Allison provides an analysis using multiple models to make several different interpretations.

Lynn’s (1982) Model

Lynn (1982) analyzes organizational decision making using the modern organization theory model\(^3\) and the so-called garbage can model. Lynn uses this model to explain the process in which the new steelmaking technology known as basic oxygen furnace (BOF) was adopted in the steel industry in the U.S. and Japan.

(1) Steelmaking technology and introduction of BOF

Steel production is performed in three sequential steps: pig iron making, steelmaking, and rolling. Steelmaking is a process in which carbon and other impurities are removed from scraps. There were three main steelmaking methods around 1950: the Bessemer method, Thomas method, and open hearth method. Each had advantages and disadvantages. The Bessemer and Thomas methods, which used converters, featured simple operational procedures and had good cost performance. However, high silicon iron used in the Bessemer method and high phosphorus iron used in the Thomas method were not available in Japan, causing quality to suffer as a result. On the other hand, the open hearth method allowed for steel to be refined without regard to the quality of pig iron. Thus, 80% of Japan’s steelmaking relied on the open hearth method; however, they were far more expensive to build than converters and cost more to operate.

The BOF that Lynn (1982) researched was a type of converter

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\(^3\) “The modern organization theory model” refers to a model developed by March and Simon (1958), Cyert and March (1963), and Thompson (1967).
process method, a new steelmaking method that blew pure oxygen from above the converter, unlike the Bessemer and Thomas processes, which blew air from the bottom of the converter. This new approach provided the BOF with the flexibility of the open hearth method and the economic efficiency and productivity of the converter method.

The BOF was a result of a study by a small Swiss steel company whose research team succeeded in testing the process in 1949. The BOF was then put into use at an Austrian steel company in 1952. One of the major factors behind the dramatic increase in international competitiveness of the Japanese steel industry was a rapid introduction of the BOF in the 1960s. Yawata Steel and Nippon Kokan were among the first to adopt the BOF in Japan, the former in 1957 and the latter in 1958.

Previously, Japanese steelmakers refined steel by increasing the ratio of scrap steel against pig iron to lower manufacturing costs at the open hearth. In other words, a significant amount of scrap steel had to be available at low prices to maintain low-cost operations at the open hearth. However, after many open hearths were built during the post-war recovery period; a shortage of scrap steel led to a surge in prices.

(2) Decision making model of early adopters: Garbage can model

The above explanations may lead one to believe that the introduction of the BOF by the Japanese steel industry was an inevitable decision. However, according to Lynn (1982), the process of the introduction of the BOF by early adopters—Yawata Steel and Nippon Kokan—had characteristics not presupposed by the modern organization theory model, a common model employed to explain organizational decision making. The process was more akin to the garbage can model.

First, before the problem surfaced, the solution was previously
available in the form of BOF. For example, Yawata Steel found the BOF as a solution before the company faced the need to expand its production capacity. Nippon Kokan, too, learned about the BOF by 1950. As mentioned above, the BOF had many advantages. The BOF’s construction and steel manufacturing costs were lower than the open hearths. The BOF could also produce high-quality steel without regard to the quality of pig iron. Yet, these advantages were found later; in the early 1950s, nobody had yet perceived these advantages. In fact, both Yawata Steel and Nippon Kokan continued their efforts to refine and test other converter process methods even after learning about the BOF.

Second, participants in the decision-making process were fluid. At Nippon Kokan, no one had a clear decision-making role, which meant that many participants participated in the decision-making process in a fluid manner. In other words, the supporters of the open hearth method decided to adopt a new technology between 1953 and 1956. Advocates of the BOF, on the other hand, sought to influence the next decision by collecting data from unofficial test results and taking various other measures. They aggressively joined the group of participants in the decision-making process. When it was found that Yawata Steel, the biggest player in the industry, decided to adopt the BOF, the issue was no longer just a technological matter confined to engineers. Non-engineers, including the president, also aggressively began to participate in the decision-making process.

Such characteristics of the decision-making process among the early adopters did not conform to the modern organization theory model. Lynn (1982) argues that this can only be explained by the garbage can model.

The garbage can model was developed by Cohen, March, and Olsen (1972), and was designed to describe the decision-making process of organized anarchies characterized by problematic preferences, unclear technology, and fluid participation typically observed in
universities and local governments. Cohen, March, and Olsen argue that the decision-making process should be considered as a collection of problems, solutions, participants, and choice opportunities (which can be compared to a garbage can) in situations where participants in the decision making and consequences of decisions are extremely ambiguous.4

The garbage can model presupposes that problems, solutions, participants, and choice opportunities are streams that act independently. Therefore, many decisions are influenced by the problems, solutions, participants, and the timing of choice opportunities. Consequently, there are situations in which solutions emerge even before a problem surfaces.5

(3) Decision making model of late adopters: Modern organization theory model

Decision theory assumes that decision making goes through the following process:

1. Decision makers find all available alternative plans.
2. Decision makers predict consequences of choosing these alternatives.
3. Decision makers choose an alternative based on preference.

In practice, however, there is a limit to the rationality of decision makers. Thus, the modern organization theory model has more explanatory power. Under this method

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4 “The garbage can model” was developed through an organization analysis using computer simulation. Organizational analyses conducted using computer simulation in recent years include Takahashi (1997), Kuwashima, Takahashi, and Tamada (2005), and Inamizu (2010).

5 Fluid organizational structures similar to the garbage can model are seen in the so-called non-territorial offices that can be seen in many companies in recent years (Allen & Gerstberger, 1973; Inamizu, 2013, 2014).
1. The decision maker considers only two or three alternatives.
2. The decision maker adopts these alternatives if they satisfy certain criteria.
3. If these alternatives fail to satisfy these criteria, the decision maker explores other alternatives.

According to the modern organization theory model, the BOF implementation process within the steel industry is as follows. When faced with a problem of having to build or replace a steelmaking facility, the decision maker searches for available alternative technology. The decision maker then examines two alternatives: the newly discovered open hearth or existing converter. However, the decision maker finds that both options fail to meet the satisfying criteria. Thus, the decision maker explores more alternatives. After repeated attempts, the decision maker discovers that BOF meets the criteria and decides to adopt it.

The decision-making process of late adopters that adopted the technology after such early adopters, as Yawata Steel and Nippon Kokan, conformed to the modern organization theory model.

(4) Lynn’s style of using models

Based on the above-mentioned analysis, Lynn (1982) argues as follows:

1. The decision-making style of the early adopters that have decided to use BOF at a stage where there were extremely high technological uncertainties conforms to the garbage can model.
2. As innovation spreads and technological uncertainties and problems are solved, the decision-making model presupposed by the modern organization theory based on certain satisfying criteria becomes more applicable.

In this manner, Lynn (1982) demonstrates that the
decision-making style of organizations can be different depending on the situation, even though they confront the same problem—the introduction of the BOF.

**Discussion**

This paper discussed the studies of Allison (1971) and Lynn (1982) to analyze organizational decision analysis models. These studies are similar in that they both use multiple models to provide an effective analysis of organizational decision making. However, the manner in which they use these models differed. According to Allison, different models lead to different interpretations. Thus, he used multiple models to provide multiple interpretations from different perspectives. On the other hand, Lynn selected one optimal model among several alternatives and provided analysis from a single perspective.

When providing an analysis of organizational decision making, one often fails to have a clear awareness of analytical perspectives or models. However, to have an effective analysis, one must first have a strong awareness of models as an analytical framework and then choose between the method of Allison (explanations from multiple perspectives using multiple models) and the method of Lynn (the use of an optimal model) based on the purpose of the analysis.

In Japan, few empirical studies have been done using the models of organizational decision making as explicit frameworks for analysis. Still, there have been some studies in recent years. For example, Takahashi (1997, 2000, 2002) suggests that phenomena that conform to the garbage can model are frequently occurring in Japanese companies. In addition, a study on research and development activities of Japanese pharmaceutical companies shows

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6 In Japan, Lynn (1982) is cited more commonly in studies related to the introduction of steelmaking technology than in studies on organizational decision making (e.g., Kawabata, 2013; Ohashi, 2005; Okazaki, 2000).
that there were instances interpreted as rational that can now be described as a garbage can model situation when their processes are carefully analyzed (Kuwashima, 2006; Kuwashima & Takahashi, 2001).

References


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7 See Kuwashima (1998, 2003) for effective R&D management in Japan’s pharmaceutical industry.


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