

Influencing Factors in the Decision and Management Sciences

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Abstract — By reviewing the different researches in decision and management sciences and find out the perspectives of the researches to reinvestigate the importance of decision and management sciences and factors that have influence on it. The theoretical foundation of the paper was a comprehensive literature review on studies of decision and management sciences from different angles. Through the grounded theory, a model was developed and evaluated using questionnaires and interviews. The suggested model is extraordinarily useful for policy makers to better understand the influencing factors that affect their decision-making. Through this essay, they may have a better idea of how to make wise managerial decisions with least risk.

Keywords — *Decision and Management Sciences; Influencing Factors; Decision-making*

I. INTRODUCTION

Traditional methods of problem solving, based on the cause-and-effect model, can no longer deal with the complicated situations in which decisions have to be made at present. These troublesome situations occur within a systems context. Most of these systems are brought up and controlled by humans and therefore, it is of significant importance that decision making is guided by a systematic and comprehensive methodology. And they should be helpful for the decision maker to make effective use of his extensive but limited powers of reasoning. Since traditional ways to cope with decision-making and management have lost their appeal in this competitive and constantly changing world, people need new methods to deal with them, research on this subject from a new angle is necessary. Therefore, this essay is going to review the different researches on decision and management sciences, reveals its importance in today's world and finds out its influencing factors in order to see if there is any new perspective to investigate it.

II. RESEARCH OF DECISION IN SCIENCE MANAGEMENT

Decision-making refers to making up one's mind or making choice. It is a kind of recognition and thinking process of making choice with consideration on all factors in various alternative plans. Every decision-making process is targeted at generating final decision, and selecting final choice. The forms of these choices can be an action or selection of opinion.

Before the decision maker makes his choice, he is confronted with different plans, choices, and uncertainties on certain degree that are relevant to decision results. Decision maker has to balance various pros and cons and risks of all choices, so as to reach optimal decision results. Since the 1950s, scholars had begun to study on decision-making.

A. Existing Results

From the 1950s to the mid 1970s, studies of scholars were mainly focused on exploring the shortcomings and drawbacks on rational decision-making theories. The studies were frequently on primitive stage of regulative study. No independent study field is divided. In this stage, the study objectives can be categorized into two types of "judgment" and "choice". "Judgment", in the sense of study, refers to how the whole decision-making process is conducted when people is estimating the probability of occurrence of something (Bowman Edward H, 1980); "choice", in the sense of study, refers to how people make choices when confronted with multiple optional things (Allais Maurice, 1979).

In the mid and late 1980s, the application of decision-making started to expand in the fields of economics, finance, and management. And the study objected also extended to all links of decision-making process. In-depth exploration was conducted upon how people complete the stages of decision-making in detail, and rich study results were obtained. For example, certainty effect, reflection effect, anchoring effect, regret theory, and overconfidence were discovered.

Today, mainstream study paradigm is: First, traditional decision-making model and its hypothesis I concrete field is identified. Second, phenomenon of inconsistency between theory and reality is disclosed. Such phenomenon of inconsistency is resulted from individual cognitive ability and psychological factors. Third, action features are concluded. Action variables are added, or variables in the original model are replaced by variables with consideration of action factor, and new decision-making model is obtained. Fourth, empirical test is conducted on new model, in a hope to find new corollary, and demonstrate whether it is absurd or not. We can tell that in current stage, theoretical study featured by deduction is dominant. Yet, empirical study method is still the major study method. And the objective of empirical analysis is no longer decision-making, but some proposition assumptions

in the field of economics, finance, and management on the basis of decision-making rules.

B. Importance of Studying Decision-making

From the perspective of management function, decision-making theory proposes a new management function. Upon management function in management process theory, Simon put forward that decision-making is management function, and decision-making penetrates through the whole process of organizational activities. Hence, the proposition of “decision-making is the core of management” is presented. Traditional management school, on the other hand, includes decision-making function into planning function. Given that decision-making theory is not only applicable to company organizations, but also applicable for other organizational management, it is of universal significance.

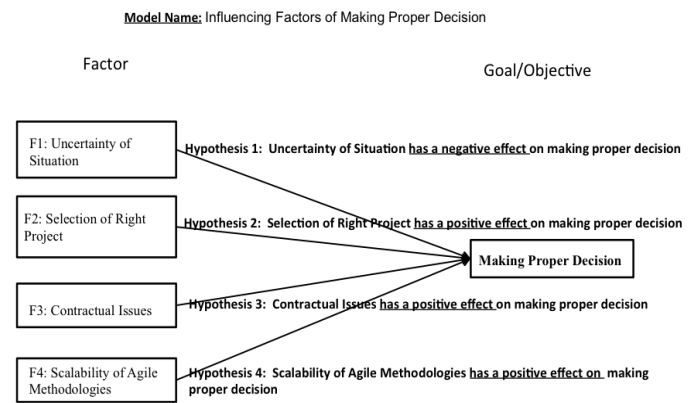
With studying decision-making, the necessity and importance of pre-execution of management behavior is deduced. Simon divided management action into “decision formulation process” and “decision execution process”, and focuses on analysis of “decision formulation process” in management study. As Simon pointed out, all these discussions, have not paid sufficient attention to choices before taking actions, it is decision on what to do, not how to do. All practical activities contain “decision formulation process” and “decision execution process”. Therefore, decision-making sits on not-to-be-neglected position, and studies on how to make right decision are of great importance to scientific management.

III. RESEARCH METHOD

Combining diversified research methods together in research process is becoming more and more important when a researcher needs to gain “rich theoretical insights (Dyer & Wilkins, 1991) p.613 .” The basic method for “developing new theoretical insights” (LePine & Wilcox-King, 2010) p.506 is literature research method. Through this method, many other academic literatures that focused on the same subject of decision and management sciences are consulted in order to find a systematic way to investigate and get a clear picture of the history and current situations of this problem. Second method in this research is quantitative analysis method. By assigning a numerical value to variables, quantitative analysis enables researchers “to replicate reality mathematically (Wang Xuefeng & Hu Zhiqiu, 2006) p.87”. It offers researchers a view to know more precisely about the subject so that the essence can be more easily grasped and development tendency is more clearly. My research approach also incorporates the comparative analysis method in which a comparison between the past and present of this problem is made (Siddheshwar K. Chauthe & Ram Jee Sharma, 2012) p.132. With this method, I can learn about the research perspectives in the past and come up with new perspectives easier.

IV. SCIENTIFIC CAUSAL MODEL

This model examines the relationship between key factor and the goal, identifies the possible effect of these independent variables might have on our objective.



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F1: Uncertainty of situation can have a big influence on the accuracy of decision-making (Nicholas G. Hall, 2012) p.129-143. It is easier to make a proper decision when every element is certain for you can decide your program after careful study. But when there are a lot of uncertainties, you have to adjust your scheme according to the changes at all times. And it is sure enough that the uncertainty of situation can be demanding for decision-makers.

F2: Both statistical and informal evidence suggest that an important factor in successful project management is selection of the right projects (Cooper et al. 2000). If you are capable of choosing a proper project, it will be easier to manage. The selection of right project can be very helpful in the process of decision-making and management.

F3: When make decisions or implement management policies, it is important for decision makers to be careful with contractual issues (Joan M Donohue & Jeremy B Fox, 2000) p.17-36. Contract is what you follow when something unexpected happen. If you are not familiar with the articles in contract, it will be quite a disadvantage for you when there are disputes.

F4: Scalability of decision is also of great importance in management, which means that the decision you made should be elastic and flexible in order to cope with the unexpected situations (Chon-Huat Goh, Clyde W. Holsapple, Linda Ellis Johnson, John R Tanner, 1997) p.123-138. If your decision is too rigid and can't be adapted to some extreme circumstances, it may destroy your whole project. With a flexible decision and policy, you can adjust your scheme when it is necessary in order to achieve a better result.

Goal: Decision-making is the key issue of management, similarly, crisis decision is the essence of crisis management (Shangmin Deng, 2010) p.23. We will make an analysis of relationships between decision effectiveness and its influencing factors. To comprehend the influencing factors of decision-making ability in clinical nursing so as to improve the relevant ability in clinical nurses (Wang Qingmei & Li Ning, 2011) p.69. Though this essay is about medicinal, it pays attention to the influencing factors of decision-making.

EXPLANATION OF MODEL

Coming across projects with tight deadlines, or those that suffer delays at the execution stage, a standard decision-making technique is crashing, i.e. expediting, tasks. In practice, the consequence of crashing can be achieved by a variety of means, for example by working overtime, by the application of additional resources, or even by the subcontracting of tasks to others. A crashing decision typically represents a tradeoff between time and cost, one that can be modeled as a simple linear program where task times are known. Yet crashing decisions are becoming much more complicated when task times are uncertain.

A frequent difficulty is that the project manager does not have an exact, or even approximate, probability distribution for the times of the individual tasks. Another difficulty is that the uncertain task times may be correlated. For example, if the same resources are used for two different tasks, it is likely that their performance on those tasks will show a positive correlation. That is to say, crashing decisions need to be made against a background of substantial and complex uncertainty. In these situations, modern robust optimization techniques (Bertsimas & Sim 2004, Goh & Sim 2010) may be useful. Such techniques can be used to develop linear decision rules that convert information that is revealed over time into decisions. Uncertainty of situations always has a negative effect on decision-making for it adds difficulty for decision-maker.

The ability to select right projects is also a challenge for decision-maker and is an important part of management skill. A major justification for this statement is that well chosen projects typically run smoothly and are easy to manage, whereas poorly chosen projects not only underperform but may hurt other projects by absorbing their resources. There exist several classical approaches for financial portfolio selection, which include the maximization of expected return, the minimization of the probability of underperformance relative to a given target, the minimization of variance subject to meeting a target expected return (Markowitz 1959), and the maximization of the safety-first ratio (Roy 1952).

Earned Value Analysis (EVA), also known as earned value management, is an accounting and control system for projects that was developed in 1962 as part of a U.S. Department of Defense study. It is based on metrics that monitor the progress of the project, including the actual cost of work performed, the budgeted cost of work scheduled (i.e., the budget), and the budgeted cost of work performed, which is also known as earned value. The central idea in EVA is that cost and time variances should be computed relative to the progress actually completed on the project. Despite this apparently sensible justification, EVA is not widely used in industry and has significant weaknesses.

Making good decision, you also have to be clear about the contract made in the project for it will save you much trouble when there appear some disputes. For the complex project, the cooperation of operators and subcontractors will result in a successful completion. In either case, it is necessary to motivate for crash or expedite in order to benefit the project.

Suffering the additional cost of crashing activities is required to compensation.

The need for cooperation also arises in a second way. It is necessary to share the resources for achieving the goals synchronously that are efficient. However it will only benefit the whole project, not all of them. Therefore it requires the compensation. Peleg & Sudhölter (2003) suggest that the structure of this problem can be modeled as a cooperative game. More importantly as one of the cooperative game concepts - balanced-ness can be applied. The literature (Brânzei et al. 2002, Castro et al. 2008) applies cooperative game theory to the problem of setting compensation in a project that has already been delayed.

The information availability can be defined in a plenty of ways. The contract design issue can be seen as a result of full information. Within the contract specifying the incentives can ensure cooperation, and in order to achieve that will use a common contract or one which is customized for each task subcontractor. Estimating costs or resource availabilities is necessary if the project manager have the incomplete information. It needs a suitable contract design which is robustly against poor estimates. The probability of using strategic information needs to be studied by the task operators. When the strategic reporting does not happen, it is another condition needed to be concerned. Cai et al. (2012) model the coordination problem as a cooperative game, which is shown to be balanced, and consider various contract design issues.

Good decision also need to have the quality of agile in case some expected accidents happen. The Agile Manifesto (Agilemanifesto.org 2001) proposes a new methodology for software development projects, but has since become more widely applicable. 'Its principles include valuing: individuals and interactions over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation, and responding to change over following a plan.' (Agilemanifesto.org 2001). Citation Agile project planning is especially useful for nondeterministic projects, i.e. those where the final configuration of the product or service being developed is not known at the start of the execution stage and only reveals itself as a result of subsequent developments.

Examples of nondeterministic projects include research and development, software development, and pharmaceutical drug development. There are many well-documented success stories for agile methodology in projects involving small project teams (objectmentor.com 2012). However, the implementation of agile methods for large projects is more problematic. A generic idea, forming teams of teams, has been tested but not extensively researched. For software development applications specifically, there are some solutions related to appropriate architecture design (MSDN Blogs 2009). However, these solutions apparently do not extend to the broad and expanding range of project management applications where agile methodology is now being used.

IMPORTANCE OF NEW INSIGHT

The world we live in is in constantly change, and we have to update our mind ceaselessly in order to catch up with the

development of the outside world. Once we lag behind, we will suffer from what is called “failure”. In this world where human resource is the most important resource, we have to take full advantage of our talents and make decisions that fit us most. We should never stick to conventions for it will confine us to a narrow horizon. Only with innovation and new insights can we make progress.

Scientific decision is in accordance with sound scientific theory and decision-making procedures and the use of scientific methods in decision-making activities. The main features of modern production are large-scale, complex structure, functional integration, numerous factors, and constantly changing and remarkable impact. Therefore, an incorrect decision is bound to cause a chain reaction and result in serious consequences. As a decision-maker in a company or government department, decisions on major issues is the key to the development of it and the person who makes decision should be responsible and wise. Decision is correct or not, directly determines the success or failure of leadership, the relationship between the working staff and company’s rise and fall. Leaders must assess the situation and formulate and implement the scientific decisions.

CONCLUSION

The research hypotheses that we investigated found support for some commonly held beliefs as well as conforming the results of some previous research studies. Through this essay, we get to know that the uncertainty of situation will bring a lot of difficulty in making correct decisions and management policy, while the selection of right project, clear understanding of contractual issues and scalability of agile methodologies will be of great help to make proper decisions. Of course there are many more factors that have influence on decision-making and management other than those we are studying in this essay. What we researched is just a drop in the bucket, yet it can help us know how important it is to make correct decisions. In addition to our findings concerning the decision-making and management, we compared the mean peer reviews across different groups of respondents. We found that most people attach great importance on scientific management.

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