Perfection of Information Data Analysis and Processing

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I. RATIONALE

To decide the choice of a new technology, in economics, first of all, we have to know the information of the technology. There are different and similar information from various sources, places, sides in the country, region or in the world. To find and use the information sources effectively, the managers usually concentrate on exploiting available information at less expenses, at the same time, they supplement and refer to current events and objective information from announcements, direct talks, reports, newspapers, telephone, email, Internet, investigations, conveys, etc.

These collected data are valuable. However, not all of our necessary information and solutions are accessible. In fact, the collected information needs refining, analyzing and processing. Then, its value will be of great significance.

II. SOME FACTORS OF PERFECTION

1. Information data analysis

The analysis of the information data is, at first, to confirm the size, exactness, truthfulness, adequacy and transparency with high reliability of objects needed for management. Then, we will specify the relations of the data and the characteristics of the objects in order to delete unnecessary information data, adjust, and rearrange information data to be stored and processed.

In the second stage, we determine the border between the tasks done by computer and by hand, build the data processing network. The determination of processing functions can be carried out with a top-down approach to identify which will be processed by computer or by hand. If failing, we go on breaking down the data until we can recognize the processing method needed. For instance, to select an investment plan of new technology, there are tasks which need computerization while the others could be done by hand without the help of computers. Therefore, these functions must be decomposed into details for processing by computer or by hand. The decomposition is aimed to help the designers pay attention to interface designs as well as the end-users know how to operate.

Thirdly, the analysis of information data plays an extremely important role in supporting the managers to determine the effective processing methods and predicting with high reliability, furthermore it will be a tool for managers for comprehensive understanding about their activities.

2. Information data processing

To analyze the data processing is to determine which tasks should be done in the system. For higher efficiency, we often use the top-down approach. That means we separate it into sub-processing and make a processing tree.

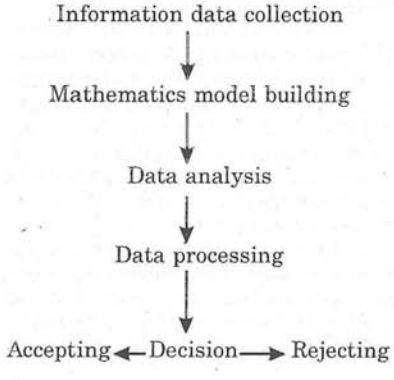
After the information is refined, up-to-dated, and re-structured, we begin processing. The roles and tasks of information processing is to carry out the calculations on the indicator groups by modern means and methods as follows:

- Manual method
- Electronic computer method
- Comparison method
- Combination method
- Probability and statistics method
- Test method

Every method has its own strong and weak points. However, the selection of the processing method must meet the requirements of techniology, economics, effectiveness, and compatibility with the institution's conditions.

3. The choice of decision

In reality, not all problems could have their adequate information to assist managers in their decisions, but only incidental information about them, namely a sample, could be collected. This sample will be a basis for an optimal decision to a certain extent, for example, at a minimum cost. The choice of such an optimal decision is a scientific method, which is commonly seen in the field of probability and statistics. The followings are the decision model in economics:



III. ANALYSIS AND PROCESSING OF INFORMATION DATA FOR INVESTMENT DECISION

To decide an investment plan of new technology, in this article, we refer to only the case of incident information. Suppose there are two plans A_i with i = 1 or 2. There are a lot of methods to collect information for A_i. Here, we examine incident information collection by professional method.

We put:

$$X^i_j = \begin{cases} 1 \text{ if the expert j accepts } A_i \\ 0 \text{ if the expert j rejects Ai} \end{cases}$$

With i = 1 or 2 and $1 \le j \le n_i$

$$S_i = \sum_{j=1}^{n_i} X^I{}_J$$

It is obvious to see that $\{S_i / i=1,2\}$ is an information set for Plan Ai and Si is a random variable in the binomial probability distribution. The above way of information collection and analysis is called a stochastic approach and we can use the theory of statistics and probability to solve the problem. The method of statistics and probability used to solve this problem is called the testing of sta-

tistical hypotheses (see [5], [6], [7], [8]).

1. The problem of testing a statistical hypothesis

We will transform the problem into a statistical hypothesis test. As we know the problem of testing statistical hypotheses is an important one in the theory of mathematical statistics. It is proved that there exists an optimal solution for this problem (see [6], [7]).

If we put p_i as the ratio of the experts accepting Plan A_i. Then, $p_i \in [0,1]$ is an unknown parameter. Clearly S_1 is a discrete random variable having the value belonging to the set $\{0,1,2,3,...n_i\}$

To solve the problem by assuming that experts are now supporting and accepting Plan A1 rather than Plan A2. Then, the hypothesis test will have the model as the following:

H: $p_1 > p_2$ and K: $p_1 \leq p_2$

where H is the hypothesis and K is an alternative hypothesis

$p1 \in [0,1]$ is unknown.

2. An optimal solution

The problem of testing a two-parameter hypothesis has the optimal solution, (see ([4], [5], [6], [7]), with the form:

Rejecting H: $Z \leq c$ and accepting H: $Z > c$

Z is given by:

$$Z = \frac{(s_1 / n_1 - s_2 / n_2).\sqrt{n}}{\sqrt{P_0(1-P_0)}}$$

where p0 = (S1 + S2) / (n1 + n2), n = n1.n2 / n1+n2

Constant c is defined by:

$\Phi_1(c) = 1 - \alpha$, $\Phi_1(x)$ is a function of standardized normal distribution

3. A simple example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In the survey of 400 economists who are interested in Investment Plan Ai with i = 1,2, we have n1 = 300 experts giving comments about Plan A1 and S1 = 225 experts accepting Plan 1. In addition, there are S2 = 280 experts accepting Plan 2.

In order to select an optimal solution, according to the above collected data, we use the software of Casio FX 2.0 plus as follows:

Using 2 pro Z test program
Press F5 (test)
1 (Z)
4 (2.prop)
Inputting data:
$P_1 > p_2$
$S_1 = 225$
$N_1 = 300$
$S_2 = 280$
$N_2 = 400$
Press Execute
Result:
Z = 1.46032
P = 0.07210
$P_1 = 0.75$
$P_2 = 0.7$
P = 0.72143

Therefore, based on the result of information data from the economists, if the managers accept the error probability is 5%, they have to choose to invest in Plan 1 and reject investing in Plan 2.

4. Remarks

In this article, we examine the condition n1 embed Equation.3 n2 , that is, there are certain economists who pay attention to this plan and ignore the other. If n1 = n2 , then all interviewed experts have been interested in both plans and give comments about them.

IV. CONCLUSION

In general, every event has its own origin and cause. There are governing rules and inevitable results, as well as the factors forming rules affecting the event. Therefore, information is the scientific foundation to make a decision. An information analysis-based decision will bring higher effectiveness. The collected information is very valuable but it must be analyzed and processed. Nowadays, the information technology is facing rapid achievements. The application of these achievements to the plan determination plays an extremely important role and will bring higher effectiveness to the information system processing.■

REFERENCES:

[1] Dr. Nguyễn Thị Liên Diệp, Management, Thống Kê Publisher, 1997

[2] Dr. Nguyễn Thanh Hội & Dr. Phan Thăng, Management, Thống Kê Publisher, Hà Nội, 2001 .

[3] Dr. Trương Văn Tú & Dr. Trần Thị Song Minh, The Information System for Management, Hà Nội University of Economics, 2000.

[4] Jack D.Callon, *Competitive Advantage through Information Technology*, The Mc Graw-Hill Companies. Inc, 1996.

[5] Huỳnh Văn Sáu & Nguyễn Trường Chấng, To Solve Staistical Problems by computer, HCMC National University Publisher, 2003.

[6] V.K.Rohatgi, A.K. Ehsanes Saleh, *An Introduction to Probability and Statistics*, John Wiley, New York, 2001.

[7] Mark L.Berenson & David M. Levine, *Basic Business Statistics*, Prentic-Hall , Inc, 1989.

[8] I.S.Milton & J.C.Arnold, *An Introduction to Probability and Statistics*, Mc Graw-Hill Companies , Inc , New York, 1995.


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