Information System Management

Chapter 8

The Concept of Information System-based Decision Making

Group Members

Muhammad Baihaqi Aulia Asy'ari	**2241720145**
Davis Maulana Hermanto	**2241720255**
Dicha Zelianivan Arkana	**2241720002**
Sri Kresna Maha Dewa	**2241720244**
Steven Christian Susanto	**2241720003**
Yanuar Thaif Chalil Candra	**2241720004**

Class
2I

Department
Information Technology

Study Program
D4 Informatics Engineering

A The concept of information system-based decision making

A.1 Understanding Decision Making

In general, decision making is an effort to solve problems by choosing available solution alternatives.

Optional:

In essence, decision-making is a systematic approach to the nature of a problem, gathering facts and data, making a mature determination of the generated alternatives, and taking action that, by calculation, is deemed the most appropriate. In other words, decision-making is a technique to solve problems using scientific techniques.

A.2 Decision Making Techniques

Teknik Pembuatan Keputusan Tradisional dan Modern

Tipe-tipe Keputusan	Teknik-teknik Pembuatan Keputusan	
	Tradisional	Modern
Diprogram: 1. Keputusan rutin dan berulang-ulang. 2. Organisasi mengembangkan proses khusus bagi penanganannya.	1. Kebiasaan 2. Kegiatan rutin: prosedur pengoperasian standar. 3. Struktur organisasi Pengharapan umum Sistem tujuan saluran informasi yang disusun dengan baik.	1. Teknik-teknik riset operasi: Analisis matematik; model-model simulasi komputer. 2. Pengolahan data elektronik.
Tidak Diprogram: 1. Keputusan sekali pakai, disusun tidak sehat, kebijaksanaan. 2. Ditangani dengan proses pemecahan masalah umum	1. Kebijakan institusi dan kreativitas. 2. Coba-coba. 3. Selektif dan latihan para pelaksana.	Teknik pemecahan masalah yang diterapkan pada: 1. Latihan membuat keputusan. 2. Penyusunan program-program komputer "heutistik".

Herbert A. Simon (1973) proposed three stages, namely:

1. **Understanding**
   The investigation process involves examining data, either in a predetermined way or in a special way.

2. **Design**
   The management information system must contain a decision model to process data and initiate alternatives.

3. **Selection**
   The management information system becomes more effective if the design results can be presented in the form of a decision. Based on its nature, the decision-making system is divided into two, namely open or closed. The closed decision-making system is considered to know all alternatives and the consequences of each alternative, while the open decision assumes that it does not know all alternatives and all results. There are several forms of decision-making techniques, including:

   1. **Creative Techniques**

      a. **Brainstorming**
         Aims to excavate and achieve maximum creativity from a group by giving members the opportunity to present their ideas.

      b. **Synectics**
         Based on the assumption that the creative process can be explained and taught, it's intended to enhance the creative output of both individuals and groups.

      c. **Participatory Techniques**
         Individuals or groups are involved in the decision-making process, including modern techniques, the Delphi technique, and the nominal technique.

   2. **Delphi Technique**
      The Delphi technique or process was first developed by N.C. Dalkey, Helmer, and colleagues in the 1950s and 1960s at the Rand Corporation. The Delphi technique falls under modern decision-making techniques that stimulate creativity by using considerations based on other people's ideas to achieve consensus in group decision-making. This technique is also one of the participatory techniques in strategic decision-making.

   3. **Nominal Group Technique**
      The Nominal Group Technique (NGT) is a participatory technique in decision-making that is less frequently used compared to the suggestion contribution technique. This method was developed by Delbecq and Van de Ven in 1968. The technique is intended as a way to gather individual views and assessments in an atmosphere of uncertainty and disagreement about the core issue of a problem, and then find the best solution.

A.3 Decision Making Measurement Scale

In essence, decision-making is seen as a process in an effort to find a way out of a problem. The quantitative benchmarks regarding cost benefits aim to facilitate the comparison between the effectiveness of various alternative ways of handling in the decision situation. This measurement scale is arranged in order of increasing restrictions. The intended measurement scales are:

1. **Nominal Scale**
   The nominal scale is the measurement with the lowest level. Here, an object is classified with symbols or numbers that are both qualitative and quantitative. Decision-making with a nominal scale is challenging because this scale shows the value hierarchy of several decision alternatives. This scale only shows differences between groups.

2. **Ordinal Scale**
   The ordinal scale is a qualitative measurement scale that indicates a hierarchy of preference associated with a specified objective or condition.

3. **Interval Scale**
   The interval scale is a scale that has the characteristics of an ordinal scale, where the difference between each number or preference hierarchy of that scale is known and then measured.

4. **Ratio Scale**
   The ratio scale is an interval scale that has a definite zero point. In this scale, the comparison of each measurement unit point is free.

5. **Absolute Scale**
   The absolute scale is a clear, tangible, and directly comparable quantitative measure. Structures or decision conditions are commonly found in corrective-type decisions, with a ratio or absolute measurement scale.

B Basic Concepts of Management Decision Making

B.1 Basis and Factors for Decision Making

- **Intuition:** decisions based on subjective feelings.
- **Experience:** decisions based on someone's experience.
- **Authority:** decisions based on the authority someone has.
- **Facts:** decisions based on empirical data and facts.
- **Rational:** decisions based on rational and logical considerations.
- **Factors in decision making:**
  - Internal conditions of the organization.
  - Availability of required information.
  - External conditions of the organization.
  - Personality and competence of the decision maker.

B.2 Quantitative Methods in Decision Making

- **Concept of operations research:**
  - Operations research is a quantitative approach in decision-making that uses scientific methods, mathematical models, and computers.
  - Operations research has seven main characteristics, namely:
    - Focused on decision-making.
    - Use of scientific methods.
    - Use of mathematical models.
    - Economic effectiveness.
    - Reliance on computers.
    - Team approach.
    - System organization.
  - Operations research has five stages of approach, namely:
    - Problem diagnosis.
    - Problem formulation.
    - Model creation.
    - Model analysis.

        * Implementation of findings.

- **Operations Research Model:**
    - The operations research model is a simplification of reality used to understand and solve problems.
    - Operations research models can be grouped into two types, namely normative and descriptive models.
    - Normative models depict what should be done.
    - Descriptive models depict things as they are.
    - Some commonly used operations research models include:
        * Linear programming.
        * Queue theory.
        * Network analysis.
        * Game theory.
        * Markov chain model.
        * Dynamic programming.
        * Simulation.

- **Applications of Operations Research:**
    - Operations research can be applied to various problems, including:
        * Inventory problems.
        * Allocation problems.
        * Queue problems.
        * Sequencing problems.
        * Routing problems.
        * Replacement problems.
        * Competition problems.
        * Search problems.

Here are some examples of the application of operations research in the real world:

- Manufacturing companies use operations research to determine the number of products that should be produced, how much raw material needs to be purchased, and how to arrange production lines.

- Service companies use operations research to determine the number of staff needed, work schedules, and delivery routes.

- Governments use operations research to determine budget allocation, transportation planning, and natural resource management.

Operations research is a powerful tool that can help organizations make better and more efficient decisions.

B.3 Decision-making process

- **Herbert A. Simon** divides the decision-making process into three stages:
  - Intelligence: Investigating the internal and external environment to identify problems and gather information about the problem.
  - Design: Determining various alternatives to solve the problem and analyzing those alternatives.
  - Choice: Selecting the best alternative to solve the problem.
- **Scott and Mitchell** divide the decision-making process into four stages:
  - Searching/finding objectives: Identifying the goals to be achieved.
  - Objective formulation: Defining the goals specifically and measurably.
  - Alternative selection: Identifying and evaluating alternatives to achieve the objectives.
  - Evaluating outcomes: Measuring the success of the decisions made.
- **Elbing** divides the decision-making process into five stages:
  - Identification and diagnosis of the problem: Determining the problem and its causes.
  - Collection and analysis of relevant data: Gathering information relevant to solving the problem.
  - Development and evaluation of alternatives: Determining alternatives to solve the problem and evaluating those alternatives.
  - Selection of the best alternative: Choosing the best alternative to solve the problem.
  - Decision implementation and evaluation of results: Executing the decision and evaluating the outcome.
- **Eilon** divides the decision-making process into eight stages:
  - Input of information: Collecting relevant information.
  - Analysis of available information: Analyzing the information available.

- Specification of performance and cost benchmarks: Determining benchmarks to assess alternatives.
- Creation of a model about the decision situation: Creating a model to depict the decision situation.
- Formulation of various alternatives (strategies) available to the decision-maker: Determining alternatives to solve the problem.
- Forecasting the results of each alternative: Estimating the outcomes of each alternative.
- Detailing the selection criteria among various alternatives: Determining criteria to choose the best alternative.
- Explanation of the decision situation resolution: Explaining the decision taken.

In summary, the decision-making process is a series of activities to choose the best alternative to solve a problem. There are various decision-making process models that can be used, depending on the complexity of the problem faced.

C Management Decision Type

- **Programmed Decision**: A decision that is made over and over again routinely so it can be programmed. This kind of decision is made in the lower level of management.
- **Half/Partially Programmed Decision**: This means that half of it can be programmed, half is repetitive/routine, and the other is unstructured. This decision is intricate and needs detailed analysis.
- **Unprogrammed / Unstructured Decision**: This decision isn't repetitive and doesn't always occur. This kind of decision is made in the upper level of management.

D Mechanism, Stage, and Model of Decision Making in an Organization

D.1 Decision Making Mechanism in an Organization

Decision making mechanism is a set of activities that is done in order to solve a problem. Here are a few things that need to be considered when making a decision:

- Understanding and Problem Formulation
- Collection and analysis of relevant data
- Choosing the best alternative
- Decision Implementation
- Evaluation

D.2 Decision Making Stage

- **Stage 1**
  Understanding and Problem Formulation. Managers identifies the problem by systematically testing the causal relationship, and searching for a oddity or changes that is "normal".
- **Stage 2**
  Collection and analysis of relevant data. Managers determine the data needed to make informed decisions.

- **Stage 3**
  Development of alternatives. Managers needs to pick an alternative that is good enough even if its not perfect or ideal.

- **Stage 4**
  Alternatives evaluation. Managers needs to evaluate to determine the effectiveness of each chosen alternatives.

- **Stage 5**
  Choosing the best alternative. The alternative selected will be based on the amount of information for managers and the manager's imperfect policy.

- **Stage 6**
  Decision implementation. The managers needs to make a plan to take care of the problems that occur in the decision implementation.

- **Stage 7**
  Results evaluation. Managers must evaluate to make sure the implementation is carried out smoothly and decisions produce the desired results.

D.3 Other types of Decision Making Models

- **Mintzberg Decision Making Model:** There is three stages in this model (1. Implementation, 2. Development, 3. Selection).

- **Rational Decision Making Model:** The decision is divided into two types, the first is programmed (repetitive), the second is not programmed (unorganized).

- **Classic Decision Making Model:** This model assumed that decision is a rational process where decision is taken from one of the best alternative.

- **Behavioral Decision Making Model:** This model is based on giving satisfaction.

- **Carnegie Decision Making Model:** This model recognizes satisfaction, limited rationality, and coalition organizations.

Tabel 8.2 Perbedaan Model Rasional dengan Model Carnegie

Model Rasional	Model Carnegie
• Informasi yang tersedia banyak • Murah • Bebas nilai • Alternatif banyak • Keputusan diambil dengan suara bulat • Keputusan dipilih yang terbaik bagi organisasi	• Informasi yang tersedia sedikit • Mahal karena masih mencari informasi • Terikat nilai • Alternatif sedikit • Keputusan dengan kompromi, persetujuan, dan akomodasi antara koalisi organisasi • Keputusan dipilih yang memuaskan organisasi

Sumber: (Jones,1995)

- **Benefit Based Decision Making Model:**
  1. quality of decisions
  2. creativity decision
  3. acceptance of decision
  4. understanding of decision
  5. decision considerations
  6. decision accuracy
- **Problem Based Decision Making Model**
- **Field Based Decision Making Model**
- **Problem Tree Decision Making Model**