

## **9.2 Future Perspectives and Challenges**

**9.2.1 Consolidation of Existing Concepts into Further Supplemental Applications (Structured Procedures and Images)**

**9.2.2 Actual Application of the DTCN Method in a Report concerning Proposal No. 19, "Basic Research Plan for Software-Related Technology" of the Science and Technology Committee Dated Dec. 12, 1992 [3]**

As completed, the contents of this publication can be developed as follows:

### **9.2.1 Consolidation of Existing Concepts into Further Supplemental Applications (Structured Procedures and Images)**

That is,

#### **9.2.1.a As a Consulting Method**

There are people who have already created the following system based on the DTC method, which is a part of the DTCN method, and have begun to utilize it. Future development should follow along the same lines.

(1) FA (Factory Automation) construction program, based on the DTCN method, by Mr. Kazumi Eguchi of Japan Management Association Consulting Inc.

(2) Work improvement program, based on multiple-variable analysis by the DTCN method, by Mr. Tetsuzane Hiroshige of Japan Management Association Consulting Inc.

#### **9.2.1.b Practical Use of the GDSS (Group Decision Support System) through the DTCN Methodology**

It is essential to make GDSS software and GDSS through the PMD method available.

The ultimate goal is to make the subject system a common tool worldwide.

(1) According to a report from a person in the United States, various government agencies have shown strong interest in PMD software. These agencies include (as of December, 1992):

- 1) The Department of Defense
- 2) The Defense System Management College
- 3) The Department of Energy
- 4) The Department of Treasury
- 5) The US Navy

- 6) The Federal Aviation Administration
- 7) The Central Intelligence Agency
- 8) The Army Corps of Engineers Fusion Center
- 9) The National Security Agency
- 10) The National Aerospace Agency

(2) In addition, the author was given an opportunity to discuss this method with officers from agencies of Japan's central government in December 1992. They (excluding the Defense Agency) showed great interest in the method.

9.2.1.c Apply the DTCN method to the organized intelligence developing method [1], advocated by Mr. Takehiko Matsuda, and its algorithm.

9.2.1.d Create a well-organized application method through the DTCN method to be used in implementing the QFD (Quality Function Development) method [2].

9.2.1.e In recent years, various project management programs have been developed. Almost all of them start by creating a project procedure and with the WBS technique. Thus, there is a need to rearrange the existing software to be used in creating such procedures and with the WBS technique. Based on this rearrangement, a "paradigm of project management software" that follows the "paradigm of word-processing, accounting, and diagram-drawing software" will be created.

## **9.2.2 Actual Application of the DTCN Method in a Report concerning Proposal No. 19, "Basic Research Plan for Software-Related Technology" of the Science and Technology Committee of the Japanese Government Dated Dec. 12, 1992 [3]**

The author would like to present proposals regarding the concerns, expressed in Chapter 2, on a report about Proposal No. 19, "Basic Research Plan for Software-Related Technology" of the Science and Technology Committee (Dec. 12, 1992).

### **9.2.2.a Important Basic Domains**

(1) Generally speaking, subjects or themes whose research has just been started, and R&D projects that

have not shown good progress, although their importance has long been recognized.

In these subjects or themes, in order to:

- 1) Create a new value and set a new goal; use the PMD method.
- 2) Apply new measures to move to a new level of function; use the PMD and implementation plan document method.
- 3) Make diverse approaches possible; use the 3-5 Improvement method.

(2) How to understand contradictions in human thought and action

In the DTCN method, three types of questions, "in order to do, how to do," and "why?" are differentiated and the most appropriate one is asked in each set of circumstances. It is advisable to use the PMD method so that the factors and processes that lead to contradictions in human thought and action will be clarified. In addition, a foundation for software-oriented technologies will be created.

(3) How to analyze characteristics rooted in the cultural environment

It is advisable to take a couple of examples from various ethnic groups and cultures, and create a PMD for each example. Provided the perception gap between the different ethnic groups and cultures can be narrowed in the PMD, this will allow information to be shared, and different characteristics to coexist.

In the past, cultural characteristics were analyzed only by comparison. It is desirable to bring the characteristics together and create purpose-measure relationships among them through the PMD Method so that the characteristics from various cultures will complement one another. In the purpose-measure relationship through the PMD Method, the characteristics, meaning, and significance of each culture will be better clarified.

(4) How to understand common sense

When one compares the way cards or blocks are connected in the KJ method, the MN method, the PERT, the GANTT Chart, the FAST Diagram, and the DTC method, one notices that the upper-lower and right-left relationship between the cards as well as the direction of the connection (the purpose-measure relationship, the input-output relationship, etc.) construct a common awareness among people (see Chapter 3, Table 3.1-1 "Comparison and Relationship between PMD and Other Creative Thinking and Procedural Thinking Techniques").

When comparing the above experience with the examples found in the Bibliography in [4] and [5], there is consistency in terms of where certain information is stored in the brain, and how it is extracted (direction of nodding) and inserted (direction of going into the right and the left eyes). Because of this consistency, the "common sense shared by all human beings" and the "common sense shared by members of one culture" can be extracted by comparison. The extracted common senses can be utilized as an interface between humans and hardware, and be developed into a system that is user-friendly and avoids danger. To this end, it is advisable to refer to the following examples given in this publication.

(Reference)

Episode 1. PMD Method and nodding when trying to understand something

Episode 2. PMD Method to investigate language

Episode 3. PMD Method can clarify "chicken or egg" relationships

Episode 4. The Method of Key Question

Episode 5. The relationship between PMD, Steplist, FBS, and 3-5 Phase Improvement method

Episode 6. Accumulation of Knowledge and Wisdom

Episode 7. Differences in the way men and women think

Episode 8. A strange phenomenon in visual recognition: a difference between men and women

Episode 9. The difference between males and females in dextro-rotation and levo-rotation

(5) How to advance basic technologies

\* Use the PMD as an information compression technology.

\* Standardize the PMD method so that the PMD method will be a universal tool like PERT, and create manuals. By doing so, knowledge and wisdom from around the world can be connected and compressed.

9.2.2.b Research into Software-Related Technology that Targets Humans and Society

(1) Mechanism for facilitating improvement in intellectual activities

1) Regarding "To Reveal the Mechanism of Intellectual Activities and to Develop Research & Development of Methods and Systems that Facilitate the Mechanism":

\* Use a decision-making mechanism that makes use of the information of differences

\* Use the mechanism of the PMD to form the direction of value that accepts the information differences

\* Apply the mechanism described in the section "Decision Mechanism by Information of Differences" when controlling awareness, spatial positioning and order, where the information of differences is input.

2) To create a system that facilitates cooperation within a group composed of individuals from various intellectual backgrounds, refer to "How to Create the Domain of Thinking and Consensus among People Concerned" (section 3.1) and "Details of the Steplist Method and Advanced Analysis" (section 3.2) to create a standard system.

3) Develop the above system to create a standard method that can correspond to differences in knowledge and ways of thinking resulting from the differences between individuals, groups, and cultures.

4) To reveal the intellectual mechanism within a group

Reveal the methods to construct and apply an intellectual mechanism in a group first by using the DTCN method and others, instead of referring to the same methods as in section 2). Then explain and analyze the applicable mechanism in the course of proceeding with the methods.

5) Research & Development of Methods, Tools and Systems that Facilitate Intellectual Activities

\* Use the DTCN method as a framework since method is in use. Clarify when and where other tools and systems should be used so that they can be most effective.

\* Regarding "Research on Evaluation Methods for the Systems and the Tools," go back to the original meaning of the English word "evaluation (ex. value)" i.e., "to create a value or emphasize a value," and create an evaluation method that allows broad and multi-step evaluation. To this end, take advantage of the trade study method found in the PMD method, as well as the Steplist method, and produce an evaluation method that can be developed further. Unlike conventional evaluation methods, this new method should also be subjected to evaluation (in a sense, the DTCN method can be used as a method to evaluate itself).

6) Research on the Tools that Support Logical Thinking

Begin the process by differentiating the Scientific Method, which analyzes existing mechanisms and starts with the hypothesis "Why does A happen?" from the Engineering Method, which starts with the hypothesis/future abduction "in order to something, it is necessary to do something." For this purpose, refer to section 1.3 "The Proper Use of Questions for Creative Thinking and Decision Making" and Figure 2.8-3 "The Comparison of the Steplist Management Process with Conventional Management Processes."

\*In order to effectively promote the human way of thinking from a vague stage to a confirmed stage, use "grade of estimate" in Fig. 6.2-3. In order to clarify where the vagueness lies as well as how to improve the

clarity, use the PMD, the Steplist, 3-5 Phase Improvement, and the FBS Technique.

#### 7) Research on the Tools that Support Intellectual Activities, including Inspiration and Creation

\* First of all, develop a computer platform that contains the KJ method, the NM method, the DTCN method and the QFD method, which fit into Japanese culture well.

\* Then develop software that supports higher-order intellectual activities.

\* Improvements on US-invented methods, such as the FTA (Fault Tree Analysis) and the FMECA (Failure Mode Effect and Criticality Analysis) should be included in the software.

\* At the same time, choose a new symbol, or a Chinese character to display the new concept.

#### 8) International Intellectual Activity

Apply the same method as in 7) to attach international characteristics.

#### 9) Human Interface

Clarify the mechanism of human interface with the help of "Sexual Differences in Sending and Receiving Images, and the Creative Application of the Differences" described in the Bibliography [5]. At the same time, start creating the PMDs for several topics to find the Key Word.

\* After finding the Key Word, create a new interface through the NM method.

\* Next observe, analyze, and establish the process of creating the new interface. Then construct a mechanism that will automatically create a new interface, integrate it with existing interfaces, and secure easy access to them.

In constructing the mechanism, international characteristics are vital. Thus, it is necessary to appeal to suitable international organizations, such as the United Nations, or to give support to establishing an appropriate research institution within the United Nations University.

#### 9.2.2.c Research & Development on How to Improve the Living Environment and the Pleasantness of the Social System, and How to Construct Such a Society by Clarifying the Characteristics of Sensibility

1) Focus for the time being on how to establish a peaceful society in a remote area. To be more specific, construct a social system to cope with emergencies and to preclude dangers (for instance, an emergency medical system, including emergency helicopters with a doctor or medical staff on board: an item supported by the Fire Defense Agency, the Ministry of Home Affairs).

## 2) Analyze the Characteristics of Sensibility

Establish facts of gender difference, including the difference resulting from the terrestrial magnetism described by Tadanobu Tsunoda [6], and ways of controlling the difference by utilizing both the concept of the DTCN method and the outcome of various research, such as "Gender Difference in Sending and Receiving Images and Creative Application of the Differences" [5].

## 3) Basic Research on Pleasantness Improvement

During the process of satisfying an individual and overall society, regard life fulfillment as one of the focal points of pleasantness. Next, narrow the focus to a group that includes the elderly and the disabled. Finally, start forming a new value, including within yourself, through the concept of the DTCN method.

To this end, the real topics that the Ministry of Health has been having difficulties addressing are used as an experiment for establishing the method. The first step is to assist the departments in charge in creating a PMD for each topic, following the example of the emergency medical helicopters. Based on the created PMDs, set an example of a procedure to be followed in drafting an integrated administrative plan among governmental agencies. Then, standardize the procedure and ensure that it is widely used.

## 4) Research on How to Construct a Peaceful Society

1) Focus for the time being on how to establish a peaceful society in a remote area. To be more specific, construct a social system to cope with emergencies and to preclude dangers (for instance, an emergency medical system, including emergency helicopters with a doctor or medical staff on board: an item supported by the Fire Defense Agency, the Ministry of Home Affairs).

## 2) Analyze the Characteristics of Sensibility

Establish facts of sexual difference, including the difference resulting from the terrestrial magnetism described by Tadanobu Tsunoda [6], and ways of controlling the difference by utilizing both the concept of the DTCN methodology and the outcome of various research, such as "Sexual Differences in Sending and Receiving Images, and the Creative Application of the Differences" [5].

## 3) Basic Research on Pleasantness Improvement

During the process of satisfying an individual and overall society, regard life fulfillment as one of the focal points of pleasantness. Next, narrow the focus to a group that includes the elderly and the disabled. Finally, start forming a new value, including within yourself, through the concept of the DTCN method. To this end, the real topics that the Ministry of Health has been having difficulties addressing are used as

an experiment for establishing the method. The first step is to assist the departments in charge in creating a PMD for each topic, following the example of the emergency medical helicopters. Based on the created PMDs, set an example of the procedure to be followed in drafting an integrated administrative plan among governmental agencies. Then, standardize the procedure and ensure that it is widely used.

#### 4) Research on How to Construct a Peaceful Society

\* Create several risk management systems and evaluation tools for them by joining the DTCN method, the CRM (Cockpit Resource Management: one of the risk management systems used in aviation services) system, and other methods. These systems and tools can be used in risk management on a daily basis.

\* Also, connect the created systems with the system designed to lighten the burden of caring for the elderly and the disabled.

### 9.2.2.d Research and Development to Support Intellectual Activities in Organizations, and to Address Various Problems found in Society

#### 1) Research on Intellectual Activities in Organizations

The DTCN method is suitable for intellectual activities.

Work closely with the Ministry of Education to develop teaching materials that explain how to use the method in plain language, and adopt them in primary and secondary education. It is important to repeatedly use the PMD method to prevent ideas from being overly divergent.

#### 2) Create Intelligence in Organizations

Make "logical algorithm" and "inspiration" two pillars of the creation of intelligence and ensure the coexistence of the two through the WBS Theme Phasing technique so that the creation of intelligence will proceed systematically. It is vital to formulate a long-term plan that includes developing prototype computer software in order to accomplish the creation of intelligence.

#### 3) Approaching Social Problems through Methods that Unite Natural Science, the Humanities, and the Social Sciences

\* Address difficult issues jointly with the government officers in charge by referring to the KJ method, the NM method, the DTCN method, and the QFD method.

\* Standardize the case studies and methods established through the example.

\* Consult with an independent organization or a consulting firm if the issues cannot be resolved by the officers themselves.



\* Research on modeling and simulating should proceed when necessary, and aimed at practical use from the start.

#### 4) Research on Science Technology

Apply concept 3) to a couple of difficult topics facing the Science and Technology Agency. Conventionally, the DTCN method has been used in product development. However, by applying the method to basic technology development in reality, the essential conditions for using the method for this purpose as well as a method to evaluate it from various angles will be created.

#### 9.2.2.e Research and Development of Software-Related Technology Targeting Hardware

##### 1) Research and Development of Software Aimed at Assisting, Replacing and Expanding Human Functions

\* Input the PMD of a specific topic into a computer and conduct research into the possibility of developing an autonomous system.

2) With respect to the functions and characteristics of human beings and the ecosystem, conduct research on what types of functions should be added to a PMD in order to have similar or the same self-organized function in the combined form of hardware and software.

3) Furthermore, explain the mechanism of emotion through the hypothetical (abductive) link that is thought to exist between the creativity of the brain and spatial positioning methods, such as the PMD method.

##### 4) Research on Assisting, Replacing, and Expanding the Physical Functions of Human Beings

Based on existing technologies and the outcome obtained by proceeding as above, find a topic in each field and formulate a long-term plan for each topic. The long-term plan which is created by the PMD method should be revised every two years.

The topics may include:

- A. Improvement of development and productivity, which may be developed in parallel
- B. Creation of supporting or additional functions for the elderly and disabled
- C. Advancement of the information network
- D. Desk system that could improve the abilities of an individual (this can be applied immediately in the Science and Technology Agency). (C and D, in particular, should first be implemented in the Science and

Technology Agency.)

E. In relation to verbal and non-verbal simulations based on ethnic and cultural background, draft a preliminary long-term plan and an implementation plan by referring to the method described in the Bibliography [7] and the DTCN method.

5) Research to Secure the Reliability of Large-scale Systems

\* Draft a development plan for a method that exceeds the FTA and the FMECA, which only preclude man-made errors.

\* Conduct necessary research on the factors involved and proceed to preliminary experiments.

6) Research into Information Processing of Emotions and Sensitivities of Human Beings

\* Conduct engineering research based on the changes in the frequency of response between the right and the left sphere of the brain according to age [6].

\* At the same time, use the hypothesis that information is transmitted between the right and the left sphere of the brain as a half tone (Michihiko Ezaki, unpublished).

\* English-speaking people often shake their heads right and left while they speak.

Examine under which circumstances they shake their heads to the left, and then to the right, and vice versa. (The rule has almost been explained.)

7) With respect to issues such as the global environment, computer crime and urban problems, start by creating a PMD for each topic and revise the measures to cope with each issue.

9.2.2.f Rearrange and Enrich the Environment and Organization for Research and Development Programs of Software-Related Technology

(1) By transforming R&D methods into software with the help of the DTCN method, prepare room for:

\* standardization

\* specific examples

(2) Based on the software, make an implementation plan among the people and parties concerned which consists of a system, preparedness and implementation, and follow up with it.

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