

THE CAUSAL SWOT ANALYSIS USING SYSTEMS THINKING AS A TOOL FOR SITUATIONAL ANALYSIS WORKSHOP

Koichi Takahashi, Takashi Maeno

Graduate School of System Design and Management
Keio University

ABSTRACT

SWOT analysis is a tool for current situational analysis on organizational activities. It was developed as a framework to evaluate strengths and weaknesses of internal environment as well as opportunities and threats of external environment. Each quadrant in the framework explains its corresponding factors. On the other hand, the TOWS Matrix is developed as a tool for developing alternative strategies based on current situational analysis. The characteristic of the TOWS matrix is developing strategies that matches external environment according to the cross-tabulation table called Interaction matrix. Previous studies on both tools show that they have something in common, that is, with regards to the subject, they sort out factors in its corresponding quadrant and spot the problem present with the permutation analysis method. Also, with the TOWS matrix, alternative strategies are developed based on current situational analysis.

The Causal SWOT analysis is a workshop technique that aims to share the perception about the present state and makes use of the concept of Causal loop and Leverage Point in Systems Thinking. In The Causal SWOT analysis, internal variables related to subject and cause-and-effect-relationship of external variables is tied together with an arrow. The arrows showing the cause-and-effect relationship between variables are saved for the decision making process. While viewing the causal relation chart that has many arrows, participants discover independent variable that has multiple dependent variables. According to the leverage point specified, verification is done with regards to holding the workshop a few times so as to convince participants.

Keyword: Situational analysis, Workshop, Systems Thinking, Being convinced

INTRODUCTION

In the negotiation in organizations such as company, local government, NPO and so on, decision making concerning the subject is important. In Europe and the United States, final decision making is done by the top of the company. Such western style decision making is called the “top-down model”. On the other hand, in Japanese companies, the final decision making rights belongs to the top but often times during the decision making process, those who pick the solutions are those in the middle management or contact personnel of the project. Such form of decision making is called the “bottom-up model”. In decision making of the bottom-up model, it involves many discussions among numeral parties therefore it is necessary to adjust opinions in order to reach an agreement. Consensus Building within organization usually takes place in a meeting. During the meeting, there is a need for a facilitator.

THE CAUSAL SWOT ANALYSIS

The emphasis of this paper is on how the workshop participants are convinced by themselves. "To be convinced" here is defined as "workshop participants voluntarily accept information through common values of other companies". Decision making in an organization requires "correctness" in the decision. In the case of a company, for matters requiring decision making, if the result of the action taken and the financial quantitative result i.e. profit expansion can be ascertained, this decision is deemed to be "correct". That is to say, there is a time gap between the period of decision-making and verifying its result.

Hence, when decision-making is done, the "correctness" of the decision cannot be proven. Thus, in a workshop, as the "correctness" of decision-making cannot be proven quantitatively, a separate evaluation axis is needed for the participants, which is to measure to what extent the participants "are convinced". The degree of being convinced is related to "doubtlessness". "Doubtlessness" is a state of mind where one, such as an individual or a group, understood the result after digesting a certain matter. "Doubtlessness" is likely to be associated with psychological satisfaction. Although the "correctness" of decision cannot be proven, it is possible to check whether participants "are convinced" enough about it.

Situational analysis tool

Previous study related to current situational analysis tool

Although SWOT analysis is well-known for being a tool used in current situational analysis, in recent years, it is said that those who actually use it are little. SWOT analysis involves plotting factors into quadrants "Strength", "Weakness", "Opportunity" and "Threat". Covering subject related to internal and external environment in detail, it is a technique for understanding the actual situation of a matter. However, after laying out all the internal and external factors, it does not show clearly how to identify the problems. While SWOT analysis is a tool for current situational analysis, there is a drawback because it is weak in traceability. It is weak because in the search process till the problem is found, you can only trace what is left behind from discussions.

On the other hand, the TOWS matrix formulated by Heinz Wehrich (1982) is a tool for executing current situational analysis of strategies that has been implemented and planning alternative strategies. In other words, the difference between the TOWS matrix and SWOT analysis is that besides the "current situational analysis", there is also "planning of alternative strategies" in the former. Multiplying the internal factors "strength" and "weakness" and external factors "opportunity" and "threat", Interaction matrix is created. To be exact, combining changes in the external environment, it covers 4 areas of countermeasures --- "Taking advantage of opportunity, what is the strategy to make use of strength", "When fighting against threat, what is the strategy to fully utilize strength", "Taking advantage of opportunity, what strategy can cover up weaknesses" and "What strategy can enable cover-up of weaknesses while facing threats". In actual execution, it utilizes the interaction matrix to evaluate the relationship between internal variables and external variables according to "+- relationship present" or "there is no 0-relationship, or they are remotely related". While doing such evaluation, depending on the

THE CAUSAL SWOT ANALYSIS

situation, there is a reasonable way of choosing which strategy should be placed as priority. This means that the TOWS matrix is able to ensure traceability depending on the process of going through alternative strategy based on current situational analysis. However, more importantly, when using the TOWS matrix to run current situational analysis, it requires management decision making that has already identified the orientation of strategic deployment. It does not pay much attention to the discussion for coming to an agreement or the thinking process.

Establishing the problem for this study (change of objective) – Developing workshop techniques as “Soft skill” instead of emphasis on analysis result as “Hard skill”

In this study, The Causal SWOT analysis which emphasizes on viewpoint of interactive process in addition to viewpoints from previous study related to current situational analysis is proposed. In The Causal SWOT analysis, instead of just analyzing, temporary co-existence of concurrent situation with a range of opinions or a variety of concurrent values stands abreast. At the same time, while paying attention towards situation (accommodation) which has accepted others, the interactive process is also emphasized.

Table 1: Comparison between previous study and Systems Thinking1

| Situational analysis tool | User | Purpose of Application | | | | Interest in Dialogue | | |
|---------------------------|---------------|------------------------|------------------------------|-----------------------------|--------------------------------|----------------------|--------------|--------------------------|
| | Group members | Overview the theme | Current Situational analysis | Discovery of critical issue | Formulation Of Backup Strategy | Accommodation | Traceability | Satisfaction in Dialogue |
| SWOT analysis | ✓ | ✓ | ✓ | ✓ | | | | |
| The TOWS matrix | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| Systems Thinking | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | |

THE CAUSAL SWOT ANALYSIS

Table 2: Comparison between previous study and Systems Thinking2

| | SWOT Analysis | The TOW | Systems Thinking |
|-------|----------------------------------------|--------------------------------|----------------------------------------------|
| Who? | A party to the theme | Business Strategy Planner | A party to the theme |
| When? | Now | Now and Future | Now and/or Future |
| Why? | Analysis of the current condition | Formulation of Backup Strategy | Overview and modeling of the real world |
| What? | Identified theme | Ongoing Strategy | Identified theme |
| How? | Extract the elements in four quadrants | Use Interaction matrix | Pursue causal relationship between variables |

Systems Thinking

Causal Loop Diagram

Connecting the elements of Systems Thinking together by an arrow, it is presented in the form of a cycle. This way of presentation is logical, easier to understand visually and able to use for all themes and it is practical. Due to this, it has gained much attention from the business world.

Systems Thinking is defined as “a method of understanding the causal relation of two or more components that took place when searching for roots and background of a problem” It is not looking at composition of things individually but being able to capture the big picture by looking from a bird’s eye view and understanding it.

Although a loop is used to demonstrate Systems Thinking, it is referred to as the feedback loop for cause-and-effect relationship.

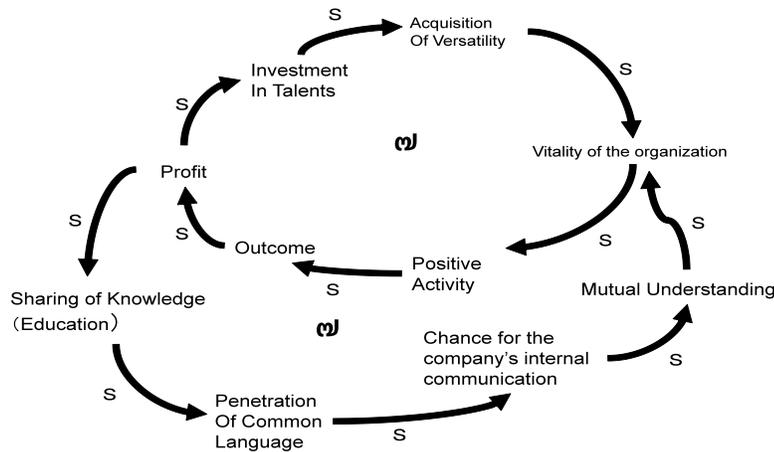


Figure 1. Reinforcing loop of strengthening enterprise diversity
Discovering Leverage Point

THE CAUSAL SWOT ANALYSIS

When drawing the feedback loop for cause-and-effect relationship, set the subject as the theme. Gather internal and external variables related to the theme and construct a loop for cause-and-effect relationship. In System Dynamics, it is possible to have quantitative simulation of different kinds of behavior caused by changes in time. On the other hand, System Thinking, a kind of quality analysis tool, instead of quantitatively simulating the behavior of each variable, it observes quantitatively which variable when changed will affect the cause-and-effect loop. In System Thinking, this is called Leverage Point. Although a Leverage Point is “the working point of a lever”, it is an important variable which can influence other variables. Thus, it also generally means that it is “the most critical issue”. Depending on the cause-and-effect relationship loop, Leverage Point is identified upon looking down at the overall prospect pertaining to a certain subject (internal and external environment). Leverage Point is “the root of the problem”.

Communication through real world modelling

Although Systems Thinking is applied as a tool used to construct subject –related model, in the process of model construction, it can be considered as a number of parties having a dialogue session. That means, in Systems Thinking, it can also be seen as a communication tool for overlooking and discussing the subject. In an organization, as a dialogue tool to apply in collective debating, communication relating to the subject can go on smoothly. Group members view diagrams together and hold discussions. Although it is the facilitator’s role to lead the discussion to a conclusion, Systems Thinking helps group members discuss logically and maintains the process until a conclusion is reached. It is a very effective tool.

Mechanism of “being convinced”

In the workshop, “to be convinced” indicates that “participants have to voluntarily accept information from others by sharing common values.” The subject of “being convinced” is oneself. Human beings will not be convinced if compelled to do so by others. In terms of voluntary acceptance of information, “to be convinced” is significantly different from “to be persuaded.”

”Being persuaded” indicates listening to someone’s explanation and being receptive to what is said. Even if a person has been persuaded, however, often, there are times when this person does not completely accept the opinion of the other person. It is not uncommon to note that after being persuaded and after some time has passed, one begins to notice differences between one’s thoughts and the other person’s opinion and retracts acceptance of that opinion.

A main difference between “to be convinced” and “being persuaded” is “whether it becomes part of (one’s) mind.” When someone is convinced about something, the idea in question becomes part of the person. When this happens, it is accompanied by a strong sense of satisfaction. In other words, it is assumed that “to be convinced” is somehow related to a “sense of satisfaction.”

The flow chart below is an observation of the process of participants being convinced in a workshop.

THE CAUSAL SWOT ANALYSIS

Process of being convinced

Expressing an opinion → Accommodating the opinion → Understanding the other party → Common understanding → Agreeing with the opinion → Being convinced

Expressing an opinion : A state in which one's own opinion are voiced to group members

Accommodating the opinion : A state in which differing opinions are temporarily considered simultaneously

Understanding other party : A state in which does not agree with another person's opinion but understands the person's point.

Common understanding : A state in which initially differing opinions gradually move toward harmony through discussion

Agreeing with the opinion : A state in which adjustments to opinions are made within the group, leading to a specific leverage point

Being convinced : A state in which "three types of satisfaction" (stated below) are fulfilled

The workshop defines the following three types of satisfaction that need to be fulfilled "to be convinced", Firstly, satisfaction toward the "time and labor" spent for discussion. Secondly, satisfaction toward the "result", in which the bottom-line agreement is reached.

Thirdly, satisfaction toward the "ties" established through teamwork in which the parties involved discuss a specific topic.

"Time and labor" are closely related to all the processes listed above. In addition, satisfaction toward the "result" denotes the sense of achievement and relief toward being able to identify the bottom-line leverage point. In addition, satisfaction toward the "ties" established indicates a feeling of "togetherness" through teamwork which involves group discussion, a point overlooked thus far in the decision-making process of a discussion. It is also denotes the sense of relief linked to "sharing of venue," "sharing of common awareness with other members," and "empathy" with other members.

Proposal of The Causal SWOT Analysis

In this reseach, The Causal SWOT analysis is proposed as a technique to advance in a workshop while having current situational analysis as an aim. Specifically, it is a group communication tool making use of visualization with borrowed concepts from SWOT analysis and Systems Thinking.

(1) Concrete procedures of the Causal SWOT analysis

THE CAUSAL SWOT ANALYSIS

- Implement SWOT analysis based on the subject
- Search for the cause-and-effect relationship between internal variables (strength/weakness) and external variables (opportunity/threat)
- If there is cause-and-effect relationship, link the determined variables with arrows
- Look for the leverage point, out of the multiple choices, determine one final variable

(2) Directing arrows among variables

Generally, the relationship between cause and result is expressed as the flow from initial cause towards getting an end result (cause → result). In The Causal SWOT analysis, instead of thinking it to be “ tracing back the outcome of the cause”, it should be pulling of arrows, directing it from cause to result like the flow of cause → result.

(3) Specific work of leverage point

The identification of leverage point in The Causal SWOT analysis is observing “What is the cause of influence of multiple result (dependent variable)“ and specifying one out of the multiple variables. However, if an independent variable cannot be found influencing the dependent variables, it is deemed to be important to choose one variable for discussion among group members.

(4) Securing traceability

Traceability means to be able to track the contents of discussion by the participants. Traceability is secured as it visually clarifies the arrows drawn among variables and at the same time leave behind traces of discussion.

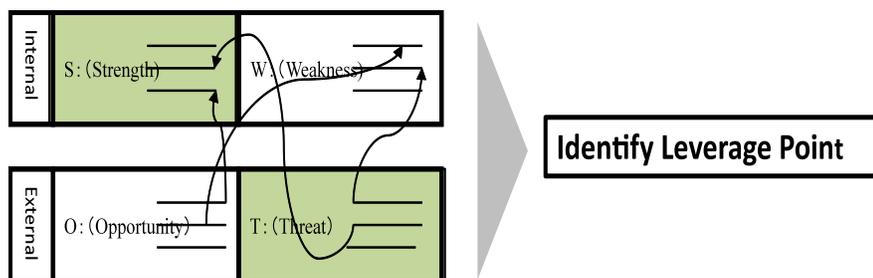


Figure 2. Identification of the Leverage point

Figure 3, shows the end product of workshop at the in-house training in the energy company. Based on the subject “Current situation of free inspection service for clients”, while conducting

THE CAUSAL SWOT ANALYSIS

group discussion, 4 quadrants of internal and external variables are plotted. In the next step, making use of the SWOT analysis result, link the cause-and-effect relationship of internal and external variables. Lastly, while tracing the cause-and-effect relationship between the variables, identify the leverage point. In this case, “organizational structure for providing service”, a result of the group discussion, is identified as the leverage point. Up till this point is the operation work of current situational analysis using The Causal SWOT analysis.

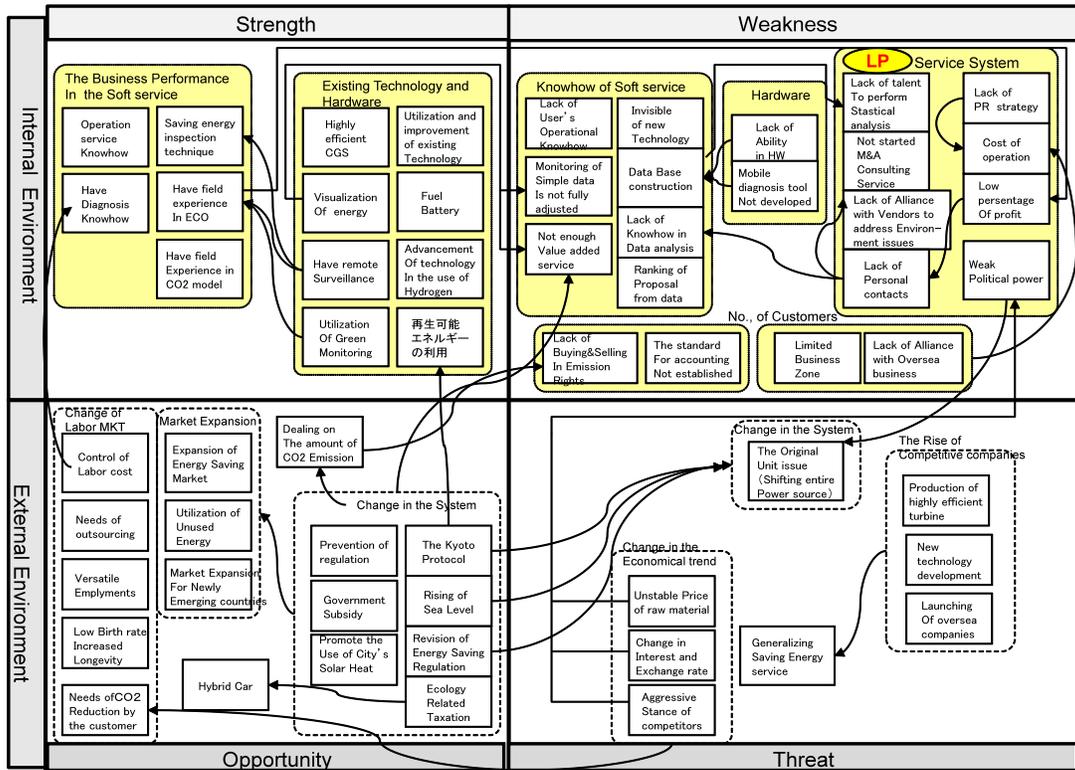


Figure 3. Sample of The Causal SWOT Analysis
Verifying the effectiveness of The Causal SWOT Analysis

Problem of verifying effectiveness of The Causal SWOT Analysis

Normally, it is necessary to describe whether the technique has obtained valid results, so as to show the validity of the technique. However, it is difficult to quantitatively show the appropriateness of the current status of the workshop held by the company. Meanwhile, what is important in the workshop is how consented will the participants be towards the result. In particular, for the Causal SWOT analysis, how convinced the participants are about making use of leverage point, a type of Systems Thinking is important as well. Therefore, this study will focus on overall degree of convincing in the workshop and degree of consenting towards leverage point.

THE CAUSAL SWOT ANALYSIS

Methodology

Right after the Causal SWOT analysis has been implemented, participants were asked 5 questions as shown below. The answer to each question is evaluated by numerical value based on a five level assessment. To see the relativity between data after evaluation result has been collected, the correlation of each question is judged from the correlation coefficient.

Table 3. Questions asked after The Causal SWOT Analysis has ended

| Reflection on the workshop |
|---------------------------------------------------------------------------------------|
| Q1 The Causal SWOT analysis is considered to be easy. |
| Q2 There is a sense of understanding after a discussion by the group members. |
| Q3 There was an accommodation during the discussion. |
| Q4 We could come to understanding on the identification of leverage point. |
| Q5 We can have the outlook for finding a solution from the identified leverage point. |

Please answer each of the following questions with five level of evaluation:

- Level 5: Strongly agree
- Level 4: Agree
- Level 3: No Opinion
- Level 2: Weakly disagree
- Level 1: Strongly disagree

THE CAUSAL SWOT ANALYSIS

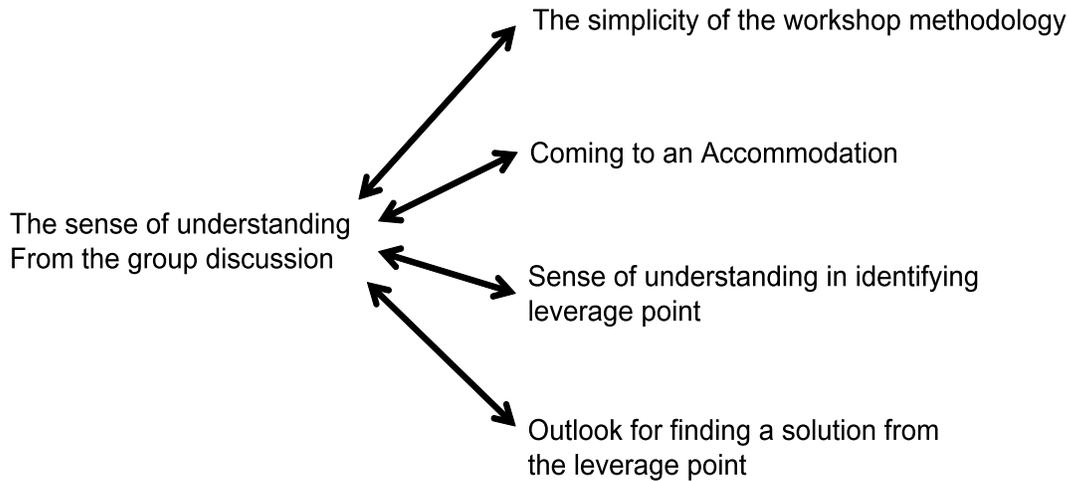


Figure 4. Relativity between “the sense of understanding from the group discussion” and each question and category

Due to the emphasis on dialogue process of soft systems methodology, the survey placed a focus on “understanding” and with regards to the relativity between “the sense of understanding from the group discussion” and “corresponding category”, statistical analysis is conducted.

Test subject

In this survey, with the cooperation from 5 companies –2 SI firms (Company A, Company B) , 1 IT consulting firm (Company C), 1 Advertising agency (Company D), Precision instruments manufacturer (Company E), stimulated corporate training workshops were held (Duration: February 2010 to January 2011).

- Number of workshops held: 11 times
- Number of groups : 39 groups
- Total Number of persons being tested : 188 persons

Below shows the breakdown of tested subjects.

Table 4. Characteristics of tested subjects, group count and number of participants.

| Companies | Business Categories | Characteristics of Participants | Group Count | No., of Participants |
|--------------|------------------------|---------------------------------|-------------|----------------------|
| A | SI Enterprise | Employed for 3-5 years | 5 | 35 |
| B | SI Enterprise | Employed for 3-20 years | 23 | 97 |
| C | IT Consulting | 10 years or more years | 1 | 5 |
| D | Advertising Agency | Employed for 3-14 years | 5 | 25 |
| E | Fine Instrument Vendor | Employed for 3-10 years | 5 | 26 |
| Total | | | 39 | 188 |

THE CAUSAL SWOT ANALYSIS

Flow of simulated workshop

(1) Organizing groups

Tables in the venue were arranged in an island formation and each group were made up of 5 to 6 participants. The groups were arranged taking into consideration preliminarily the number of years of experience in the company for the various groups in the talent development department of the head office so that there is no bias with regards to the department they belonged to resulting an appropriate allocation.

(2) Procedure of simulated training workshop

Step 1: Setting theme

Each group discusses and decides on a theme related to the company

Step 2: Implementing SWOT analysis

Each group were made to implement SWOT analysis to find out about current situation based on the chosen theme

At this step, no explanation is made on the Causal SWOT analysis

Step 3: Implementing the Causal SWOT analysis

Right after SWOT analysis has completed, the Causal SWOT analysis is carried out. Results of SWOT analysis done earlier were used to trace variables in the causal relation and to link the variables thought to be related with arrows.

Step 4: Identifying leverage point

After tracing variables in the causal relation, determine one leverage point through discussion.

Step 5: Evaluation after the Causal SWOT analysis has been conducted : Individual evaluation

Next, individual members are evaluated based on the questions below. Before the above-mentioned evaluation, definition of accommodation as stated below is explained to the participants.

Accommodation means “in a situation where various opinions co-exist temporarily, specifically in order to reach mutual agreement within the group, while various values exist at the same time, acceptance of others also takes place” (Kijima 2005)

Result of analysis

THE CAUSAL SWOT ANALYSIS

(1) Analysis of relationship between data and correlation

Responses to five questions from 188 respondents were collected as data. Using “correlation coefficient”, the relativity between data is shown by an objective numerical value. It is concluded that the larger the correlation value, the more the workshop participants think it is important. Results derived from Diagram 9 are shown in Diagram 10. There is high overall satisfaction towards “understanding of workshop result”. The correlation of other questions, showing strength of relativity is highlighted in Diagram 10. Looking at the size of the correlation, category related to “understanding of the workshop result” is “occurrence of accommodation (0.448)”.

Table 5. Average values of % level of evaluation based on 188 respondents

| The understanding of the results from the workshop | The simplicity of The workshop technique | Accommodation | Understanding of the leverage point | Outlook for a solution |
|----------------------------------------------------|------------------------------------------|---------------|-------------------------------------|------------------------|
| 4.35 | 3.35 | 3.35 | 4.24 | 3.72 |

Table 6. Correlation Coefficient

| | Understanding of the results form workshop | Internal and external variables total | Simplicity of workshop technique | Accommodation | Understanding of the Leverage Point | Outlook for a solution |
|--------------------------------------------|--------------------------------------------|---------------------------------------|----------------------------------|---------------|-------------------------------------|------------------------|
| Understanding of the results form workshop | 1 | | | | | |
| Internal and external variables total | 0.142 | 1 | | | | |
| Simplicity of workshop technique | 0.282 | 0.135 | 1 | | | |
| Accommodation | 0.448 | 0.053 | 0.027 | 1 | | |
| Understanding of the leverage point | 0.206 | 0.053 | 0.288 | -0.133 | 1 | |
| Outlook for a solution | 0.149 | 0.112 | 0.490 | 0.060 | 0.393 | 1 |

THE CAUSAL SWOT ANALYSIS

Table 7. Table of correlation coefficient and average value of evaluation

| | Correlation Coefficient | Averaged Value of Evaluation |
|------------------------------------------------|-------------------------|------------------------------|
| Simplicity of the workshop technique | 0.282 | 3.35 |
| Accommodation | 0.448 | 3.35 |
| Understanding of the identified leverage point | 0.206 | 4.24 |
| Outlook for a solution | 0.149 | 3.72 |
| Average | 0.271 | 3.67 |

Table 7. shows a list of “correlation coefficient” and “average value of evaluation” and the average of the two in the 4 categories is computed.

The first observation is verifying the focus of problem 1 (to convince participants the workshop results where the Causal SWOT analysis was applied). The coefficient of correlation of “understanding of workshop result” and “sense of accommodation taking place” is 0.448. In another words, there is high statistical significance between “occurrence of accommodation” and “understanding of workshop result”.

Next, the second observation is verification of problem 2 (convincing participants with leverage point identified using Causal SWOT analysis) is the focus. According to the 188 participants, from the 5 level evaluations, the average evaluation of “understanding of leverage point” is 4.24. Thus, understanding of identified leverage point is high.

(2)Correlation of each factor

Problem1 :To convince participants of the workshop result where the Causal SWOT analysis was applied

With regards to “understanding of workshop result”, amidst a total of 188 participants and 39 groups, the average value of 5 level evaluations is 4.35 (see diagram 9). Diagram 12 shows the frequency distribution table of understanding of workshop result.

In the evaluation, out of 39 groups, 19 groups had evaluation value ranging from 4.5 to 5.0 and 14 groups had evaluation value ranging from 4.0 to 4.49.

THE CAUSAL SWOT ANALYSIS

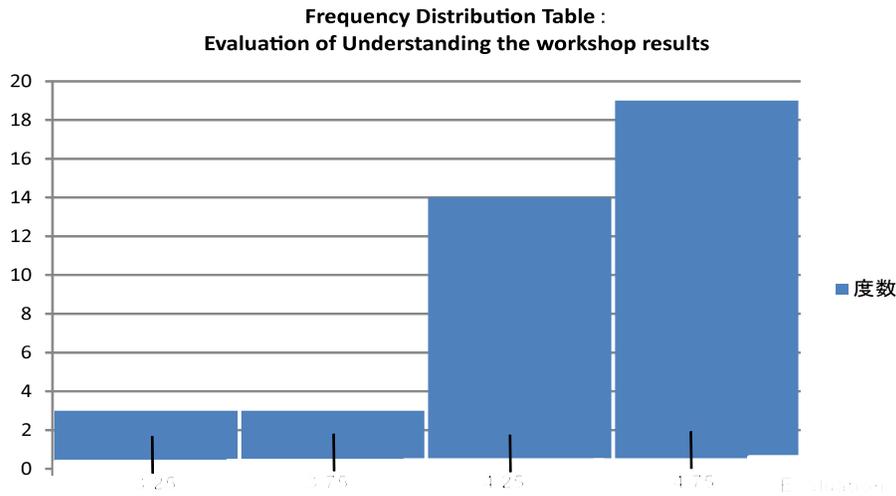


Figure 5. Frequency distribution table of understanding of workshop result according to group

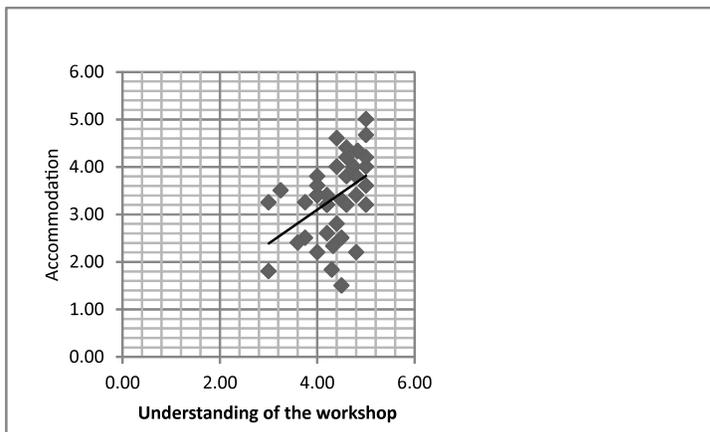


Figure 6. Correlation of “Understanding workshop result” and “accommodation”

Meanwhile, in observation1, the relationship with “understanding of workshop result” and “accommodation” has a correlation coefficient of 0.448. As shown in the scatter diagram, there is positive correlation.

Problem2 : To convince participants of identified leverage point using Causal SWOT analysis

For “understanding of leverage point”, according to the 188 participants, average evaluation based on 5 level evaluations is 4.22. The significance of relationship between “understanding of leverage point” and “accommodation”, as seen in the scatter diagram, cannot be identified.

Also, the significance in the relationship of “understanding of leverage point” and “understanding of workshop result” cannot be identified as well.

THE CAUSAL SWOT ANALYSIS

In contrast, there is positive relationship between “understanding of leverage point” and “outlook for a solution beginning with leverage point” as displayed on the scatter diagram. As seen in Diagram 10, the correlation coefficient between the two is 0.393. Therefore, there is statistical significance. That is to say, there is a tendency that “as participants feel convinced by the identified leverage point, they are able to visualize the development of solution”.

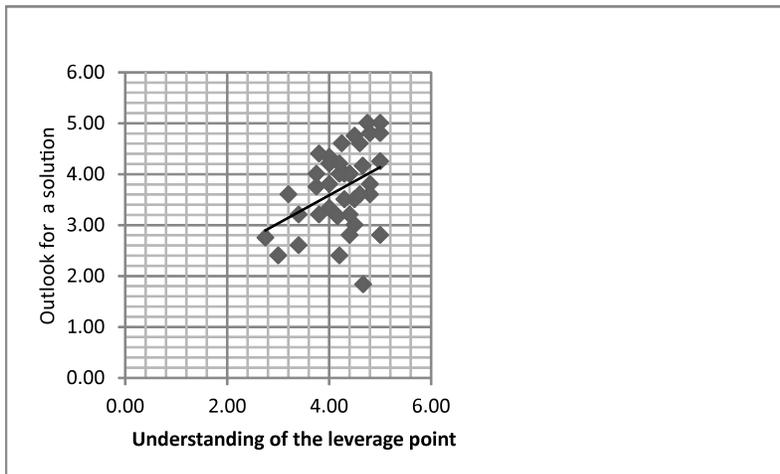


Figure 7. Correlation of “understanding leverage point” and “outlook for a solution”

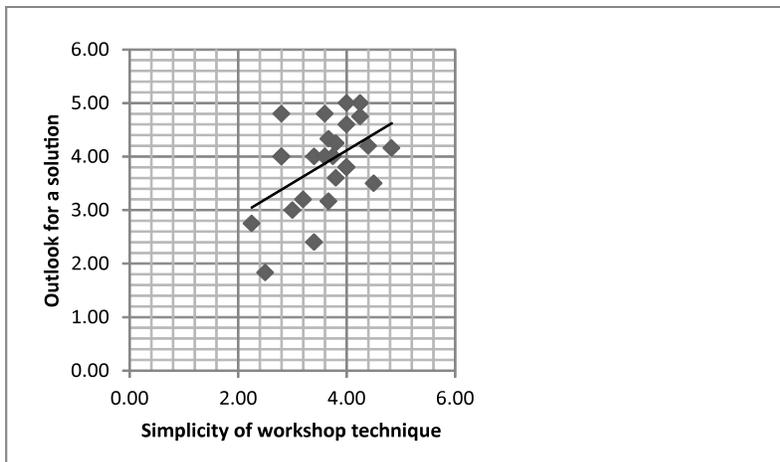


Figure 8. Correlation of “Simplicity of workshop technique” and “outlook for a solution”
(2) Regarding manageability of the Causal SWOT analysis

As shown in Figure 8. , the relationship between ”simplicity of workshop” and “outlook for a solution with leverage point as the starting point” is 0.49, therefore there is statistical significance. In other words, there is a tendency that, “for the participants, development of solution after definition of leverage point is imaginable just like how workshop technique is simple”.

THE CAUSAL SWOT ANALYSIS

CONCLUSIONS

Framework of SWOT analysis and application of Causal Loop in Systems Thinking is proposed in this study. That is to say, while connected by arrows to enable visualization of causal relationship between variables, with regards to the act till leverage point is identified, decision-making process and conclusions drawn (the leverage point) showed the quantitative degree of understanding by the participants. The findings from this study are as follows.

- Accommodation in a dialogue through the Causal SWOT analysis is an important factor to convince participants of the workshop results
- Participants are convinced of the identified leverage point with Causal SWOT analysis
- Just like how they are convinced of the identified leverage point, participants can equally visualize the development of the next tasks for a solution
- The workshop which made use of the Causal SWOT analysis is effective in discovery and sharing of problems. At the same time, it connects to the beginning of problem solving.
- In the decision making in the organization, although only the conclusion tends to be valued, to the participants, they find understanding in the dialogue with other members until a conclusion is reached.

REFERENCES

- Checkland, Peter, Scholes, Jim (1990) *Soft Systems Methodology in Action* John Wiley & Sons, Ltd.
- Dyson, Robert G. (2002) *Strategic development and SWOT analysis at the University of Warwick*
- Kijima, Kyoichi, Naoko Nakajo, Michel C. Jackson, Norimasa Kobayashi, Shingo Takahashi, Tatsuyuki Negoro, Takenori Yoshida (2007) *Holistic Creative Management* Maruzen
- Kneer, Georg Armin Nassehi (1993) *Niklas Luhmanns Theorie Sozialer Systeme Japanese translation rights arranged with Wilhelm Fink GmbH & Co. Verlags*
- Kurttila, Mikko, Mauno Pesonen, Jyrki Kangas, Miika Kajanus (2002) "Utilizing the analytic hierarchy process (AHP) in SWOT analysis - A hybrid method and its application to a forest-certification case" *Forest Policy and Economics* 1 2000
- Minzberg Henry (1976) *Planning on the Left Side and Managing on the Right* Harvard Business Review July-August
- Senge, Peter M. (1990) "The Fifth Discipline-The Art & Practice of The learning organization"
- Sterman, John D. (2000), *Business Dynamics Systems Thinking and Modeling for a Complex World* Irwin McGraw-Hill
- Takahashi Kouichi (2009) *Rebarejji pointo wo mitsukedase! Mondai hakkenryoku youseikouza 'ki wo mite mori mo miru' shisutemu shinkingu* (Identify the leverage point! Problem discovery seminar "Seeing forest for the tree" Systems Thinking) Nihon Jitsugyo Publishing
- Weilrich, Heinz (1982) "The TOWS matric a tool for situational analysis" *Journal of Long Range Planning* Vol.15 Issue 2