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THEORETICAL INVESTIGATION INTO SYSTEMS ANALYSIS

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Abstract

Systems analysis has been practiced by expert systems analysts or IT people in the third person perspective or objective one. We question this style of systems analysis and investigate into what it should be and who should practice it in an unpredictable, turbulent environment. The existing systems analysis methods such as UML help systems analysts ignore the differences of individual workers and pay attention solely to roles or functions played by them. However current companies depend more on individual knowledge workers and their experiences. Recently there have appeared a few methods with which business professionals or workers themselves reflect on their own knowledge and experiences, one of them proposing systems analysis in the first person perspective. The development of those methods is primarily based on the practical experiences and needs as consultants. Therefore there is still no theoretical background and support to the development. We made a theoretical investigation into this alternative discourse of systems analysis. Our study consists of an exploration into Stacey's theory on organizations as a cue for systems analysis in a turbulent environment and two explorations into organization development literature for high performance in a less turbulent environment and the meanings of systems analysis.

Keywords: Systems analysis, Systems analyst, Business professionals, Workers, First person perspective

1. INTRODUCTION

Systems analysis precedes information systems development. It is IT professionals or expert systems analysts who have practiced the systems analysis with some participation of business professionals or workers (Whitaker, 2007). A presupposition that external experts such as systems analysts practice systems analysis is widely shared in many organizations (Alter et al, 2000). We question this presupposition. We will have a theoretical investigation into who should practice systems analysis in turbulent environments and what systems analysis should be.

In a globalized world economy, high performance is a must for a company to survive in an oligopolistic market. However, IS failure and dissatisfaction are still prevailing, although project success rate improved over 10 years (Standish, 2004). IS has a risk to become a system drag on organizational changes (Truex et al, 1999). It is well known in IS development that the earlier the factor the more serious the associated problem. As systems analysis is the earliest factor in IS development, the possible inappropriateness will become a serious problem later in a business for a long time.

The seriousness or importance of systems analysis can be shown in another way. Systems analysis is to systems development as a scientist is to an engineer. Amour (2003) says, "The difference is that to the scientist the understanding is the goal; to the engineer the understanding is a means to an end … it is a way to create something that works. This end-focused reasoning can be so strong that I have seen engineers happily provide an answer to a problem they don't understand." Systems analysis is concerned with knowing not building some artifacts. Systems analysis is expected to provide a project team with a more thorough understanding of the problems and needs that trigger the project (Whitaker, 2007). Therefore, inappropriate systems analysis necessarily entails low performance in the organization for a long time.

Systems analysis and its methods have been based on the third person perspective or objective one. It means that a person who is external to the processes of an organization undertakes systems analysis. However, the scene is changing a little bit. There have appeared systems analysis methods for business professionals or workers, for example, the work system method (Alter, 2002). Furthermore, a practitioner even proposed systems analysis of the first person perspective (e.g. Whitaker, 2007).

Current popular systems analysis methods such as UML are aimed at professional use by expert systems analysts. This implies systems analysis in the third person perspective. This is exemplified by two points. One is that: In 'use case' diagrams, the notion of actor in the diagram does not mean an individual person on the spot but a role responsible for a specific task, liberating the systems analyst from paying attention to the differences among various workers involved (Fowler, 2000).

The other point is 'user discourse' in IS development. A term 'user' carries a specific connotation in IS. As Whitaker (2007) notes, any concerns for the interrelationship between a person and her task were supplanted by attention to the interrelationship between the person and the artifact, that is, a 'user' and the IS product. A worker was trivialized simply into a user of IS produced externally. Therefore, most of workers became basically uninvolved in systems analysis and design. It means that most of systems analysis has been practiced in the third-person perspective.

Although popular systems analysis methods are for professional use, there have emerged a few methods for business professionals or workers (Bednar, 2000; Alter, 2002; Kosaka, 2006; Whitaker, 2007). Along with establishing IS discipline, Alter (2004) insists that analysis of work systems should precede that of information system, and has been developing the work systems method intended to be used directly by workers. It is worth noting here that he mentions "experience to date shows that typical American business professionals need a systems analysis approach that is more prescriptive than SSM and that includes specific, teachable vocabulary and concepts" (Alter, 2004). Bednar proposes a need for producing a method for workers that helps them reflect on their work practices in order to understand their own social reality and to empower them (Bednar, 200l; Bednar et al, 2005). He created a method, SST, which combines personal learning with organizational one. Whitaker (2007) proposes systems analysis in the first person perspective and is developing a method. However, the method is aimed at emulation of the first person perspective by IT professionals. It is

not for direct use by business professionals or workers. However, it is worth noting that it is he who advocates systems analysis in the first person perspective.

As mentioned above, a few systems analysis methods for business professionals or workers are appearing, however, the needs for them are not necessarily known or accepted widely among researchers and practitioners. There are a few reasons that contribute to little interest among them. One of reasons is a strong belief that systems analysis is what is practiced by IT professionals. In this paper, we assume that it is because the theoretical justification of systems analysis by business professionals or workers is not established.

Though a few methods for business professionals or workers are appearing on the scene, their developments are mostly based on the needs from the experiences as a consultant or a practitioner. For example, Alter (2004) mentioned that his motivation for the development is based on his consulting experiences. In case of Whitaker (2007), he described that conventional IS methodologies are predicated on logical empiricism. However, the theoretical needs for systems analysis methods for business professional or worker are not discussed there. In case of Bednar (2000) who extends learning from organizational one to individual one, he proposes a need for producing a method for workers and created a method SST. However, the situation is similar to Whitaker as far as the theoretical needs are concerned.

To our knowledge there is one theoretical research. It is Truex et al' research (1999) that focuses on the theoretical needs. They proposed the needs for transferring IS development in a project base to continuous development. They implicitly suggest systems analysis by business professionals or workers. However their research is based on Luhumann's systems theory. As known, Luhmann's social system is problematic in case of IS research because the entity of an organization is assumed to be simply communication not humans (Kay, 2001). The experiences of individuals in an organization are not taken into consideration. It is therefore not clearly mentioned in their paper that business professionals or workers should practice systems analysis.

From the discussion above, it can be concluded that there is little theoretical investigation into systems analysis by business professionals or workers, although there have appeared a few methods for them.

Our discussion is a theoretical study as follows: In order to rethink what is systems analysis in turbulent or unpredictable environments, we explore into the related researches from Stacey's theory of organizations to organization development (OD) literature. Recently societies and organizations are becoming complex so that there has been a widespread application of complex theory to them. Stacey et al (2000) applies the theory of complexity to understand organizations. We derive issues for systems analysis in turbulent or unpredictable environments from Stacey's theory of organizations. The exploration into Stacey's theory suggests that participation is a key in unpredictable environments, that is, systems analysis by business professionals. Then, we explore into OD literature, Coch and French study in particular and find that total participation is a key for high performance even in non-turbulent environments. We further explore into another OD literature and find the meanings of participation in systems analysis. Finally we discuss the differences and similarities between the current dominant discourse of systems analysis and an alternative discourse derived from the three explorations into the related literature, and have a theoretical conclusion that a method for systems analysis by business professionals or workers is required.

2. ACTORS OF AN ORGANIZATION

In the field of systems analysis, we explore into Stacey et al's thinking about an organization. Our reason for the exploration is that the environment is so turbulent and unpredictable that survival is not considered an easy task for an organization with the current systems analysis there. The science of complexity has been concerned with stability and change in the environments of that kind. Stacey et al (2000) applied the science of complexity and the history of philosophy about nature and human to understand the source of stability and change in human organizations. Their thinking is considered worth exploring to rethink what is systems analysis in turbulent and unpredictable environments.

2.1 Stacey's understanding of an organization

Stacey et al (2000, p.19) argue that self-organization as cause can be understood in one of two fundamentally different ways, the first being formative and the other being transformative. They use a concept Formative Teleology in which there is an end state, or final form, knowable in advance. The final form is enfolded in the sense that whole exists in some sense before the parts. The purpose is to reach this enfolded end state. It is as if the system, the whole, was moving toward a subordinate final state that was already given (Stacey et al, 2000, p.25).

In a human organization, the final end state is chosen by a choosing manager. They say that the today's dominant management discourse is built on Rationalist Teleology as an explanation of choice and Formative Teleology as an explanation of how the choosing manager or social dynamics works. Rationalist Teleology means that the manager can choose the goals of the organization and design the systems or actions to realize those goals. Stacey et al (2000, p.58) say:

Rationalist teleology applies to the choosing manager (theorist, researcher, decision-maker), from whom the organization itself is split off as a 'thing' to be understood. The organization, that which is to be explained and operated on, is then regarded as an objective phenomenon outside the choosing manager, equivalent to a natural phenomenon, to which Natural Law or Formative Teleology can be applied.

In Rationalist Teleology both stability and change are human choices. It is assumed that organizations are designs chosen by humans and humans can design the truly novel (ibid, p.28). There are assumptions that human action is essentially an individual action and that managers are objective observers who stand outside the processes of the organization and design them according to rational criteria to do with goal achievement (ibid, p.158).

Here it can be thought that the dominant discourse of systems analysis conforms to Formative Teleology with Rationalist Teleology, because an expert systems analyst practices systems analysis as an external observer to the organization. Workers are obliged to use IS provided simply as a user. This fact suggests that the dominant discourse of systems analysis is not appropriate for an organization to survive in turbulent or unpredictable environments.

Based on the distinction of philosophical thinking between Kant and Hegel, they derived Transformative Teleology where there is self-organization that has the potential for transformation as well as continuity at the same time.

They relate their analysis of philosophical thinking with that of chaos theory and dissipative structure. In the theory of dissipative structure, the future is unpredictable and what happens to the system depends upon the micro detail of interactions in the here-and-now of the bifurcation point (ibid, p.96). The future for every level of the universe is seen as under perpetual construction and the process of perpetual construction at every level can be understood in nonlinear, non-equilibrium terms. In human organizations people jointly create the meaning of what they are doing when they act into the unknown, co-creating their future in interaction with others (ibid, p.194). These features, unknowable futures emerging in here-and-now interactions, are essentially what Stacey et al have defined as the causal framework of Transformative Teleology (ibid, p.97).

In a globalized economy the environment is so turbulent that stability cannot be attained solely by a single manager as an external observer. Therefore it is considered that Transformative Teleology is the underlying basis of a sustainable organization in a turbulent environment, chaordic organization in a term of Dee Hock (1995). It is because the future of organizations and environments are unpredictable in this age. In the environments, externally acquired knowledge has bounded effectiveness. It is also because the source of knowledge is expected to be interaction among members.

What is self-organization in a chaordic organization? Members of an organization are suggested to have a shift of thinking from a way that treats them inhuman as the object of control from outside, to another way that places interactions between them as a transformative cause of the organization. This gives rise to the importance of communication as the core of organizing. The points here are the diversity of people in and around the organization and fluid conversations among them. They enable perpetual construction of future and create a sort of collective minds, as mentioned by van Eijantten

(2003) as an orgmind, or a collective subject. When members are divergent and open to change, the chaordic organization continues to innovate itself on its own. It is in this process that mind and self arise between people rather than being located in an individual (Stacey et al, p.174). Management could influence this collective mind.

2.2 Findings from Stacey's study

For systems analysis, Formative Teleology with Rationalist Teleology explains the dominant discourse of systems analysis. In contrast, Transformative Teleology can provide findings for an alternative discourse of systems analysis. First of all, it is participation: that is, members of an organization participate in systems analysis to create their futures. Furthermore, the participation is not a peripheral one around an expert systems analyst. The members of the organization are major players in systems analysis. Knowing and making sense of their past and current activities, they create their future and also create meanings with colleagues. They not simply formulate functions of an organization but create meanings for their lives.

Their participation is not occasional but perpetual or always practiced. They have to practice systems analysis as one of their daily works.

What happens to them is unknowable in advance. Therefore, their future emerges in here-and-now interactions through their communicative action. Co-creating their future through communicative action is dynamic. It is made by neither an individual alone nor a generic role. It need a collective subject, or inter subject to be understood in systems analysis. This collective subject is referred later to as collective person perspective (CPP).

3. TOTAL PARTICIPATION

We explore OD papers, Coch and French study (1948) in particular in this section. The reason for the exploration comes form the fact that Stacey et al (2000) revealed that innovation or change is made by the members of an organization, business professionals or workers, not a manager alone. However it should be noted that the findings are based on not a stable environment but a turbulent one. Then, what about an organization in a non- or less-turbulent environment? Whether innovation or change by business professionals or workers themselves is an efficient and effective way? It comes into question. In order to clarify these questions, we will investigate it in the study by Coch and French (1948). In their classic study, we will look at the efforts or measures taken by an organization primarily to increase the productivity even in a non- or less-turbulent environment.

As Stacey et al (2000) revealed, dominant discourse of management is that a manager designs and chooses a new plan, and that the other members of the organization just follow what the manger chose. The members are therefore considered inhuman even though they are human. In non- or less-turbulent environments, it might have been effective that design and control are practiced by a third person like a manager. For example, strategy formulation has been one of the management practices in the third person perspective. A strategy formulated outside is introduced into the organization, like external best practices.

As well known, however, the idea or plan introduced from outside usually encounter resistance to change or a reaction of not-invented-here. The dominant discourse of management is expected to lose the effectiveness in a global economy where high performance is a must for the organization to survive. The more globalized the economy is, the more efficient and innovative the company must be. In an economy of an oligopolistic market, it is difficult for companies to survive with copying the strategy of their competitor. They must innovate and change on their own even in less-turbulent environments.

Because of the above reasons, we will look at OD classics concerned with motivation of workers and high performance. Their study shows that achieving high performance even in less-turbulent environments requires everybody's participation and cooperation. That is total participation.

3.1 Coch and French's study: Overcoming RTC with participation

The Coch and French's paper published in 1948 in Human Relations has been widely referenced as a cornerstone in research to change. They studied the workers' resistance to changes (RTC) in products and methods at the main plant of the Harwood Manufacturing Corporation in USA, addressing worker's autonomy or 'job design by worker' as a key for high performance.

With the changes in methods and jobs, workers responded with the following resistance: "The resistance expressed itself in several ways, such as grievance about the piece rates that went with the new methods, high turnover, very low efficiency, restriction of output, and marked aggression against management." (Coch et al, 1948)

Despite these undesirable effects, the change was necessary to maintain competitiveness. Efforts were made to solve this serious problem by the use of traditional means such as monetary allowance. However, these actions did little or nothing to overcome the resistance. The factory management felt that the resistance demanded further research for workers' concerns and solutions.

The first step taken in the overall program was to devise a preliminary theory to account for the RTC based on general observation and performance data. It was interesting to note that the re-learning period for experienced workers was longer than the learning period for new recruits. The fact indicates that RTC is primarily a motivational problem not technical one like skills. It was also discussed in the paper that 'we-feeling' known as group dynamics facilitated RTC.

Coch and French set up an experiment with the thought that the most appropriate methods for overcoming the RTC would be group methods because the resistance is a combination of an individual reaction to frustration with strong group-induced forces. The experiment was designed employing variations of participation. The first group involved "participation through representation." The second and third group consisted of "total participation" by all members in designing the changes. The fourth group with no participation was also observed as a control group.

The result of the experiment showed clearly that the rate of production and rate of recovery were directly proportional to the degree of participation, while aggression and turnover were inversely proportional to it. As a result, total participation was shown to be more effective than participation through representatives in the changes of production methods.

Although it has been criticized over the years, mostly because of their research design and management in a real factory setting (e.g. Bartlem et al, 1981), their study remains a significant contribution to research on RTC as a valuable research resource.

Coch et al (1948) shows total participation is importance in case of labor shortage. The findings have increasing significance today because current companies depend on scarce knowledge workers. The findings also show that group dynamics are the mode of effective participation, suggesting the importance of a collective subject as well as that of an individual subject.

3.2 Findings from Coch and French study

What can we learn from Coch and French study? They illustrated a case of achieving high performance. It is shown that total participation is a key for maximum performance. Participation suggested by Stacey et al is enlarged into total participation, which is better than participation through representation. This means that that Stacey's findings that member of an organization construct their reality is supported by Coch and French study, and further suggests that total participation is a key for high performance in less-turbulent or stable environments as well as in turbulent environments.

Their study revealed that group-induced forces create resistance to change. It is not appropriate to treat each business professional or worker as a disjointed individual as the dominant discourse of management does. Rather we have to see a group of people as a collective subject or inter-subject, which can be located in between an intra-subject and a generic-subject that is a role. This requires systems analysis methods in the collective person perspective (CPP) that enable collective subjects in a workplace to be depicted.

In addition to the lack of collective person perspective in them, the existing systems analysis methods treat human simply as a role. The methods do not see a worker as a living man because they are based on an idea that users have no emotion. Therefore, the existing methods cannot help systems analysts

understand how group dynamics work in a workplace, and even do not understand the differences among members of an organization.

4. FIRST PERSON PERSPECTIVE

We have so far revealed that members of an organization have to participate in building their social realities and that the type of participation must be total participation. As systems analysis is concerned with not only understanding work systems but also formulating IS needs for them, the idea of total participation alone is not enough to achieve high performance. What is important in systems analysis for business professionals or workers is how to realize the total participation.

Total performance is pointed out to maximize performance in Coch and French study. However, why it can achieve high performance is not explained. One of what is revealed is that group-induced forces work in workplaces and create resistance to change. Their study is considered to say that preventing from the occurring of bad aspects of group-induced forces brings an expected performance, because changes by management initiatives trigger group-induce forces to occur, which disturb an expected performance to be realized. It is simply considered that they pointed out that the removal of negative factors brings high performance. Then, the influence of positive factors comes into question.

There is a classic study that deals with the positive factors, motivation by job enrichment. It is Hackman et al's research into job enrichment. It is also considered that participation without a guide of good practice does not necessarily bring high performance. Their research addresses both the positive factors and the guide of good practice. Hackman et al (1975) formulated a methodology for job enrichment about how to motivate an individual worker (Fig.1).

4.1 Hackman et al's study: A new strategy for job enrichment

Hackman and Lawler (1971) found that three "psychological states" are critical in determining individual person's motivation and satisfaction on the job: (a) 'experienced meaningfulness' of the work: The individual must perceive his work as worthwhile or important by some system of values he accepts, (b) 'experienced responsibility' for outcome of the work: He must believe that he personally is accountable for the outcomes of his efforts, and (c) 'knowledge of results' of the work activities: He must be able to determine whether or not the outcomes of his work are satisfactory. When all three are high, then internal motivation, job satisfaction, and work quality are high, and absenteeism and turnover are low.

Here, it should be noted that 'experienced meaningfulness' and 'experienced responsibility' are of subjective reflection. Stacey et al (2000, p.58) pointed out that dominant discourse of management treats members of an organization as inhuman part of the organization. The inhuman part does not experience the meaning of jobs and the responsibility of jobs. Therefore Hackman et al assumed the members of an organization are living humans who make sense of their jobs. It suggests that analysis and planning must be made not by mechanistic parts of an organization but by human parts of the organizations, that is, human members on the spot.

What job characteristics or dimensions elicit these psychological states? Hackman and Oldham (1975a) identified five core job dimensions in their job characteristics model. Three of the five core dimensions contribute to 'experienced meaningfulness': (1) Skill variety: the degree to which a job requires the worker to perform works that challenge his skills and abilities, (2) Task identity: the degree to which the worker does a job from beginning to end with a visible outcome, and (3) Task significance: the degree to which the job has a substantial and perceivable impact on the lives of other people in the immediate organization or outside. If the job is high in all three dimensions, the worker is quite likely to experience his job as very meaningful. As other core job dimensions, they identified autonomy toward 'experienced responsibility,' and feedback toward 'knowledge of results': (4) Autonomy: the degree to which the job gives the worker freedom, independence, and discretion in scheduling work and determining how to do it. This leads a worker to experience increased responsibility in his job, and (5) Feedback: the degree to which a worker, in carrying out the work activities required by the job, gets information about the effectiveness of his efforts. These five core job dimensions are of objective description.
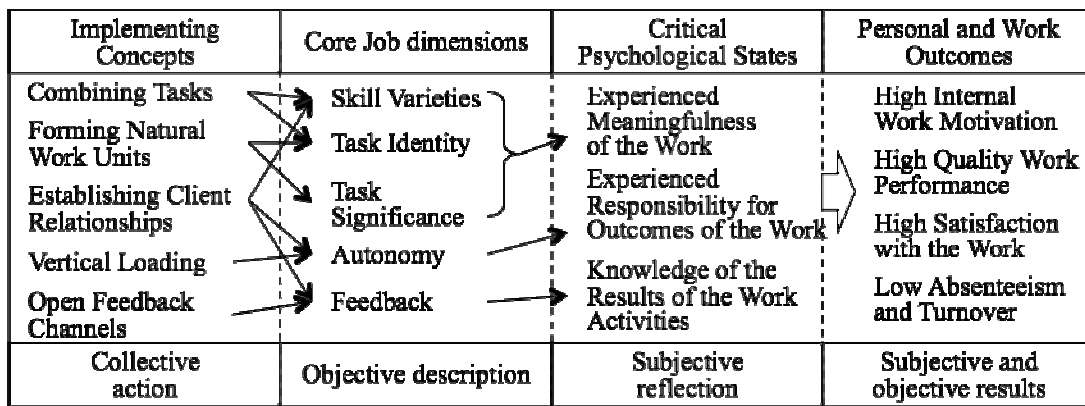
Implementing Concepts	Core Job dimensions	Critical Psychological States	Personal and Work Outcomes
Combining Tasks Forming Natural Work Units Establishing Client Relationships Vertical Loading Open Feedback Channels	Skill Varieties Task Identity Task Significance Autonomy Feedback	Experienced Meaningfulness of the Work Experienced Responsibility for Outcomes of the Work Knowledge of the Results of the Work Activities	High Internal Work Motivation High Quality Work Performance High Satisfaction with the Work Low Absenteeism and Turnover
Collective action	Objective description	Subjective reflection	Subjective and objective results

Fig.1 Hackman et al's model and subjectivity

Hackman et al (1975b) further identified five "implementing concepts" for job enrichment. As shown in Fig.1, the implementing concepts are linked to the core job dimensions, which combine to affect psychological states (subjective reflection), which are critical in determining whether or not a worker is internally motivated to work effectively. Each implementing concept is a specific collective action step aimed at improving both the quality of working experience for the individual and his work productivity. They are: forming natural work units, combining tasks, establishing client relationships, vertical loading, and opening feedback channels.

- Forming natural work units: The principle underlying natural units of work is ownership – an individual's sense of continuing responsibility for an identifiable body of work. Natural work units are directly related to two core job dimensions: task identity and task significance.
- Combining tasks: This principle suggests that whenever possible fractionalized tasks should be put together to form new and larger modules of work. As a job-design principle, combining tasks expands the task identity and skill variety that contribute to the overall experienced meaningfulness of the work.
- Establishing client relationships: By enabling workers to have relationships with the clients of their work, improvements can be often realized on three of the core job dimensions: skill variety, autonomy, and feedback.
- Vertical loading: What is intended in vertical loading is to narrow the gap between the doing and the planning / controlling in order to reap some important motivational advantages.
- Open feedback channels: Many organizations have not recognized the importance of feedback as a means for motivation. Job-provided feedback, rather than supervisor-supplied feedback, increases the worker's feelings of personal control over his work.

The realization of implementing concepts requires collective action. Forming natural work units, combining tasks and vertical loading need the reconfiguration of tasks among people. Without collaborations and cooperation they are never realized. Therefore implementing concepts necessarily require collective action.

4.2 Findings from Hackman et al.

For job enrichment, Hackman et al (1975b) defined five implementing concepts, three of them (forming natural work units, combining tasks, and vertical loading) are related to the reconfiguration of the division of labor, and two of them (establishing client relationships and open feedback channels) are related to contextualizing a job. From these, workers need to make sense of their works in wider contexts in systems analysis. In another words, all of the implementing concepts require the individual to make a shift of his concern or attention from his immediate action or object while he is doing his job, to a wider context such as relations to customers and relations to upstream and downstream tasks. It is similar to the situation of medical doctors with saying that good doctors pay attention not only to diseases but also to a patient as a whole, like a slogan "From human factors to human actors" in Bannon (1991). Therefore, the first findings from Hachman et al (1975b) can be expressed as a need for a shift of attention from action to activity.

Concerning to the psychological states, Hackman and Lawler (1971) brought subjective experiences by individuals to the fore in the field where objective evaluation had been dominant. This means that effective participation requires not only the third person perspective (3PP), i.e. objective perspective in the dominant discourse of systems analysis by expert systems analysts but also the first person perspective (1PP) in the alternative discourse of the total participation. That is because, by definition, it is the members of an organization not an observer who can experience the psychological states.

The notion of the collective person perspective (CPP) previously mentioned in the section of Coch et al's study is further supported by the needs for collective action in implementing concepts. Each implementing concept can be actualized through a collective action aimed at improving both the quality of working experience for the individual and his work productivity. The collective person perspective combines 1PP and 3PP into multiple levels of perspectives, which are considered a requisite for actualization of participation (Kosaka, 2006).

5. DISUSSION AND CONCLUSION

We have explored three related literature to investigate what systems analysis should be and who practices systems analysis in particular. We derived findings from them. From Stacey et al's research of organization through theory of complexity, we have findings to systems analysis: Participation, that is, organizational members participate in the construction of their futures through communicative action in turbulent and unpredictable environments. The construction is perpetual. Especially they jointly create the meaning of what they are doing when they act into the unknown. It must be mentioned here that they not only build some artifacts but also create meanings.

From research into resistance by Coch and French, we have findings: Total participation is the most productive even in non-turbulent environments. It is noted that participation becomes total participation here. As group dynamics work in workplaces, collective perspective becomes important for understanding the processes of an organization.

From job enrichment model by Hack et al, we have findings to systems analysis: First person perspective, that is, intra subject with which his experience is taken into consideration. We also have findings: a shift of attention from his immediate action to activity. This means sense-making of his job in a wider context. This is coupled with Stacey et al's suggestion that people jointly create meaning of what they are doing when they act into the unknown. This means that constructing work systems and information systems are not enough, and that constructing meanings among people is required in workplaces for high performance.

Now that we have restated findings to systems analysis from exploration into the related literature, we will sum up what an alternative practice of systems analysis is in contrast with the dominant practice of systems analysis. Systems analysis is concerned with knowing or understanding the processes of an organization not building some artifacts. Systems analysis is a broad activity from understanding the existing work practices to knowing the futures of the environments. Activity theory (Engestrom, 1999) is an appropriate framework in depicting such a broad activity (Kosaka, 2007). We described the alternative discourse of systems analysis in the framework of Activity theory (AT). As Bannon (1997), however, says the complexity of AT has frightened off many practitioners from actually trying to apply the concepts in practical situations, it is not necessarily appropriate to present the result in the framework. Here we will rephrase the result of the analysis in the format of conventional 5W1H with some extension.

Who is a systems analyst? In the alternative discourse, business professionals or workers practice systems analysis (SA) as an individual at the outset, and as a group or community on the way. In the dominant discourse of SA, external systems analysts such as IT professionals or consultants practice SA with some participation of workers. What is the object and the outcome in SA? In the alternative discourse, the object of SA is their work systems and the outcome of SA is meanings created and shared among them. In the dominant discourse, the object is the functions of an organization and the outcome is requirements for would-be information systems.

Why do they practice SA? Firstly, people undertake the division of labor in an organization. In the alternative discourse, workers practice SA as a part of their jobs while systems analysts practice SA in

the dominant discourse because SA itself is a major task of IT department. Is there another reason why workers practice SA? Secondly, people have some incentive to do it. In the alternative, workers undertake SA because their works become more productive and more worthwhile through job enrichment while an expert systems analyst undertake the task for his living in the dominant discourse.

When and where do they practice SA? In the alternative, they always practice SA at their workplace as one of their daily works. In contrast, a systems analyst practices SA in his office with occasional visits to a client organization in a project base which has start and end.

How do they practice SA? In the alternative discourse, their current methods are practically limited only to self-reflection and communicative action among colleagues because there are no appropriate SA methods available for workers to use at present as Alter (2004) mentions. In the dominant there are several SA methods including UML for expert systems analysts.

With whom do they practice SA? In the alternative discourse, workers practice SA with colleagues with some help from internal consultants as shown in a Toyota case (Spear et al, 1999). In the dominant discourse, SA is usually an independent work solely undertaken by an expert systems analyst with his occasional visits to workplaces for observation and hearing to workers on the spot.

We have depicted an alternative discourse of systems analysis for high performance. Our research is theoretical not practical. The findings are derived logically from the related literature. Whether the alternative discourse is applicable to many actual organizations is disputable. It is not applicable to authoritative organizations of a deep hierarchy. However, it is possible to say that the absence or lack of new SA methods for workers is one of the reasons why the alternative discourse is prevented from its appearing.

Our discussion is based on theoretical thinking that mainly focused on positive workers. There is the fact that there are many organizations whose members are short of aspiration for their internal growth and progress. Our discussion is not applicable to those organizations with members of little aspiration. It is expected that there are more discussion on multiple types of SA for a variety of organizations.

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