

Exploring the Real-Time Enterprise From Systemic Perspective: The Case of Korean Enterprise

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There is a growing awareness that the social and cultural aspects of the Real-Time Enterprise (RTE) are the critical factor of good business practice. This fact shows that sustainable development and long-term profitability of business enterprise will not continue through only having with capital and technology. A new form of business strategy is necessary for complementing the availability of 'social capital' and social network analysis for maintaining the viability of the business enterprise in the era of a knowledge-based economy. We explore the nature of the RTE from rhizomatic systems perspectives. Rhizomatic systems perspectives enable us to appreciate the holistic understanding of social, cultural and political dimensions of the RTE in the form of social networks or communities. In this paper, 'rhizomatic systems' thinking is demonstrated through the application of Checkland's Soft Systems Methodology (SSM) to appreciate the process of problematization, and generate systemic knowledge about the transformational processes of Korean enterprise.

Introduction

For real-time organizations attempting to be successful in the 'knowledge society', the concept of social capital is useful. While there are many success factors for creating values and maintaining relationships, building effective networks through constitutive partnerships, knowledge sharing and learning has attracted significant research attention (Parkhe, *et al.*, 2006). Briefly, the field of social network analysis focuses on the social process that makes sure people have time and encouragement to participate from the network of relationships poses by an individual or social unit (Nahapiet and Ghoshal, 2000: 132-140). Social network analysis focuses on value created by fostering connections between individuals (Lesser, 2000, p. i). Acknowledging the fact that social network will increasingly be influenced by human networks and communities that make cooperative action possible, the aim of research is to help practitioners and managers to understand the value of soft/ rhizomatic systems thinking and concept of social networks for the successful execution of the Real-Time Enterprise (RTE). The case study presented and analyzed in details throughout the application of Soft Systems Methodology (SSM) within Korean company.

Exploring the real-time enterprise from systemic perspective

How the real-time organization functions, that is to say how they control their actions, how individuals learn from errors and mistakes that make in their workplace? Put differently, how do we understand the cultural aspect

of the Real-Time Enterprise (RTE)? Systems theory provides the conceptual basis for discussing the dynamics and inner workings of any real-time enterprise. It enables us to understand and reinterpret how effective real-time organizations work. Systems thinking, which is based on holism, feedback, self-regulation, self-reflection, creating values and maintaining relationships, is useful to explore the complex nature of the RTE within changing environments (Hugos, 2005). For instance, as we try to make a sense of a new organizational form that is suited for maintaining organizational identity within constantly changing environments than the traditional hierarchical forms, the Viable System Model (VSM) and Soft Systems Methodology (SSM) offer useful insights, ideas and techniques (Hugos, 2005: 41-58). Roots of the RTE can be traced back to the 1930s at organization as Bell Laboratories and other research labs and universities (Hugos, 2005: 15). Historically, the principles and practices that define the RTE have been evolved over the last 80 years or so. Gartner, a prestigious research firm defines the idea of the RTE as a 'enterprise nervous system' or 'living nervous system' which is concerned with collaboration between the RTE and suppliers, and linking with trading partners to produce better design and demand forecasts for real-time applications (McCoy, 2002). In this sense, the RTE can be viewed as an open, adaptive, living system or social network systems. To be open systems, according to Ashby's Law of Requisite Variety, the RTE must be at least as great as the variety of environmental turbulence. In this vein, a living nervous system must have sufficiently minimum and necessary varieties of actions in order to ensure to maintain organizational viability from the environmental changes. To be an adaptive whole system, the RTE must have capacity to learn from experience and perform anticipatory learning, in order to achieve adaptation at all level: from system functioning to systems constitution. In this way, an understanding the RTE in terms of systems theory, would provide a theoretical basis for supporting the learning processes of self-transformation or self-organization towards higher states of systems stability and the complex emergence of the whole living systems. The living nervous systems will have real-time principles to their internal processes, achieve the continuously improving key business processes, and adopting them to changing environments (Flint, 2002). From systemic perspective, there are some fundamental principles that characterize why and how time-based organizational transformation will happen within the RTE. These principles are as follows (Raskino, 2002). Firstly, the simplicity and openness of time-based improvements will promote broader understanding within the RTE across, its value network and within its stakeholders' base. Secondly, in the RTE, the management of elapsed time is given much higher priority, visibility and management information support. The setting of headline goals for the end-to-end delay reduction will cause questioning of all new, time-consuming tasks and a rational debate about their value. Eventually, wasting elapsed time will become as culturally unacceptable as wasting money. There is a need for the structure of the RTE to make control of elapsed time. Thirdly, the RTE is event-driven. As soon as a requirement arises, the RTE can judge its performance on how quickly it can satisfy the requirement. Requirements come from customers, supply chain partners, shareholders and other organizations, in the case of automated processes and activities, from other systems. Each of these entities has a window, from the time the original request is notified, to the time the response

comes. Beyond a certain time, the wait causes irritation and frustration, or the response becomes less valuable, and ends eventually, irrelevant. With the ever-quickening response on events that happen in environments, these 'tolerance windows' that is, how long the recipient will wait for the response, will get shorter. The managers must understand the current tolerance window of the recipients and the rate at which these windows are shortening. Fourthly, although we refer to the RTE, it is not sufficient to consider a single enterprise in isolation. Elapsed-time saving should focus on processes that span organizations horizontally and vertically. It will have little impact if initiatives are only local and uncoordinated. Therefore, most end-to-end process cycles that are worth tackling will cross value networks. In many cases, the RTE collaboration will involve suppliers and supply chain partners in shrinking process times. Finally, business ethics and integrity are being questioned in ways not seen for a decade or more. In order to make transparency amongst supply chain partners, customers, and shareholders, ethical governance is needed for better decisions, moral behaviours and ethical conducts. Creating ethical governance through improvements of transparency and speed will increase trust amongst people. This will contribute to increase a synergy of various working groups and organizations, and lower internal costs by improving inefficient management processes. Dealing with complex situations, knowledge management is necessary to activate and synchronize various working units and viable organizations within the RTE in order to achieve a synergy of various working groups and organizations.

Understanding social networks from rhizomatic systems thinking

Understanding the nature of complexity from systemic perspectives, complexity means not only nonlinearity but a huge number of elements with many degrees of freedom that leads to unpredictable, complex, irregular, and chaotic states in a given situation (Mainzer, 1994: 3). Dealing with complexity, as Yu (2001; 2006) has shown, the concept of 'rhizomatic systems thinking' is useful. It deals not only with the knowing about problem situations, but also with thinking about (and doing something about) problem contexts. Thinking about problem contexts, the formation of a community of inquiry and practice is useful when it related with knowledge management and organizational learning, which are the interdisciplinary frameworks of systemic interventions. We now live in a society where the mechanisms of power and knowledge are greatly transformed. Building community of inquiry and practice focused on organizational process and in the creation of new knowledge. In turn, studying the processes of social participation in which learning takes place both individually and collectively within these communities. While there are many kinds of communities, we find what we call 'rhizomatic networks' relevant and consistently useful to our particular interests, the way of understanding micropolitics and micropower. For Deleuze and Guattari (1988) micropolitics is the essence of what rhizomatic networks are based on the idea of learning and acting as social participation. Groups of people share a concern, a set of problems, or a passion about *desire*, and pursue common pursuit of solution through the process of problematization and subjectivization. Rhizomatic networks are, in effect, constituted by flows of desire, belief, micropolitics and micro-power,

in which rhizomic decision-making can occur in the process of learning and acting as social participation. Key feature of rhizomatic networks include: shared visions and interests, shared desire, belief and knowledge, voluntary participation, autonomy in setting goals and facilitating learning and outcomes, awareness in learning that can be central or peripheral to the process of developing connection which, as a totality, because everything is affected, effects everything (Jackson and Carter, 2000). We have said that rhizomatic networks embeds social networks, which relates to complex relations with multiple 'real interests' of the various actors involved within such networks (Coleman, 2000). As Foucault argued, the social forms of power and knowledge can define relations of force in terms of the everyday life of men (Foucault, 1977: 205). In this sense, we argue that social networks are not only concerned with knowledge creation and sharing, but concerned with power relations are emerged as relations of force which are the very basis of a power analysis. Having said that, we argue that local form of power/knowledge exists in 'regional' and 'local' forms in any social networks, which embed social capital that is the network of relationships that individuals have throughout the organization (Lesser, 2000).

Case Study: The project for the EA manufacturer

Project outline

As part of the requirement of the work in the project for the EA manufacturer, participatory action research (PAR) was carried out from October 2005 to September 2006. EA is a Korean semiconductor manufacturer which in 2006 have around 2,100 employees and had a sales turnover \$ 360 millions for the financial year 2005. EA is a pseudonym for the company in order to protect the confidentiality of the informants. The 'direct' manufacturing division mainly performed the corporate functions of EA, which is responsible for production and production development, and the sales department that is directly concerned with the selling the semiconductors. The 'indirect' manufacturing division mainly functioned to facilitate the overall activities of 'direct' manufacturing within EA. The 'Managerial Innovation Centre' (MIC) is mainly concerned with the strategic planning and its operational activities which are mainly concerned with organizational change and learning within EA. The author, who was the systems analyst of the research project, acted as a facilitator for carrying out participatory action research within EA.

Application of the 'problem-solving' method

Peter Checkland (1981) proposed Soft System Methodology (SSM) in the 1980s and 1990s. SSM regards as a 'problem-solving' approach that is suitable for dealing with 'human activity systems' in organizational and social contexts (Checkland, 1981; Checkland and Scholes, 1990). SSM is to make a systemic inquiry into the complexity of problematic situations in which Morgan (1986) sees organizations as culture. Dealing with cultural and social contexts of RTE within EA, soft systems methodology (SSM) was used to explore problem situations within EA. The basic process of the systemic intervention using SSM is summarized by the following stages.

Stage 1: Finding out “key issues”

The methods of finding out a ‘rich picture’ of EA were conducted by the study of the written documents, official records, social network analysis, observation and informal and formal interviews. It was identified that a centralized decision-making process was formed through a top-down hierarchy of EA. There were a tendency for poor communication, lack of trust and understanding between managers and workers throughout the divisions in EA.

Stage 2: Express the problematic situation

In addressing any messy problem situations concerning the successful operation of the RTE within EA, the various perceptions were identified. These perceptions were expressed as follows.

Person A

“The leaders of the working groups (including MIC) lack a vision for the successful operation of the RTE that functions in the form of social network to react to environmental changes.”

Person B

“There is a need for exchange a good quality of information between managers, working staff and customers at a regular basis in order to make fast decision-making for improving the efficiency of work.”

Person C

“Taking into consideration the semiconductor industry, what can we do about corporate culture that gives us pride in our work?”

Person D

“There are no effective evaluation systems and procedures for the measurement of operational performance of individual workers and working groups within the ‘in-direct’ manufacturing division.”

Person E

“Communication flow is top-down and managers exercise a directive leadership. Our corporate policy focuses mainly on the operational performance in terms of the financial criteria. Workers do not wish to interact with others unless they have to do. Having to deal with a hierarchical structure within EA, it is difficult to share the information and knowledge amongst all the levels of the employees in the various divisions and working teams in EA... I would like to see a good relationship and more interactions between managers, workers, suppliers, large and small customers within EA in order to make the successful implementation of the RTE within EA.”

There were other ‘areas of concern’ that identified by the social network analysis. These are summarized as follows.

- Leaders of working groups lack of leadership with a new way of thinking
- Managers and leaders fail in gaining people’s sympathy

- It needs to change employees' mind and attitude
- There are no good understanding and communication between managers and working staff.
- -There is a tendency to evade responsibilities, and difficulty in clarifying where responsibilities lie

There were consensus about the 'knowledge management system' and 'the effective managerial activities system' that had to be established to facilitate the implementation of the RTE within EA.

Stage 3: Preparing 'root definitions'

Stage 3 was concerned with the preparation of 'root definitions', which were precise definitions of a notional system within a given situation. Having clarified the root causes of the problem contexts, root definitions were formulated, which seemed 'relevant' to the problem situations within EA. These were the 'knowledge management system' and the 'effective managerial activities system', which are described as follows.

Root definition 1: The knowledge management system

A private owned system that produces and distributes a good quality of information and knowledge amongst employees within EA in order to make up three levels of management, which are concerned with operational efficiency at production, the corporate effectiveness at the strategic level, and ethical management at the normative level, through cooperative problem-solving, participatory decision-making, and having with leadership, technology and learning culture within EA.

Root definition 2: The effective managerial activities system

It is a system to facilitate the formulation of corporate visions, strategies, effective managerial activities and capacity to achieve these activities with the aim of implementing corporate philosophy of the RTE by establishing a new form of social network which is necessary for complementing the availability of social capital and networks within EA.

Stage 4: Building conceptual models of the perceived reality

There are two conceptual models which seem to relevant to problematic situation in EA. These are the conceptual models of 'the knowledge management system', and of 'the effective managerial activities system'. These models are shown in Figures 1 and 2. The development of the conceptual models had proved very useful to identify new aspects of the situation and possible areas for change. The comparison of these models with the situation revealed, as has to be done in SSM, which was actually not happened in a given situation in which consensus did not occur during the process of PAR.

The process of probelmatization

When a new thought begins with knowing about the problem situations within EA, the systems analyst and participants focus on "what happens" rather than "what is (the case)". A new thought begins not with merely dependent on the imposition of

systems methods or an ‘intellectual framework’ that makes sense of both the situation and the researcher’s purposeful activities in it, but by considering micropolitics, in preference to micro-power, where everyone in an organization was making decisions. In this sense, “the decision-making which goes on in organizations, ubiquitous and universal, is itself rhizomic and produces activity and behaviour which is rhizomic - unspecifiable, unpredictable, uncapturable” (Jackson and Cater, 2000, p. 253). This leads to new insights concerning ‘what happens here and now’. We can speak of ‘what happens’ in terms of the Deleuzian sense of an event (Deleuze, 1990). The process of problematization can be divided into three distinctive stages in which participatory learning had happened within the problem-solving practice. These stages can be summarised as follows.

Stage1: Collecting ‘information’

In an actual study the archive of ‘information’ collected can include written documents and records, questionnaire-based survey and notes taken from formal and informal interviews with the member of staff (i.e., Chief Information Officer, senior managers) within EA. Only the facts which are considered to be of relevance for creating and sharing an appreciation in a given situation in stage 2 are given as follows.

The company

The EA enterprise, though at core business of manufacturing semiconductors, is engaged in many businesses which include chemicals, construction, and engineering. It is essential that EA’s technology is continually being assessed and updated. For this reason, EA has been cooperated with American and Japanese companies for researching and developing ‘non-memory’ semiconductors since early 2000.

The tasks of the MIC

- Monitoring the process of manufacturing activities in production units
- Monitoring the performance of production units
- Establishing and implementing real-time enterprise (RTE) system within EA.
- Making the unique corporate culture for the EA enterprise

Ideas and questions expressed by participants

- The high degree of autonomy and responsibility will be necessary for improving the overall performance of EA
- How to create and develop the unique corporate culture for the EA enterprise?

Stage 2: Creating and sharing an appreciation amongst participants

In stage 2, it is concerning about creating and sharing an appreciation amongst participants in order to building the community of inquiry and practice that aimed to create ‘open space’ which generate the semantic communication to discuss and re-appreciate the problem situation within EA. It is about ‘response’, which is partly for the sake of its connection with responsibility as Vickers (1970, p. 128) reminds us, “Life consists in experiencing of relations, rather than in seeking goals.” This included the process of an appreciation in discriminating form from contingent con-

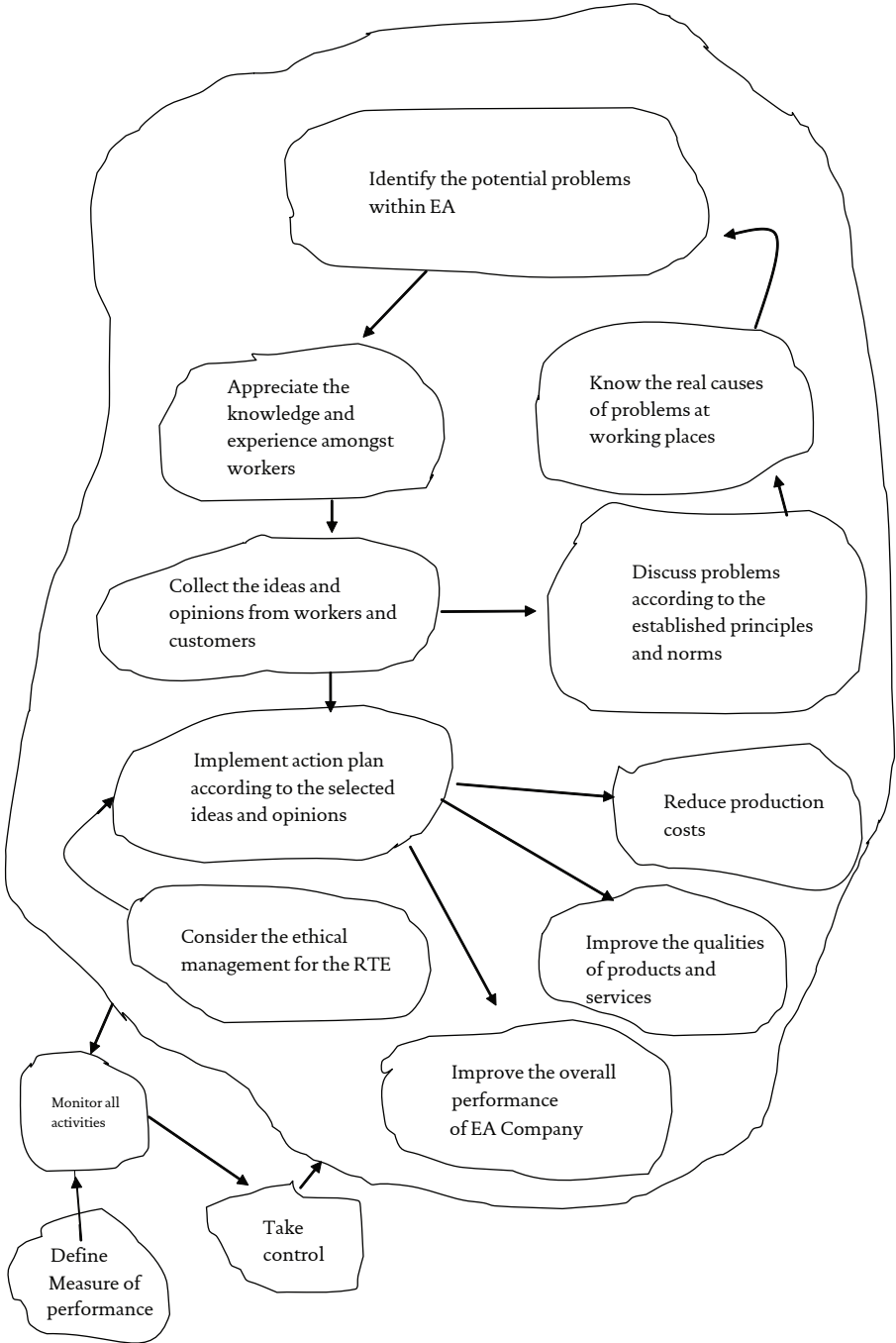


Figure 1 *The knowledge management system in EA*

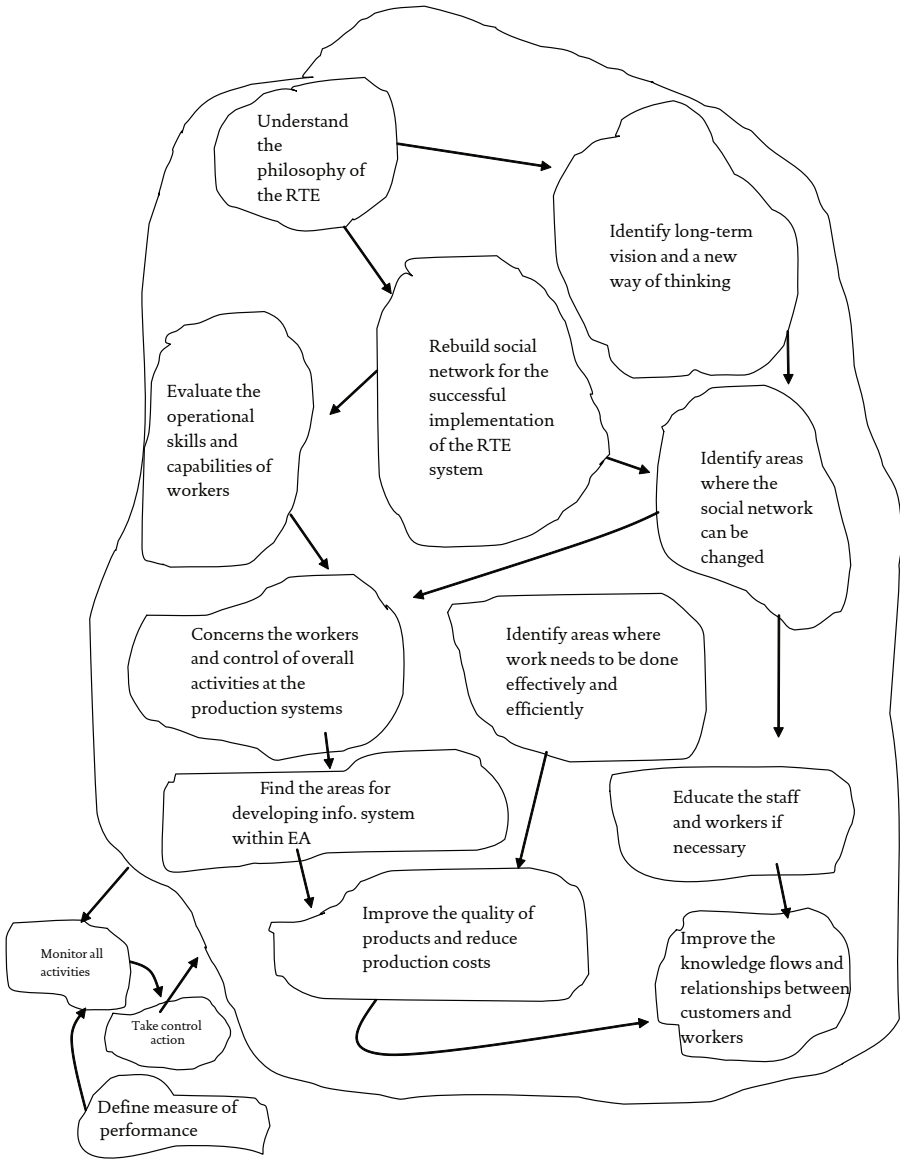


Figure 2 *The effective managerial activities systems*

texts, in appreciating the manifold relations between the problem situation (as the entities observed) and with participants (who are observers). In this way, an appreciation of the collected ‘information’ took place to understand problem situations being dealt with micro-power as indeed, no problem situations or decision-making process can be understood without considering the complex dynamics of cultural, social and ‘political’ dimensions within an action research context (Yolles, 1999).

Stage 3: Making sense of ‘problematizing fields’

As Tsouvalis (1995, p. 220) has shown, problematization creates the space, the conditions, within which various responses can be given. It is through making sense of ‘problematizing fields’ which make up the question of the exercise of micropolitics amongst participants. This question will be examined in details as participatory action research will be carried out further in due course.

Conclusions and discussion

Exploring the Real-Time Enterprise from rhizomatic systems thinking that we have demonstrated in this paper, what are main contributions of SSM that has been applied into the problematic situations within EA? Our contention is that rhizomatic systems thinking can help us to explore the social, cultural and political dimensions of the RTE which can grasped by the metaphor of a ‘living nervous system’ that was perceived in the continuous process of transformation within regional and local contexts. Using SSM, the semantic communication are vital to carry out participatory action research which facilitates debate by which actors or participants were committed to the learning process of participatory action research within EA, and to create interventions to create or explore the shared norms and values amongst participants. During the process of problematization, participants were appreciated open-ended process of learning in order to deal with ‘problem-solving practice’ as cultural change went on within EA. This process was subjected to the conscious thought and actions of people in dealing with complexity in contingent contexts. Whereas the notion of ‘real-time’ is much considered in RTE, our research focuses on the process of problematizationm which the research process focuses on “what happens” rather than on “what is “ or “what is the case.” In the process of appreciation of “what happens”, it is possible to appreciate complex situations which are concerned with power and conflicts amongst participants. Further research will then be required to dealing with issues of power, conflicts, politics and ethics concerning the sustainability of RTE within shared environments. To do so, we aware that rhizome kind of open systems exist upon the intense space of ‘outside’ thoughts as Deleuze and Guattari (1988) have proposed for dealing with unpredictable and chaotic situations.

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