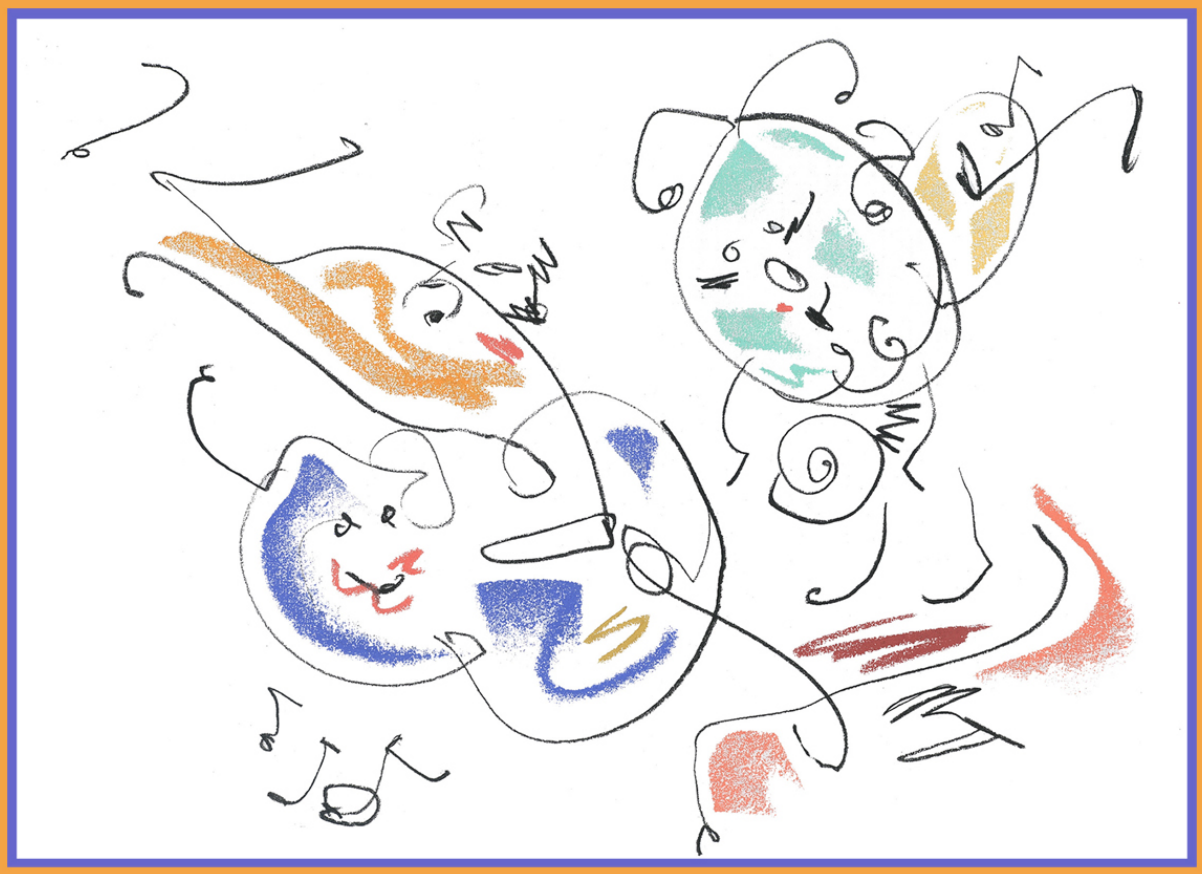

Systems Intelligence

DISCOVERING A HIDDEN COMPETENCE IN HUMAN ACTION AND ORGANISATIONAL LIFE

Helsinki University of Technology
Systems Analysis Laboratory Research Reports

Raimo P. Hämäläinen and Esa Saarinen, editors

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Introduction

Systems Intelligence is an effort to combine human sensitivities with engineering thinking that approaches matters with the idea of making things work.

Systems Intelligence is multidisciplinary, applicative and philosophical in its orientation. It involves thinking-in-action, tacit, unspoken elements, situational awareness and touch for complex wholes around us. Its emphasis is on interactive participation in systems with feedback and subtle interrelations. It is a form of holistic and instinctual thinking that we believe is vital, indeed fundamental to human nature. Systems Intelligence is a survival asset we have as a species.

By Systems Intelligence we mean intelligent behaviour in the context of complex systems involving interaction and feedback. A subject acting with Systems Intelligence engages successfully and productively with the holistic feedback mechanisms of her environment. She perceives herself as part of a whole, the influence of the whole upon herself as well as her own influence upon the whole. By observing her own interdependence in the feedback intensive environment, she is able to act intelligently.

Like the forms of intelligence described by Howard Gardner in his ground-breaking work, as well as Emotional Intelligence as explicated by Daniel Goleman, Systems Intelligence deals with the structures human agents use in order to conduct their lives successfully. Systems Intelligence, as defined here, is a fundamental human competence not covered by Gardner's theory of Multiple Intelligencies or the theory of Emotional Intelligence. Our conviction is that Systems Intelligence is a key form of human intelligence and a fundamental element in the adaptive human toolbox.

Systems Intelligence points beyond the forms of intelligence of Gardner and Goleman in linking intelligence with the concept of a system. At the same time, Systems Intelligence reaches beyond traditional Systems Thinking in its pragmatic and active, personal and existential emphasis.

The term was coined by Raimo P. Hämäläinen in a research seminar we facilitated at the Helsinki University of Technology in the fall of 2002 on creative problem solving.

Hämäläinen, a professor in operations research and the director of Systems Analysis Laboratory at the Helsinki University of Technology, had brought Esa Saarinen, a philosopher with a highly distinctive life-oriented and pragmatic on-stage lecturing and thinking style and with strong commitment to a Socratic accessible-to-all philosophy, to the Helsinki University of Technology in 2000. In Saarinen's highly popular lectures engineering students were introduced to questions of the philosophy of a good life, as developed in an engaging, personal and energizing, application-seeking manner by Saarinen, in connection with some key ideas of Peter Senge's

thinking. The seminar we conducted together was offered to a selected group of the best students of Saarinen's class as a way to develop their personal mastery and thinking skills further still. We wanted to stimulate the students' abilities to function more effectively in complex life situations and to develop their understanding of the impact of their own ways of thinking upon the outcomes of their actions and eventually upon their lifes. The idea was to connect the pragmatic and concrete change-seeking attitude of an engineer with the humanistic tradition that seeks to understand the human condition for the purposes of the good life. It was in this context where the term Systems Intelligence immediate caught fire.

This volume contains working paper articles on a number of facets of Systems Intelligence. The topics represent the authors' diverse backgrounds and orientations. We have wanted to approach the concept of Systems Intelligence in the Open Source – spirit, and have encouraged in our seminars and workshops students and scholars to use their own intuitions and experience for the benefit of identifying Systems Intelligence at work in various aspects of life. This methodology, unorthodox as it is academically, has led to fruitful perspectives and contributions, we think. Many of the authors will continue to work on their essays and publish them in academic journals in their own fields. We thank the contributors and hope the reader will find the essays collected here to be stimulating and rewarding.

The essays collected here are intended to the view that Systems Intelligence is a highly intuitive and useful concept for the purposes of enriching one's everyday conceptualizations and the actions based on those conceptualizations. Systems Intelligence, we hope, will prove useful as a theoretical concept and also in terms of its true applications in the reader's personal life. We believe the reader will find Systems Intelligence a mirror that helps her to identify productive forms of actions one already follows intuitively.

Otaniemi, Finland, 21 October 2004

Raimo P. Hämäläinen Esa Saarinen

On Systems Intelligence:

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Systeemiäly!, Eds. Tom Bäckstöm, Ville Brummer, Terhi Kling and Paula Siitonen, Helsinki University of Technology, Systems Analysis Laboratory Research Reports B23, April 2003, in Finnish, abstracts in English.

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The Concept of Systems Intelligence

Chapter 1

Systems Intelligence: Connecting Engineering Thinking with Human Sensitivity

Esa Saarinen and Raimo P. Hämäläinen

This paper outlines the basic features of Systems Intelligence and discusses some of its fundamentals. Systems Intelligence combines insights of Systems Thinking with a pragmatic orientation and philosophy of life. We argue that Systems Intelligence is a new concept that is highly useful for understanding human behaviour in complex interactive settings, and in concrete efforts to generate change. We suggest that Systems Intelligence is something we apply as humans instinctively. Systems Intelligence combines engineering thinking with human sensitivity and thus serves as a foundation for a down-to-earth pragmatic philosophy of life of optimism and change.

Introduction

By Systems Intelligence (SI) we mean intelligent behaviour in the context of complex systems involving interaction and feedback. A subject acting with Systems Intelligence engages successfully and productively with the holistic feedback mechanisms of her environment. She perceives herself as part of a whole, the influence of the whole upon herself as well as her own influence upon the whole. By observing her own interdependence in the feedback intensive environment, she is able to act intelligently.

Systems Intelligence reaches beyond Systems Thinking in its pragmatic and active, personal and existential emphasis.

We believe that Systems Intelligence is a key form of human behavioural intelligence.

Systems Intelligence combines insights from a variety of disciplines and schools of thought. For us, a particular inspiration is the work of Peter Senge (1990, 1994, 1999).

Like the forms of intelligence described by Howard Gardner (1983, 1999), as well as emotional intelligence as explicated by Daniel Goleman (1995, 1998), Systems Intelligence deals with the structures human agents use in order to conduct their lives successfully. Like Gardner in his groundbreaking work on Multiple Intelligences , Systems Intelligence is not only restricted to the

verbal, analytic and conceptual aspects of intelligence. In his own criticism of Multiple Intelligences Gardner (1983) refers to higher-level cognitive capacities, which are not explained by it. These include common sense, metaphorical capacity and wisdom. Systems Intelligence, as defined here, is another important human competence not covered by Multiple Intelligences.

Systems Intelligence points beyond the forms of intelligence of Gardner and Goleman in linking intelligence with the concept of system.

Traditional Systems Thinking literature (see e.g. Churchman 1968, von Bertalanffy 1969, Checkland 1999, Flood 1999) emphasizes the importance of wholes and perspectives as it conceptualises and models systems of interaction and feedback from outside. In contrast to that Systems Intelligence wants to account for the active and practical thinking that human agents use in real life situations involving complex systems of interaction with feedback mechanisms. Systems Intelligence reaches beyond Systems Thinking in its pragmatic and active, personal and existential emphasis.

In this paper we give a programmatic introduction to the concept of Systems Intelligence, sketch out some of its different forms of manifestation and discuss its fundamental role in human life. The paper can be seen as a program description and starting point for a research initiative[1] in the analysis of this new intelligence paradigm.

Key Ideas of Systems Intelligence

Systems Intelligence makes use of some key ideas of Systems Thinking (Churchman 1968, 1969, von Bertalanffy 2001, Senge 1990, Checkland 1999, Flood 1999), Theories of Decision Making and Problem Solving (Simon 1956, 1982, 1997, Newell and Simon 1972, Rubinstein 1986, Ackoff, 1987, Keeney 1992, Kahneman and Tversky 2000), Philosophical Practice and Dialogue (Bohm 1980, Isaacs 1999, Schuster 1999), a number of other forms of holistic thinking and of the human sciences as well as certain forms of therapeutic thinking, positive psychology and situation analysis (Bateson 2000, Goffman 1974, Haley 1986, Seligman 2002, Baker 2003). A major source of inspiration is also the Socratic tradition in philosophy which emphasises conceptual thinking for the purposes of the good life (Hadot 1987 and 1995, Long 2002). The reader is referred to the related literature to learn the historical roots of each of the ideas. Here we shall give a programmatic sketch of a new approach to understand human intelligence in a systems setting which is built on ideas described below.

Whole is more important than parts.

Human agents can influence entire systems.

“Part” and “Whole” are relative abstractions that are always subject to potential redefinition by changing the perspective.

Systems approach starts when you perceive the world through the eyes of another person.

Systems approach looks beyond isolated linear cause-and-effect chains for interconnections and interrelations.

[1] http://www.systemsintelligence.hut.fi/

In our culture the human conceptual system emphasizes linear thinking, isolating thinking and seeing separate units rather than seeing wholes.

Our perception mechanisms exhibit a similar tendency.

Human beings perceive themselves as independent individuals, yet they most often are encompassed in systems.

Structure produces behaviour.

Beliefs regarding structures produce behaviour.

Beliefs regarding the beliefs others have regarding structures, produce behaviour.

Co-operation is natural but extremely hard to conceptualise in a behaviourally relevant, subjectively convincing manner.

Structures of co-operation are fundamentally based on the assumptions and meta-assumptions people make of others involved in that system of co-operation.

The behaviour of people often reflects their best guess of rational behaviour but that guess can be completely erroneous.

People can get caught in systems that serve nobody's interest.

Much of the time, people display behaviours they would change if they only could see the bigger picture of the setting they are in.

A system can make people act in some undesirable ways but as people act in such ways, they maintain the system and its influence upon the others, partly causing the system of undesirable behaviours to regenerate itself.

There does not need to be an external reason for the particulars of a system, yet people in the system can feel helpless regarding their possibilities of changing the system.

In most systems, each subject separately reacts to the system without seeing the cumulative overall effect of the reactive behaviours on the others.

The System Concept

Here we shall use the concept of a system intuitively. In the last chapter of this paper we shall discuss links to the related systems theoretic concepts. The principal features of a system for us are:

- A system if characterized by the interconnections of its elements, as well as the internal nature of those elements.
- A system has generative power. It produces effects beyond the modes and functionalities of its elements.
- A system has primacy over its elements while at the same time the elements influence the system.

- A system has emergent features, not reducible to the features of its elements.

Examples of human systems include:

Party, Lecture, Meeting, Family, Friendships, School, Village, Society, Organization, Company, Industry, Administration, Traffic, Internet, Language, Parenthood, Global economy, etc.

Paradoxes in Human Systems

Consider the following cases:

- Most managers want to support their team members more than they currently do. Most team members would want to get more support from their managers. Yet more support does not result. There seems to be **a systemic non-support generator** in place.

- Most husbands would want to be more romantic with their wives. Most wives would want their husbands to be more romantic with them. Yet more romantic behaviours do not result. There seem to **be a systemic non-romantic behaviour generator** in place.

- Most lecturers would like to give their best in a given lecture, also when people seem restless and even negative and come in late. Most people in the audience would like the lecturer to give her very best, even at a lecture for which he came late and might not seem that focused early on. But the lecturer cannot give her best, the audience does not receive the best, and everyone is disappointed. There seems to be **a lousy-lecturing-behaviour generating system** in place.

- Most people in the industrial world would like to produce less waste. Most companies would like to produce less waste. But more waste is produced. There seems to be **a waste-generating system** in place.

- Most adult readers would like to see more responsible, holistic and broadly-minded journalism. Most journalists would like to produce more responsible, holistic and broadly-minded journalism. But the opposite seems to happen. There seems to be **a system in place that generates relatively irresponsible, fragmentary and narrow-minded journalism.**

Saarinen has explored this kind of paradoxes in the context of his accessible-to-all-lecturing (lecturing as a Philosophical Practice) which following the Socratic tradition aim to provide platforms of change, reflection and renewal for academic and non-academic people (Saarinen and Slotte 2003). The experience is that people irrespective of their background find it easy to identify such paradoxes from their everyday life. Furthermore, becoming more aware of such paradoxes helps many people avoid the traps involved, often with astonishing results.

Most people in the industrial world would like to produce less waste. Most companies would like to produce less waste. But more waste is produced. There seems to be a waste-generating system in place.

A husband may see his wife in the course of a Saarinen lecture with different eyes and from a fresh perspective. This may lead to a small but significant change later in the evening as the

spouses meet. The wife may be encouraged to react with a small but significant positive change vis-à-vis the husband. A positive loop may now be generated and yet the day before apparently nothing could have been changed.

The four dimensions of change are:

Mental change

Perceptual change

Individual behavioural change

Change in the system.

The research group lead by Raimo P. Hämäläinen[2] has studied extensively the modeling of complex systems as well as the mathematical models of decision making, competition and co-operation. What we call Systems Intelligence started as an effort to combine the concrete-life oriented approach of Esa Saarinen's Socratic Philosophical Practice[3] with Hämäläinen's systems research and thinking. Some first results have been described in the volume of our student essays (Bäckström et.al. 2003) and first working papers (Hämäläinen and Saarinen 2004 a, b).

The Moral of Systems Intelligence

Systems Intelligence is about the betterment and improvement of human life. The idea is to take the ancient promise of philosophy seriously, the one that called for the Good Life, and to use a systems approach to the benefit of such a process.

Surprisingly, the cause of the good life has not occupied the central focus of psychology or of philosophy in the past decades. Notable exceptions are de Botton (2000), Comte-Sponville (2001) and in psychology the work of Seligman (2002). In systems thinking tradition, the work of C. West Churchman is marked for his strong moral motivation but his work has not received the credit it is due (see e.g. Churchman 1982).

We believe our organizational behaviours, family life, individual lives, communal lives and co-operation in general can be improved enormously by relatively simple means that address the systemic perspective. The moral driver of Systems Intelligence is the creed that such profound changes of utmost human relevance hinge on Systems Intelligence.

Examples of Systems Intelligence in Action

Someone presents an astonishing proposal.

A Low Systems Intelligence Someone reacts: "That is so stupid and so wrong".

A High Systems Intelligence Someone continues: "Striking. Tell me more."

[2] http://www.sal.hut.fi/Personnel/Homepages/RaimoH.html
[3] http://www.esasaarinen.com/luennot/?sivu=yritysluennot&kieli=en

A lady is at home with his boyfriend. They watch tv. Suddenly the boyfriend picks up the remote control and switches the channel.

A Low Systems Intelligence: The lady says: “What do you think you are doing, Mr. Wise Guy?”

A High Systems Intelligence: The lady says: “Was this our decision?”

Much of what Senge describes as “inquiry mode”, as opposed to “advocate mode” can be understood in terms of high Systems Intelligence.

A guy has a drinking problem.

Low Systems Intelligence: The guy gets furious any time his lady suggests he might have a slight drinking problem.

High Systems Intelligence: The guy turns to his lady and says, “How could we work on this major personal problem I have?”

We propose that the following forms of change-creation should be conceived in terms of Systems Intelligence in action:

Job rotation, as a result of which people gain deeper understanding of the whole organisation

The mirroring technique of certain forms of family counceling, where both parties are asked to repeat what the other just said, in order to show he or she has understood and is willing to listen to what the other just said (see e.g. Hendrix 1990).

Parents talking to their child well before she shows any signs of learning a language.

The first two axioms of to Alcoholics Anonymous (1939) that say: “We admitted we were powerless over alcohol – that our lives had become unmanageable” and “Came to believe that a Power greater than ourselves could restore us to sanity”. (For a discussion of AA from the systems perspective see Bateson 2000.)

Harri Kontturi (2004), a Finnish attorney-at-law tells, relates in Hämäläinen and Saarinen (2004 a) a story of a an old sea captain who in his last will indicated for each of his valuable memorabilia the recipient and connected in his will the memorabilia with a personal message that identified the reasons for the decision on a human and emotional level. “The sea painting from the dining hall I give to my daughter Kaisa because when I returned from the seas she always wanted to sit on my lap in front of this painting and hear my adventures on the voyage from which I had just returned.” “Let this painting be an eternal window to those cherished shared moments and to voyages you can return to in your memories again and again.” Thus the will continued for seventy seven pages. As the attorney came to the end, everybody was touched and nobody challenged a detail of the will. The sea captain’s Systems Intelligence bypassed the systems of envy and greed that so often poison similar estate inventories.

Virtues as Intelligence for Practical Life

Systems Intelligence links with the ancient promise of philosophy that challenged people to ask: How to live a good life? Systems Intelligence aims to enhance the prospects of good life and in doing so it relates to what Aristotle called practical reason rather than theoretical reason. The

theme of Systems Intelligence is a “know how” rather than “know that”. The understanding required will be judged by its practical outcome and manifestation in conduct.

Traditionally, virtues were perceived as excellencies of life. Virtues such as wisdom, courage, prudence, justice, politeness or mercy related people to other people around them as well as to the bigger picture of life. When people strive to be virtuous, they produce a better city together – a better whole, community, a better system to live in.

Virtues are Systems Intelligence. They point the subject’s perspective and actions beyond her immediate benefit and egoistic concerns to a whole-in-the-making, with the possible outcome of contributing successfully to the workings of that whole.

The more we deal with other people in our environment without clear-cut roles and without command-and-control, and the more the innovation involves productivity-together, the more we need internal motivation. But internal motivation in an environment of co-operation and innovation, will amount to the re-emergence of virtues such as courage, moderation, wisdom, justice, generosity and friendliness.

Greed is often thought to be the key driver of market economy. We believe this emphasis is misplaced. A more sustainable basis of innovation economy is in the ancient virtues. This amounts to acknowledging others on a par with oneself and will direct focus to the whole. It is a call for thinking that will seek creativity and innovation from communal contexts characterized by enthusiasm, joy, peer respect and strive for the meaningful. Creating such contexts, in turn, calls for Systems Intelligence.

In innovation economy, human sensitivity makes good business sense.

Seeking an Impact on Thinking

Systems Thinking starts by viewing the environment and one’s involvement with it in holistic terms. The environment and one’s place in it are perceived in terms of interconnectivity and interdependence rather than separation and disconnection.

But as pointed out in the Systems Thinking literature, our conceptual apparatus, as well as our established ways of perceiving the world, are severely biased against such an approach. The temptation is to conceive the world in terms of separate “things” rather than in terms of systems and interconnections.

Systems Thinking can be defined as the theory, methodology and practice of perceiving and operating in terms of holistic structures. Anti-reductionism and holism characterise the worldview of Systems Thinking.

The systems perspective wants to see the world as composed of systems, to examine these entities as wholes and assumes the wholes to be primary to their parts.

Yet wholes are abstractions. They are mental constructs, which are relative to the perspective adopted. As a result, there is a relativistic and perspectival undercurrent in Systems Thinking. Boundaries of a system can always be redrawn.

The human being perceives the world around herself in many ways as static and unchangeable. Systems perspective explains some of this by reference to hidden dynamic systems that generate state of equilibrium and play down short-term change.

Systems Intelligence in the sense in which we conceive it wants to push Systems Thinking towards action and concrete, actual life. The effort could be described as follows:

1. Systems Intelligence follows Systems Thinking in setting out from the primacy of the whole, from acknowledging interconnectivity, interdependence and systemic feedback as the key parameters.

2. Like Systems Thinking, Systems Intelligence wants to account for change. Unlike Systems Thinking, Systems Intelligence involves driving change and actively embracing change.

3. Unlike Systems Thinking, Systems Intelligence is primarily outcome-oriented and not a descriptive effort; it is intelligence-in-action on its way to create successful systemic change.

4. Unlike Systems Thinking, Systems Intelligence is a capacity in the human being that involves instinctual, intuitive, tacit, subconscious and unconscious and inarticulate aspects that cannot be straightforwardly reduced to a full-fledged and transparent cognitive dimension.

Systems Thinking is an expert discipline and a field of theoretical study. The literature is often technical and thus remains inaccessible to the layman. While not dismissing the significance of such a study, our aim with Systems Intelligence is to emphasize the applicable dimension. We seek to have impact on people's thinking, and not merely to describe models of or ideals for thinking. One might observe with regret that contributions to the theoretical understanding of Systems Thinking might not amount to any increase in Systems Intelligence, any more than contributions to academic philosophy typically result in an increase in philosophical reflection in the actual conduct of people's lives.

Personal Mastery

Peter Senge's groundbreaking book *The Fifth Discipline* (Senge 1990) identifies five key themes as cornerstones of learning organisations:

I. Personal Mastery

II. Mental Models

III. Shared Vision

IV. Team Learning

V. Systems Thinking.

We propose Systems Intelligence is the fundamental link between I and V. The way we see it, Systems Intelligence is Systems Thinking having become an integral part of a person's Personal Mastery. Like Senge's Personal mastery, it is about the way a person conducts her life, and at the

same time, it is about Systems Thinking, i.e. the focus is on the impact and workings of the holistic and systemic structures that encompass the environment of the person.

The way we propose to interpret Senge's notion of Personal Mastery is: Personal Mastery is the ability of an individual to use her unique potentials as fully as possible to the enrichment of a good life. Thus understood, it is clear that one's ability to manoeuvre successfully in the various systems structures that constitute the environment is a key component in what Senge calls Personal Mastery.

Mental Models

Behaviour reflects one's models of thinking and of what Senge calls "mental models". Our mental models largely determine what actions are considered necessary and possible. They are a key driver for the human being in her actions. The aphorism, "As a man thinks in his heart, so he is" highlights this familiar fact. Thinking transforms into actions, and repeated actions into habits. Eventually, thinking and habit constitute to a large extent the person's mode of being, personality and existential condition.

But as observed by Senge and others, we are mostly unaware of our mental models, i.e., the modes of thinking that govern and direct our actions.

What kind of mental models support System Intelligence? We propose that particular attention should be focused on:

Mental models that relate to one's self-reflective behaviour and to meta-level mental models in general: - "Can I change my thinking"; "Is there a possibility that my thinking might be one-sided?"; Where do I adopt the Advocate mode, as opposed to Inquiry mode?"; "What are my key forms of egoism that I legitimate and rationalize as unchangeable aspects of me?"

Mental models that relate to belief-formation: - "How can I become more active a subject in the constitution of my beliefs"; "Why do I believe life is not all that miraculous, grand, exciting, full of opportunities?"

Mental models that relate to the subject's beliefs regarding the beliefs of others: - "Could it be that she does not convey her meaning accurately in her actions?"; "Could it be that her way of talking hides her true aspirations"; "Could it be that I am misled by appearances?"

Mental models that relate to co-operative possibilities: - "Could we succeed spectacularly together?"; "Have we reached the top?"; "What would trigger excitement in others and help us create a magical uplift?"

Mental models that relate to possibilities of human change: - "Could I change at the age of 52", "Is mesmerizing love still possible as a trill after all these years"; "Is my human style fixed at the age of 40?"; "Are meetings in our company necessarily boring?"

Our beliefs reflect our experiences but are also influenced by highly idiosyncratic coincidences. Our beliefs could be something dramatically different from what they are now, had certain particular incidents not occurred. In particular, our beliefs regarding other people in our neighbourhood as well as *their* beliefs, could be different from what they are. Yet we believe, regarding our entire mental realm, that it simply mirrors the actual states of affairs.

One's beliefs might seem unchangeable and yet they can be subject to massive redefinition in an instant. You come home one day, and suddenly everything is different – because your mother has died, because you almost drove over a kid running after a football, because you have found a new love after contacting an old school mate, or perhaps because you have simply thought about the words of a familiar song with insight and sudden inspiration.

To the extent beliefs determine action, the possibility of change in beliefs amounts to a major window of opportunity of change for the individual in question. It is because of this that Systems Intelligence, as skilfulness in complex human systems environments **that always will involve beliefs,** will call for the ability to work with beliefs within oneself and in others..

Belief management and belief leadership, accordingly, will become cornerstone of Systems Intelligence. Systems Intelligent people can manage their won belief systems, the belief systems of others as well as the systems these beliefs systems together constitute, better than those low in System Intelligence.

We acknowledge three particularly critical dimensions of the Systems Intelligent belief orientation:

Thinking (believing) about one's own thinking (and believing), and realising the opportunities therein.

Thinking (believing) about what others are thinking (and believing), and realising the opportunities therein.

Thinking (believing) about the interaction systems, rituals, social habits and their chains, and realising the opportunities of influencing those systems.

Thinking about Thinking

Thinking about thinking is a meta-level capability fundamental to man as a self-corrective system.

Thinking about thinking is a key to learning Systems Intelligence. This involves the following:

1. Acknowledging that one's action and behaviours are a function of one's thinking (mental models, beliefs, assumptions, interpretations, etc.);

2. Acknowledging that one's thinking is likely to be highly idiosyncratic, one-sided, egoistical and a far cry from an accurate, multidimensional grasp of the bigger picture; the holistic system around self is likely to be mirrored in one's thinking only partially and possibly in a highly distorted form.

3. In order to act more intelligently in the holistic systemic environment, I need to mirror mental models and engage in meta-level thinking regarding my own thinking, in order to change my behaviours and actions to be more in line with my true aspirations, interests and the parameters at hand, as they appear in the environment in which I operate.

4. One's framing of the environment and its holistic, interactive systems is likely to be severely subjected by idiosyncratic limitations. Meta-level reflection on my own

framing systems is thus a particularly promising path to more intelligent behaviours in the context of such systems.

It is a well-known fact of cognitive science and creativity research that re-framing is a key to new opportunities, higher productivity and to creativity at large. Thinking about thinking is about identifying one's favoured framing patters, challenging them and adjusting them accordingly. It is clear that the possibilities to re-frame the holistic, feedback-intensive structures around self, as well as their relation to self, are literally limitless. At the same time one is likely to have gotten stuck and stationed to some particular framing.

A Systems Intelligent person will acknowledge the limitations of her thinking and mental models particularly when it comes to conceiving the interactive environment, looking for fresh openings through challenging her own thinking.

Systems Intelligence begins when the person starts to re-think her thinking regarding her environment and the feedback structures and other systems structures of that environment.

We Have a Dream

Our views might be distorted regarding our environment. Our views might be distorted regarding what people are like – team members, the boss, key customers, our spouse, our aging father.

As a result, we approach a situation from an angle that might trigger negative reactions in the other people involved. Seeing the reaction, we react accordingly. A self-maintaining and self-verifying system takes over. If nothing from outside disturbs the system, it can reach a seemingly unalterable state, and all people involved believe that their picture of each others is totally accurate – in perceiving others as fundamentally negative and down-putting. "It is a little miracle I can survive in the first place in the company of such frustrated and cynical people."

You might entertain the dream of having a totally different type of people to work with, a different spouse and different personalities in your immediate neighbourhood. How different you could be, how much more the true yourself – so generous and so caring, so attentive and so productive - if only the others would change.

But other people around you might have exactly the same thought, the same wish, the same exact dream. In fact, this is what they are likely to have.

A major motivation for the work at hand comes from the experience of Esa Saarinen from the context of his Socratic company lectures. In the course of his hundreds of lectures and seminars for all kinds of companies and organisations for over a decade, it became apparent to Saarinen that 95 % or more of all people in any organisation want the same kind of humanly relevant qualities from their everyday – qualities pertaining to human basic behaviours such as listening, humour, empathy, presence, expressing gratitude, showing respect, etc. No matter how easy it is to generate such behaviours technically, the behaviour might get generated, due to the nature of the interaction patters of their everyday. The systems people play together, the systems they form and generate, help sustain and believe unchangeable, destroys the prospects of a good life.

They make up systems that nobody wants.

It seemed appropriate to ask, how can people get caught in seemingly unalterable systems that lead people to deliver behaviours almost nobody wants and behaviours that do not reflect their own true aspirations?

This is the key question of Systems Absurdity and Systems Dictatorship as opposed to Systems Intelligence and hope.

Seeing the Situation through the Eyes of the Other

“Systems thinking starts when a person looks at the world through the eyes of another person.“ (West C. Churchman 1968)

Becoming aware and exploring the views of other actors and from the outside perspective is one way to enrich one's own viewpoint. Exploring the views of others is one way to grasp features of the system in a given situation, and to understand ones own input into the system.

The following techniques are likely to be of particular use for an enhancement of Systems Intelligence:

1. Inquiry-mode in the sense of Senge, as opposed to “advocate mode”.
2. Dialogue techniques.
3. Listening to – techniques.
4. Facial expressions and bodily gestures that express openness and human acceptance, rather than prompt out fear.
5. Meta-level techniques that reinforce the subject’s awareness of the interpretative nature of her images and internal representations of the people around.

Such techniques have been described in the literature intuitively and technically but notice that ultimately the question concerns the age-old human behaviours that are not technical at all. We might be able to force ourselves to see the world through the eyes of our spouse better as a result of a family therapy weekend that teaches us a “Listening to Your Lover” –technique. That escape from the current system of interaction with your spouse might be welcome but it does not change the basic fact that it is the system that counts – more so than your individual needs, aspirations and even love in your heart.

How can people get caught in seemingly unalterable systems that lead people to deliver behaviours almost nobody wants.

Systems Intelligence is about compassion and love that makes good pragmatic sense.

Seeing Oneself in a System

"The human experiences himself, his thoughts and feelings as something separated from the rest – a kind of optical delusion of our consciousness." (Albert Einstein, quoted in Senge 1990)

There is a difference in how people see themselves as opposed to how they see other people. We do not observe ourselves as we observe other people. We do not judge ourselves the same way as we judge others. Self-centeredness is a prominent feature of the human perceptual apparatus and of our mode of thinking.

It is this self-centeredness that Systems Intelligence tries to challenge. In Systems Intelligence

1. The agent perceives herself as part of a system environment, breaking away from her own limited personal perspective in favour of a more holistic perspective;

2. The agent, perceiving herself and her environment from a systems perspective, acts intelligently in that system.

As pointed out in Systems Thinking, cognitive science and philosophical literature repeatedly, our mental apparatus tends to want to decompose the observed reality into separate disjoint categories. Bipolar subject-object distinction lurks deep in our conceptual apparatus.

In bipolar subject-object thinking, the person either perceives herself to be a subject that acts upon an external system, seeking to cause an impact, or else the environment as a subject acts upon her as an object. Notice that when an agent in a system (an employee or employer in a work-system, husband or wife in a marriage-system, parent or a child in an upbringing-system) perceives herself in these modes, her options of rational behaviour are immediately restricted.

In Systems Intelligence, the agent operates with a far vaster universe of options for possible behaviours:

1. Me as a subject operating on an object, or on another subject treated as an object.

2. Me as a subject reacting to having been treated as an object.

3. Me operating in a system with the intention to change a feature of a system.

4. Me and the others forming a system, with my perspective focused on changing a feature of the system, influencing others in the system, and creating a snowball effect through the leverage as created by the other agents in the system.

The child gets mad and throws herself on the floor. A High Systems Intelligence mother, instead of getting angry at her or trying to calm her down by pointed calm and rationality, also throws herself on the floor and pretends to act like a child in rage. The High Systems Intelligence mother is likely to stop the child from acting in rage. Her surprising behaviour changed the system.

A manager is not satisfied with a team member and tells about the problem. The team member reacts very negatively. The High Systems Intelligence manager listens to the angry team member and gives him an extra bonus salary citing as the reason the team member's clearly demonstrated commitment, but still confirms the need for a change.

A wife attacks her husband with frustrations that the day has generated. It seems like she is accusing him. The High Systems Intelligent husband, however, does not take the wife's words as personal criticism but perceives her need to let some steam out. With compassion, he adjusts to a productive role in a faith-in-life increasing system, as opposed to a cynicism-increasing system taking place with the couple next door.

Seeing oneself as part of a system is likely to involve the following aspects:

1. The impact of one's behaviours and possible changes in interaction patters upon the behaviours and possible interaction patterns of other agents in the system.

2. The impact of one's behaviours and possible changes in interaction patters upon the behaviours and possible interaction patterns of other agents in the system, as these feed back to my behaviours and possible changes in the interaction patterns.

3. The impact of the current system on all of us, in the long run.

4. The impact of one's behaviours and possible changes in the interaction patters upon the behaviours and possible interaction patterns of the other agents in the system, as these feed back to my behaviours and possible changes in the interaction patterns, in the long run.

5. The modes of adjustment that I have already adopted as a result of conformity, history, established practices and unimaginative, flat thinking.

6. The modes of adjustment that others have already adopted as a result of their conformity, history, established practices and unimaginative, flat thinking.

7. The desired ideal state I would like to reach with others.

8. The dream we are likely to share.

Optimism for Change

Change starts somewhere. It might emerge from something incremental, marginal, even trivial. And yet it might amount to a huge restructuring of the fundamental aspects of the entire system – because of the leverage created by

change in the way people perceive other agents of the system as a result of a small change in the other's behaviour

change in the way people perceive their own possibilities of acting within the system as a result of a small change in the system

change in the way people perceive the likely structure of the system in the longer run.

When Ms. Rosa Parks refused to give her seat to a white man in a Montgomery city bus in 1955, most people had not heard of Rosa Parks, considered the bus systems a technical and routine matter, did not perceive the city of Montgomery as anything particularly significant, and considered totally uninteresting the question of a particular bus seat on a particular bus leg. But as Rosa Parks was arrested the civil rights movement had reached a tipping point (Gladwell 2000) and the marginal incident caught fire, created an avalanche that eventually reached epic proportions. Change was on the way to reshaping the entire system of race distinction in the most powerful country in the world.

"The moral, rhetorical, and political brilliance of Martin Luther King, Jr.", write Paul H. Ray and Sherry Ruth Anderson in their *The Cultural Creatives* (2000), "was his ability to expose the old frames and to reframe segregation as an *American* problem." (p. 120)

Our philosophy of change is optimistic because of the overall view we have of people's beliefs. Our conviction is that many of the core beliefs of people around us do not show up in their actions as the actions reflect the assumed nature of the current system. People have adjusted to what they believe is the system – e.g. regarding "negroes". But when the system is brought to focus, the latent beliefs might trigger a revolution, spreading like an epidemic. Given a small but critical change in the system, deeply held aspirations might suddenly leverage, adding exponentially to the momentum. Such a chance is created by the nature of beliefs and the fact that externally we must be content with the interpretations of other people who in fact might be adjusting to systems in the way they express externally their beliefs.

People might hold back, each one individually, because of a system nobody endorses.

Beliefs are distinctive in having a fundamentally ephemeral essence. They can be changed dramatically, massively, instantaneously and with incremental input. For Systems Intelligence, this is a tremendous possibility as people's beliefs affect their actions and therefore other people.

Beliefs are distinctive in having a fundamentally ephemeral essence. For Systems Intelligence, this is a tremendous possibility as people's beliefs affect their actions and therefore other people.

The dominating paradigms of change conceives change in terms of notions such as

linear cause-and-effect

hierarchy

control

predictability.

Systems Intelligence focuses on changes as leveraged by the dual force field of the human mental world and the systemic nature of life around us. Because the system itself can change as a result of a small intervention, constrained mainly by ephemeral beliefs, there is a possibility of enormous leverage built into the systems perspective.

Systems Intelligence acknowledges that beliefs influence actions and actions influence beliefs. But **one might be massively misguided with respect to the representations of what the others truly believe.** There might be a systematic flaw in the way a group of agents perceives the way others think and what they truly want. As a result, the possibilities of co-operation among the whole group might be severely curbed as a result of the beliefs each has of the others as participants of the currently prevailing and dominating system.

Systems Intelligence is based on a principle of dynamic humbleness, which acknowledges that my perspective of others might be drastically mistaken, particularly regarding what the true aspirations of those others might be. A relatively small change, an incremental and even trivial change in my behaviour might intervene with *their* beliefs regarding me, and thus trigger a chain of changes in the actual behaviours in each of us and in the system we form together.

To the extent there is a veil of ignorance in our beliefs regarding the beliefs of others in the system, there also is a possibility of a cumulative enrichment and improvement. Systems Intelligence is a philosophy of realistic optimism, based on acknowledging the possibility of such an upward-spiraling movement.

This sort of leverage thinking is often bypassed. It amounts to an articulation of some of the seemingly miraculous mechanisms of actual human life. Senge (1994) for one points out in *The Fifth Discipline* that "Small changes can produce big results – but the areas of highest leverage are often the least obvious" (p. 63). The highest leverage points might indeed be hiding because they are likely to lurk in the shadows of the beliefs systems of oneself and others plus in the subtle system of interconnections we make up together.

Without going into the details, we observe that many key successes of so-called Brief Therapy (Haley, 1986) and other solution-oriented forms of therapy (Baker, 2003) can be understood in terms of changes in belief systems and in terms of Systems Intelligence. Similarly, Tannen's ground-breaking work on intimate communication can be understood as identifying Systems Intellegent structures in the way a couple or families communicate, and the possibilities of positive change that such a perspective opens. (Tannen 1986 and 2001) Radical changes in business logics as a result of new technologies and similar discrepancies can also be understood in systems terms.

Changing the System

Bringing about change in a system is likely to take one of the following forms:

- Intervention or disturbance from outside (external catastrophe; major change in the market situation; the doctor's diagnosis that you have cancer, a new technology that revolutionalizes a business).

- Intervention from within the system such as: the boss surprisingly stops and suddenly listens; the husband comes home and without taking his coat off, but taking his shoes off, goes immediately to hug his wife of 20 years; the CEO of a supplier calls the customer's lower level people in order to hear it straight from the front line; Richard Branson as the head of Virgin Airline greeting people on board of a routine flight to New York).

- Internal change of a relationship such as: the supplier and its customer decide to share the same physical site for their joint actions; President Nixon visits China; husband and wife agree to listen to each other for a minimum of ten minutes each day.

- Planning ahead; scenario working.

- Communication with other agents in the system.

Optimism is a cornerstone of our change philosophy due to the fact that changes in a system are often the result of a relatively small disturbance.

Higher Order Change

In their classical work *Change*, Paul Watzlawick et.al. (1974) conceptualise change in terms of a type theory. They follow the ideas of Gregory Bateson (2000) in what has become a groundbreaking work in the field of short therapy:

"To exemplify this distinction in … behavioural terms: a person having a nightmare can do many things in his dream – run, hide, fight, scream, jump off a cliff, etc. – but no change from any one

of these behaviours to another would ever terminate the nightmare. *We shall henceforth refer to this kind of change as first-order change*" (Watzlawick et.al. 1974, p. 10, their italics). "Waking, obviously, is no longer part of the dream, but a change to an altogether different state. *This kind of change will from now on be referred to as second order change."* (p.10-11, their italics).

A first order change takes place within a type, while a second or higher order change takes place among alternatives each of which consists of lower order possibilities.

In many cases the first order change is superficial, illusory or non-effective. It might amount to not more than running away from the true problems at hand, and the necessary changes of a deeper level that in fact are called for.

Very often, an effective change will involve a change in the perspective regarding the way the problem is perceived, and with that will involve a shift of thinking that introduces possibilities of change of a higher order.

Similar distinction is helpful when conceptualising possible solutions to a problem one faces. A solution might be superficial and only temporarily hide the real problems, yet it might seem natural and advisable given the alternatives. We might fail to look for genuine, more productive solutions because they are situated in a box or category of a different type. We might fail to perceive them, because they might point to directions we are not accustomed to taking. They might seem to carry a cost in the short run and only pay off in the long run. They might seem counterintuitive or challenge some deeply held convictions of the given industry. They might involve us getting out of the box – the box of alternatives as they present themselves seemingly exhaustively right now.

For instance, if a person with a canoe tries to fight a strong current by struggling to slow down by sticking the paddle between the rocks, trying to choose the right rocks, the current is likely to defeat the paddler. The most successful way to paddle in a foaming current is to paddle faster than the river. But this might seem counterintuitive to a layman who reacts to speed already too high.

Systems Intelligence is about getting out of the reactive loop and onto the tracks of higher-order possibilities. A systems intelligent person acknowledges the fact that her perception of the system in which she operates might be distorted, one-sided or mistaken. She is constantly on the look-out for possible redefinition of her very perception of the system – for possibilities of a higher order.

Explosive Possibilities of Co-operation

A person's beliefs about co-operation are a limiting factor on her conception of, perception of and success in human interaction. They limit her Systems Intelligence.

How an individual acts with other people, approaches them and frames herself and the situation are all influenced strongly by his co-operative beliefs. The urge to make room for new forms of co-operation is a major driver of Systems Intelligence.

An illustration provided by J.T. Bergqvist, a senior executive in the Nokia Corporation, will illustrate the kind of possibilities we have in mind here.

Let us consider a project team consisting of six persons. They meet in a meeting room:

1 1 1 1 1 1.

In the meeting room they interact meaning that their individual effects multiply. Let us illustrate this phenomenon or overall impact of the interaction by multiplication:

1 x 1 x 1 x 1 x 1 x 1 = 1.

In real life, however, things do not work that way, given the perceptions and beliefs that people have about one another.

Let us use a story to illustrate the case. Imagine a situation where the first person to come into the meeting is a Finnish engineer, Jaska, 50 years of age. Technically a top professional but somewhat introvert and not comfortable with spoken English. As he comes in, he is thinking about Mark, 32, an Australian engineer. Like many of these Aussies in Jaska's experience, Mark is incredibly self-assured and articulate – he speaks his own mother tongue – a tremendous man-of-the-world who believes he knows everything. Arrogant guy, Jaska finds him, a person who never listens, particularly someone like himself who is a pretty awkward with his spoken English. Jaska is put down by this advance projection, losing some of his excitement and best energy. Some 20 % of his best edge is cut off and he enters the room as 0.8.

Mark is approaching the room through another corridor, already put down by what he expects the meeting to be. These Finnish guys, such a depressive lot. They might be pretty good technically but you would expect them to be able to say something without three beers. I'm tired of sitting in the saunas all the time, in order to have a discussion, Mark thinks. I try to be a little bit provocative in order to open the discussion but usually to no avail. He loses some of his best edge, say 20 % and enters the room as 0.8.

A lady is also coming in, quite feminine, a controller, who finds it irritable that she always has to act like a "tough bird". She can do it, but she loses some of her sensibilities as a result. She is a loving mother of two fabulous children but she can never talk about her children, not with these guys that act so touch and work-achievement oriented all the time. She loses some of best energies, say 20 %, and enters the room as 0.8.

A senior 54-year old market guy also shows up, a bit weary because he knows what this meeting will be like. These young hungry lions. They believe they command the world. To be sure, he himself is not quite so eager to board the next plane to HK as in the old days. But you would expect there to be some respect for experience in our company. But no. He loses some 20 % of his best creativity and enters the room as 0.8.

Each enters the room as 0.8. They interact as 0.8's but interaction multiplies the effects. Thus the actual outcome is

0.8. x 0.8. x 0.8 x 0.8 x 0.8 x 0.8 x 0.8 = 0.26.

This is a far cry from the 1 they could have achieved as an outcome. But even more, there would have been the higher-order possibility all along for Jaska the Finnish guy, when coming to the room, to think how lucky it is that Mark could make it. That guy is so quick on his feet. A tremendous articulator. He knows that when it comes to the technical side of things, I'm pretty good. Jaska the Best he calls me. And he knows I'm not that comfortable with my English language nor with situations where you have to impress a lot of other people. It's great to have Mark by my side, Jaska thinks. He enters the room as 1.2.

How lucky I am, Mark is meanwhile thinking, to have such colleagues. Colleagues such as Jaska the Best. A bit shy, Jaska is, a bit innocent even – a tremendous guy of integrity. It feels great to be able to contribute in so many ways, not only as a professional – my articulation powers are an additional bonus here, something I never thought of when working in Australia. He approaches the room as uplifted by his projection of the immediate future, getting a boost of some 20 %. He is 1.2.

Each enters the room as uplifted by the projection they have of one another. They start to interact, but interaction multiplies the effects:

1.2 x 1.2 x 1.2 x 1.2 x 1.2 x 1.2 = 2.98

Systems Intelligence is based on the assumption that human interaction is a system of tremendous leverage, i.e. that the possibilities avoiding 0.26 and reaching 2.98 are always there, by positioning oneself not in the 0.8 but in the 1.2 mode.

But the upscale possibility what we here represent by the 1.2. mode and 2.98 outcome most often goes unnoticed. The reasons are

- People do not see themselves as contributing agents of an interactive system but they see themselves as individual agents affected and limited by others and the interaction patterns of the environment;

- People do not see themselves as contributing agents of an interactive system which could change;

- People do not perceive the way they themselves contribute to the way the prevailing system increases scepticism and lessens the possibilities of massive positive change in other people and the system;

- People do not perceive how much they could be themselves are individuals if the system would change and encourage individual growth instead of promoting systemic down playing on the individual level.

Systems That Drive Downwards

The 1.2./2.98 mode described above is an example of an enriching system. But most human systems, and we mean this literally, work the other way, pushing people down rather than up as individuals and as group members.

How am I treated? This is a question nobody can fail to ask internally. No matter what the system, the first impression a person gets is in terms of the effects upon oneself. But

1. People are more sensitive to ill-treatment imposed from outside upon oneself than to the ill-treatment oneself generates upon others. It is easier to become aware of small incremental misdeed others impose on me than to become aware of the small incremental misdeed I myself do upon others. As a result, most human systems generate ill-treatment upon its members, even when no intention to that effect exists among the group members.

2. It is natural to assume that people are what they seem to be. If people seem inconsiderate, rude, nonattentive, unexcited, indifferent and frustrated, that is what

they are. If your husband seems unromantic year after year, this is what you believe he is to the core.

3. It is hard for a human being to stand out for her own ways of acting and to her own principles regarding other people, if you feel alone with those ways of acting and those principles. If it is part of the culture that people come late to meetings and do not really listen to each other, it is hard to come on time and be fully attentive week after week.

A key conviction of our Systems Intelligence Theory is that all human systems have a tendency to slide towards the negative, unless a conscious and creative effort is launched to counterbalance the tendency.

Your presentation has already begun, and no sign of the boss as yet. So typical. A couple of the sales guys seem bored. So typical. You push on, you make it decently, but you realize you are 0.8. That's the way it is around here, no option for anything better.

And next time somebody else is making a presentation, you seem fairly bored.

All human systems have a tendency to slide towards the negative, unless a conscious and creative effort is launched to counterbalance the tendency.

The mechanism being described here is the **System of Holding Back in Return**. Systems Intelligence is based on the insight that such systems prevail everywhere, and yet do not tell the whole story. In fact, an entirely different story is hiding beneath the surface – and it could be triggered out by a marginal change. This is because, most people hate the prevailing system. They just adjust to it, believing it cannot be changed.

In their view, you are one of those that support the system.

The System of Holding Back in Return is remarkably easily identified by people of various ranks and files, irrespective of age or education, Saarinen has observed in the context of his lectures. Pointing it out and naming it has often triggered astonishing change in various groups of people and organisations. It is a paradigmatic archetype of the kind of a system a Systems Intelligent person tries to challenge and change.

Collapse of Systems Intelligence

There is a number of limitations for the growth of Systems Intelligence. The bugbears of systems intelligence include:

1. **Reactionary Mindset**. Notice that the Systems of Holding Back in Return is fundamentally based on reactionary modes of thought and conduct.

2. **Fear.** Systems Intelligence aims at growth. Fear feeds systems dictatorship and subservience to the status quo rather than creativity and co-operation.

3. **Static State Thinking**. The world is not a collection of individual states. The world is not static. But one's mental models, modes of thinking and talking, patterns of conceptualization and of discourses might presuppose otherwise.

4. **No-Growth Thinking**. If no growth is possible, no need to look for it from within or from surrounding systems of interaction and feedback.

5. **Mechanic Improvement Thinking**. You might focus your efforts to generate growth to technical arrangements only, thereby losing the change for super-productivity. Most management thinking falls into this category.

6. **Command and Control –Thinking**. If all is well already, no need to seek out fresh perspectives and avenues for growth through systemic changes in the way people interact.

7. **Elementalism and Individualism**. Seeing people as insulated objects narrows down perception and the space for opportunities. It leaves out human processes and wholeness, and one becomes blind to the crucial parameter of the human systems.

8. **Cynicism.** Systems Intelligence presupposes the possibility to improve life beyond the obvious. Perceiving the fundamental role interactive systems have in life, Systems Intelligence is a philosophy of optimism and faith in life, as opposed to cynicism, which assumes there is an upper limit to everything that can be done and to everything that people can become together.

Minimal Input, Maximal Output

Systems Intelligence is based on the possibility of systemic change on the basis of an input, sometimes minimal input. A key question concerns the most productive forms of a systems-enhancing input.

By a systems intervention we mean an element which when introduced to a system will generate a change in the system and in its output. Our optimism concerning the possibilities of Systems Intelligence is based on the following ideas:

1. In most human contexts the possibility of a systems intervention is always hiding. The current system does not tell the whole story.

2. An intervention of potentially enormous effect can be minimal in external terms. This is because ultimately what counts is the way the intervention is interpreted in the belief systems and meaning systems of the people involved. In particular, even a minimal change might symbolize something essential, leading to a change in the interpretative perspectives of the subjects involved, and triggering an effect of potentially enormous proportions.

3. People adjust to systems instinctively. If a system is changed, people also change their behaviours. This leads to further change.

Notice first the highly illustrative case of New York's subway system in the later 1980's, or more generally what Gladwell (2000) calls the Broken Window Theory. The dramatic drop in New York's crime rates can be interpreted as having its origin in the small changes in the City's subway lines where a zero-tolerance approach was adopted about graffiti. Dirty cars were never mixed with clean cars. The idea was to send a message to the vandals that the system had changed. But it turned out that all kinds of other minor felonies also went down on clean cars. It is almost like a person entering a dirty subway car would enter a system that says, "You need not

pay here, and please feel free to piss to the corner if the need arises". But a clean subway car is a different system.

Our assumption is that people read situations from a systemic point of view and interpret any given context in systemic terms. Then they adapt to the system. But obviously the system could be different from what people believe it to be.

As a result, there is a tremendous leverage built in any human context, if only people would interpret the system as having changed.

Here lie the chances of systemic intervention. An intervention is a change but any change is interpreted in the human context as a symbol. Therefore a clean subway car can become a powerful symbol of a new era.

The interpretation of an event, incident or a change as symbol in the human context is highly variable upon subjective, intuitive, interpretative, emotional etc. human factors. In the context of human change of the kind being discussed here, in most interesting cases, the logic is not "If X then Y". One needs to be sensitive, in order to grasp what needs to be done in order to produce a relevant outcome. It is sensitivity to such parameters that Systems Intelligence wants to highlight. As such parameters typically point beyond traditional engineering territory, Systems Intelligence extends the realm of engineering thinking considerably here. Indeed, we believe Systems Intelligence here identifies a vital connection of engineering thinking with human sensitivity.

We touch upon some fundamental existential themes. This is because the most forceful forms of intervention are likely to be ones that touch symbolically upon basic human aspirations, especially:

1. A subject's sense of worth and desire to be respected;

2. A subjects desire to feel connected to the company of others;

3. A subjects desire to feel connected with something meaningful.

A systems intervention that touches upon a person's basic existential needs is likely to transform into a change factor through the internal system of that person. (For a good down-to-earth discussion of the existential realm, see Koestenbaum and Block, 2001.)

Consider now an example used by Saarinen in his lectures.

Most Finnish men do not buy roses for their wives on normal weekdays. A **Non-rose buying system** is in place, generating behaviours and lack of rose buying. The system is invisible however, and remains unchallenged: it is not perceived to be the reason for the actions of an individual man. Yet it is the system that decides whether a given man buys roses or not – ruling out that option. The guy himself is not consulted.

The system is in place partly because the guy himself has felt neglected for a number of years. His wife never puts lipstick for him as he comes home. No sexy underwear, either. The husband reacts to what he feels is the wife's overtly pragmatic approach to each given day. But the same is true of the wife: the two are caught in a system of mutually holding back in return and also in advance. They create a system together but soon the system takes over and reality seems to be fixed to something flat and boring, everydayish and uncreative – with no possibility to change anything, because of the way "the other one is".

Suppose, however, the guy would one day come home with a rose and without making a number of it, would smuggle it into the bedroom, put the rose in an empty wine-bottle, leaving it there for the wife to find. Maybe that would be an opening…

For most men, if you have not already bought roses to your wife, it is difficult to start it all of a sudden. She might react negatively – because she might suspect you are trying to buy her somehow, or maybe she would be reminded of all the times she did not get the roses. In short, she might not take a sudden bucket of roses as a symbol of love or appreciation. Therefore the roses as a systems intervention might not lead to a positive change in the overall system because the intervention would not touch symbolically upon the wife's basic aspiration to feel respected.

In setting out an intervention that works, sensitivity and prudence is in order. But notice that this in itself is not news to engineering thinking to the extent **it wants to make things work and to fix whatever doesn't work.**

Systems Theory and Systems Intelligence

Finally we want to relate some of the topics described above to the technical concepts and descriptions used in engineering systems theory. We feel that some of the basic systems theoretical concepts are quite useful when describing systemic phenomena and situations of the kind we are here exploring. These will also help us understand the difficulties and challenges that systems pose to us.

In systems theory a system is defined by first identifying the system inputs, i.e. the control, intervention, decision or stimulus variables and the system output variables, i.e. the responses or reactions. There can also be exogenous inputs sometimes called disturbances. An input causes the state of the system to change. The term forcing function is also used for the input (see e.g. Luenberger 1979, Rubinstein 1986).

The outputs of a system are the variables that we observe directly. The state of a system consists of the state variables representing the elements in the system. The real system and its state representation model need not to be the same. One can have many different state representations for a given system. An element in a system can also be a subsystem. The states possess the relevant history of the system and they together with the inputs determine the future behaviour of the system.

Elements and subsystems can be interconnected in different ways. Feedback refers to a connection from an output variable to an input variable. The role of a feedback connection is often to stabilize, i.e. regulate the state and output to given desired goal values. Negative feedback acts to decrease, i.e. to stabilize, the deviations from the goal. Depending on the system structure a strong negative feedback can also result in a too strong of a corrective response, which can result in instability. Positive feedback loops reinforce deviation and act to increase deviations and are usually destabilizing but on the other hand they produce growth.

A system is adaptive if it is able to learn and accommodate changes in its parameters by itself.

Typical dynamic elements in a system represent phenomena such as time delays, integrative accumulation or the build-up of potential.

A system is controllable if we can bring it with the available control variables from one state to any other state in a finite time. A system can have subsystems or elements which are not

dependent on the controls used. This means that all changes in the system state cannot be achieved by the inputs (decisions, controls, interventions) available. In an uncontrollable system the structure can be the reason for behaviour i.e. then the structure produces behaviour.

A system is observable if one can identify the state of the system in a finite time by observing the system output under changes in the input. Systems are not necessarily identifiable unless forced or disturbed with sufficiently rich inputs.

Systems can have triggering states or controls which lead to a bifurcation path with a completely new overall behaviour. Such phenomena are called chaotic. This does not need to represent chaos in the normal sense but a sudden unforeseen essential change of mode. Systems can also be trapped in limit cycles where the behaviour oscillates back and forth around a focal point.

The above described concepts may seem technical but they are directly applicable in the characterization of Systems Intelligence. The framing of a problem corresponds to the definition of the inputs, outputs and state variables. We can have different framings for the same problem. A systems intelligent person is aware of this and willing to explore the effects of changing the frame. She also recognizes that in addition to the obvious system state variables there can be important hidden ones e.g. related to the mental dynamics of the people involved. Even if a system mainly consists of human agents the overall behaviour can be determined by the seemingly invisible non-human elements included which represent active or inactive physical entities and dynamic structures such as time delays or sequential communication patterns. An example of this is the famous Beer Game used in management training (see e.g. Senge 1990).

In most human systems and organizations the true system often includes hidden subsystems such as processes of fear or trust generation.

A systems intelligent person is able to understand these systemic phenomena. She is aware of the fact that in most human systems and organizations the true system often includes hidden subsystems such as processes of fear or trust generation. The inputs i.e. interventions available usually control both systems. The challenge is to understand how the inputs should be used to activate all the states of the system. It is very easy to forget to use nonphysical input variables. This is reflected in the fact that the related output, such as fear or trust, of the hidden subsystems is ignored, even if it is a major driver affecting the overall system. Thus, Systems Intelligence includes the ability to take a metalevel perspective on the inputs and interventions used. The question of observability is an important one. With partial or limited outputs one cannot always understand or see the true inner dynamics. In systems thinking vocabulary this is reflected in the saying of Churchman: Systems thinking starts when a person looks at the world through the eyes of another person. By taking a new perspective we can reveal more of the system. If we do not consider, measure or observe some factors, e.g. such psychological products as trust, then we do not know whether they are produced or not. Yet, to understand the system, it can be more important to know what is not produced than what the standard product is.

A Systems Intelligent approach acknowledges and aims to identify and understand both the visible and the invisible part of the system and control their behaviour in a positive way. An unobserved process, such as fear generation, non-support generation and similar examples as were discussed on page 4, left without attention in organizations can easily steer the whole organization to a bifurcation path with chaotic or collapsing behaviour. An opposite example is the buying-of -a-rose phenomenon where a seemingly minor act, a new input signal, can move the system to a radically new, positive bifurcation path. A systems intelligent person is adaptive

and sensitive to changes in her behaviour and is ready to understand changes in the structures of the system and adaptively revise her behaviour in new situations.

Game Theory and Ecological Systems Intelligence

The theoretical models of co-operation are discussed in the literature on economics and game theory. We wish to point to this research as the related concepts are also relevant in Systems Intelligence and can be very useful in understanding human behaviour. Human decision making does not follow the axioms of rationality assumed as the basis of economic theory. Human choice behaviour strongly reflects the decision environment and the process i.e. it is adaptive. Gains and losses are seen differently and often mechanistic optimizing is replaced by searching a goal (see e.g. Newell and Simon, 1972, Kahneman and Tversky, 2000). These phenomena are studied under the term Bounded Rationality (see e.g. Gigerenzer et.al., 1999, Simon, 1982, 1997). People are postulated to possess an adaptive toolbox of ecological rationality for tackling complex problem solving and decision making situations (see Gigerenzer, 2000, Gigerenzer and Selten, 2001). We see Systems Intelligence as one basic human capacity, a form of ecological rationality, in such an adaptive toolbox.

Game theory studies decision making behaviour in situations where two or more decision makeing agents are interacting. Systems, which consist of independent goal seeking agents, can be described by game settings. The overall behaviour depends on the form of agent interaction. When each agent always reacts by one-sided optimization the result is the generation of a prevailing myopic non-cooperative Nash equilibrium. It becomes the local status quo an escape from which is not possible by self-interested rationality. This is the case in the famous problematic phenomenon and paradox of game theory called Prisoner's Dilemma. In this situation the agents end up in an inferior non-co-operative equilibrium solution even if a jointly dominating solution would also be available by co-operation. This reflects the system of holding back discussed earlier in this paper. However, evolutionary processes as in biological and human systems do exhibit the spontaneous emergence of the evolution of co-operation generating superior dominating overall behaviour for all the actors (Axelrod, 1984). This can be interpreted as a manifestation of ecological Systems Intelligence. A system can also include a coordinator or an organizational structure which is able to introduce rules, explicit or tacit, or interaction mechanisms to induce co-operation by incentives. Such incentives which are conditional on the actors' own behaviour can reflect organizational Systems Intelligence as they can produce stable self enforced co-operation. Human organizations and societies have done this by means of e.g. social and moral rules with sharing and positive reward mechanisms. For related literature see e.g. Simon 1980, Smith J.M. 1982, Fiske 1993, Bateson 2000, Smith V. 2000, Gigerenzer and Selten 2001.

Conclusion

In this paper we have indicated some fundamental characteristics of Systems Intellegence. We believe that Systems Intelligence is a key form of human behavioural intelligence. We hope to have demonstrated that this concept is useful for understanding a number of fundamental, interrelated, yet seemingly distinct phenomena. Also, we hope to have shown that the concept of Systems Intelligence is highly intuitive and that it therefore is potentially applicable for practical purposes. The other essays in this volume also demonstrate the variety of contexts where the concept is useful. We hope the present volume will stimulate further research, as well as practical applications, in fields such as education, organizational life, leadership, personal growth,

counseling, cultural studies, antropology, law, etc. The Systems Intellegence web site will provide access to our future work in this area and links to other related sites.

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Chapter 2

Dialogue and Systems Intelligence: A Work Philosophy

Sebastian Slotte

The article discuss dialogue as a way to enhance Systems Intelligence. A core idea of dialogue is to enhance human systems, be that, an organization, a team, or a family to recollect, create and strengthen its fundamental values. The article present dialogue not only as way for effective systemic intervention but as work philosophy to be internalized in organizational culture. The examples relates to work-life at all levels of organiztions. Leaders, employees and teams can all benefit from a dialogical work philosophy.

Introduction

Dialogue, as real world practice has previously been presented, for example, as the basis for real human encounter (Buber 1947), as a way to deepen communication and understanding in human systems (Bohm 1992, 1996), as way to enhance team-working (Senge 1990, 1994, Isaacs 1999), as a method for democratic community building and education (Freire 1972) and generally as a pragmatic way of systemic intervention. My research and work with dialogue in education, conflict management and organizations suggests that the different conceptions of dialogue serves practical purposes but that a creative use and mix of different dialogue methods and philosophies can and are a powerful way to work with dialogue (Slotte 2002, Slotte and Hämäläinen 2003, Slotte 2003, Slotte 2004).

In this article I present dialogue as way to enhance systems intelligence. I use the word dialogue as referring to a) a method to enrich and improve human encounters by increasing creativity, commitment, energy and motivation. b) a personal philosophy and attitude to engage with other human beings. The view presented combines different dialogue methods with a philosophy of dialogue. Most dialogue methods have been developed as tools for educators, consultants, practitioners and leaders to aid and manage human systems. Generally dialogue interventions are used as parts of change programs, training, and conflict resolution. Dialogue sessions are thus separated from daily work processes and routines. Such interventions aim to gather information on a specific topic, create shared vision, solve conflict and build trust. Also, these interventions

are means to train dialogical skills, for example, skillful listening, inquiry, thinking together and consensus building that can be used in concrete working situations.

The approach presented here takes the latter ambition further. It presents dialogue as a possible way of life. Here I restrict my presentation to a study of dialogue as a way of life in the scope of work. Thus, I argue tha dialogue is not only as way for effective systemic intervention but as work philosophy that can be internalized in organizational culture. The examples relates to work-life at all levels such as employees and teams at every level of a company or organization.

It is generally accepted in contemporary organizations that a) decision-making should be made at the lowest possible level of the hierarchy, that hierarchy should be minimized in order for information to flow not only top-down-top but also horizontally. Likewise we know that such flat organizations do not automatically produce the sense of trust, shared vision and commitment it is intended for (Senge 1999). When there are no strict hierarchy human beings tend to create their own explicit and implicit patterns of behavior. Employees suffering from the insecurity that these self-made hierarchies in worst cases create can tell stories that could make the authors of *Lord of the Flies* and *The Beach* envious. It is my hypothesis that a dialogical work philosophy and culture could strengthen the ambition of people to live and work in a virtuous, sense-making, valuable group or community (as outlined by Saarinen and Hämäläinen 2004). As a work philosophy in an organization dialogue could thus support:

- *Organizational culture*
- *Every day meetings*
- *Developmental talks*
- *Encounters at the workplace*
- *Problem-solving methods*

As a method dialogue supports:

- *Strategy building*
- *Leadership*
- *Value navigation*

Dialogue deepens the sense and practice of

- *Communication*
- *Team-working*

Dialogue can be incorporated into Systemic Interventions such as

- *Change programs*
- *Training*
- *Conflict resolution*

The conception of dialogue promoted here goes further than the idea that dialogue is a way of talking and interacting that breaks ground for new action and reveals such knowledge which cannot be attained individually. Dialogue, when realized is itself new action. When participants in dialogue learn to engage in dialogue, they learn a new way of relating that in itself is more of an act than mere speech or contemplating on ideas. *This action or attitude can be used in any human encounter*. In other words, dialogue does not only provide tacit knowledge, align new action and values, inform decisions but is a possible attitude one can realize in every action with other human beings.

The novelty of my approach is inspired by systems thinkers who questions the need for new methods and fore more outside intervention interventions and change programs and instead emphasis the need to improve already existing with organizational and work practices by providing alternatives to how people engage in and think about these practices (Senge 1990, Brinkerhoff and Gill 1994, Stacey 2001). Combining philosophies of dialogue and dialogue methods in order to strengthen work practices seems to be a very promising way to enhance systems intelligence in individuals and groups.

What then is Systems Intelligence? Systems intelligence can be grasped by a comparison to Systems Thinking. While Systems Thinking is said to enable an objectifying helicopter perspective of the system it studies or engages with, Systems Intelligence recognizes subjective relationality with the systems it studies. A Systems intelligent individual is said to perceive himself as a part of the human system he is interacting with and recognizes her influence on the system and the systems influence upon her (Saarinen and Hämäläinen 2004). Sensitivity to the system allows the Systems Intelligent individual to act intelligently in the given system. When all individuals in a given human system perceive themselves as part of the system and the possibilities to act creatively in a systemic context, rather than acting as isolated individuals, a synergetic effect takes place. Instead of diminishing their own or others capacity and capability they enhance them (For an illustrative example of this see Saarinen and Hämäläinen 2004).

A systems intelligent action supports, inspires and drives the human system in accordance with its values and aspirations.

Thus, an agent can form different perspectives of the system studied. Systems Intelligence is the recognition of the multitude of possibilities followed by appropriate judgment of which perspective to choose as a basis for action. This is especially crucial when it comes to human systems. I human encounters the nature of the system is not settled in advance. If the nature of the system could be determined in advanced then the correct perspective would be “out there” to discover. But it is rather the encounter itself that determines what the nature of the system is going to be. The multitude of possible perspectives does not amount to a total relativity i.e. any perspective is as good as another. When dealing with human systems, a systems intelligent agent relates the perspective he chooses to his own and the others, knowledge, values, goals and

aspirations. A systems intelligent action supports, inspires and drives the human system in accordance with its values and aspirations.

Dialogue is a powerful way of dealing and sharing understanding of concepts that have a philosophical twist to them. According to Peter Senge the failures of grand change programs such as Total Quality Management, Re-engineering and the Learning Organization lies in our fundamental ways of thinking. Senge, like many other Systems thinkers, proposes that the philosophy of science called Systems Thinking is to be incorporated in both personal and organizational change programs in order for them to deliver results.

Dialogue and Human Systems

By seeing the world, ourselves and organizations as a whole and in a systemic way we will be able to control and steer more successfully. One of the most important lessons from Systems Thinking is that fixing only a part of a complex system rarely achieves the intended goal. For example a computer company that due to demands from customers must deliver more sophisticated software can hire new expertise or train former employees (revised example from Brinkerhoff and Gill 1994). In addition they have to:

- *Revise job descriptions*
- *Negotiate and sell new contracts*
- *Redesign contracts*
- *Redesign billing statements*
- *Revise performance appraisal procedures*
- *Adjust bonus and merit procedures*
- *Inform everyone in the company about the changes*
- *Orient the new employees to the company*

This is all neat. However, the implementation of these procedures is at least partly dependent on human work: employees encountering and engaging with employees. Human systems cannot be controlled in the same way as a non-human system. Laws of social behavior cannot be controlled in the same way as the laws of mechanism and nature. This is not only a philosophical idea relating to free will. Experience teaches us that human systems are not controllable or manageable in any strict sense. Systems thinker Robert Flood (1999) expresses the challenge of managing in such conditions in poetical terms: “We will not struggle to manage over things – we will manage within the unmanageable”. To succeed in that task can be called Systems Intelligent.

Technically speaking; dialogue enhances systems intelligence by letting participants in dialogue:

- *Observe and be observed by the human system*
- *Share information with the system*
- *Commit to the system*
- *Test the potentiality and pragmatics of various kinds of input*
- *Create systemic understanding, values, and goals.*

An engagement in philosophical thinking on everyday matters is prerequisite for people and organizations to change (Senge 1991). In organizations the interest in dialogue and its transformative power comes from research that have shown why and how improved and deep communication on fundamental question affect organizations and teams in a positive way (Janis 1982, Senge 1991, Peters 1997, Goleman 1983). In public decision making the call for new methods for democratic deliberation has triggered the interest. Philosophy is the practice of thinking about the most important matters in our lives, especially those that cannot be solved by science alone. Take for example the concept of knowledge which is central in the grand change programs. Before I can determine if, for example, I or the organization I work in, possess knowledge I have to have an understanding of what knowledge is and how knowledge differs from, say, information, beliefs and rumors. Only then can I measure or evaluate it. The same is true for the concept of democracy. If my only criteria for calling a society democratic is that everybody is allowed to vote then an empirical study of which governments have been democratic will include nations like the former Soviet Union and Saddam's Iraq. Dialogue can be characterized as way to engage in deep, structured and pragmatic philosophy without any prior knowledge of academic philosophy.

Examples: Communication, Thinking and Intervention

Recent criticism of dialogue (Stacey 2001, se also Frydman et al. 2000) have questioned the presumed power of dialogue. A simple but important lesson to be learned from the criticism is that dialogue, or any other change program, does not work if it is subordinated to the modes of thinking, communication and culture that dialogue in the first place is aimed at. In such situations dialogue becomes a mere "buzz word" in the service of the very unwanted forces that real dialogue challenges. This can happen when, for example, the goal of a dialogue is settled in advance. When pressure to reach the goal becomes high, real dialogue, creativity, surprise and joint investigation disappears. If dialogue and dialogical methods merely are incorporated in organizations, conflict situations and the classroom without questioning the dominating views on communication, learning, thinking together and interaction dialogue will only become a means to enhance the current practices that we wish to change. This is a core reason why a philosophy of dialogue is needed.

Change programs does not work if subordinated to the modes of thinking, communication and culture that they are aimed at in the first place

Communication

Extensive research has shown that the lion part of managerial textbooks present communication in terms of the conduit metaphor (see Bokeno 2002, Axley 1984). According to the conduit metaphor successful communication is like a pipeline. Messages are understood as information that are transmitted from a sender to a receiver, decoded by the receiver, and successful if the meaning of the message is the same at both ends (Bokeno 2002). According to Bokeno (2002), the popular conduit metaphor that describes how the understanding and practice of communication is perceived in organizations, is theoretically inappropriate, often dysfunctional and ineffective and a hindrance for implementing programs for creative, playfull and innovative communication such as dialogue. If the conduit concept is dominating and not questioned dialogic modes of interaction "might simply be covered as yet another management concept, rather than modeled or developed as the rich, constructive and productive mode of interaction that it is" (Bokeno 2002).

Thinking

The philosophical foundations of dialogue interventions concern how we think about communication, thinking and interaction and learning in dialogue. As we shall see, dialogue emphasizes communication as something happening "between" communicators not from a communicator to another. If the philosophical foundations of dialogue, such as the one regarding communication, is overlooked and dialogue is understood within the conduit metaphor of communication dialogue will loose much if not all of its transformative power. The difficulties involved in improving communication and conversation through dialogue are not due to a lack of dialogical methods, programs and software which there are plenty of. As Tom Peters (1999) writes about communication in organizations: "You can have the perfect e-mail system, the perfect groupware, be wired up the gazoo" but in the end it is the quality of conversation that determines success. In dialogue and in conversation in general nothing is settled by a communication program, software or espoused rules since developing, learning and sustaining creative conversational patterns is an ever recurrent challenge. In order for a dialogue intervention to be successful, every participant must, so to speak, reinvent the wheel again, by continually challenging her own basic ways of thinking. There is no shortcut.

Intervention

As a form of systemic intervention dialogue aims at providing an alternative conversational pattern, changing the way of interaction in human systems, and strengthening people´s capability to thinking together and thus fostering: Dialogue is first and foremost a practice not a theory. "The talk about dialogue takes from men the experience of dialogical life. These "dialogical dialecticians do not seem to notice that the dialogic is essentially a way. However, the way is there that one may walk on it (Buber, quoted in Friedman 1955, p. 323). I take this proposal seriously: my contribution to our understanding of dialogue is directed not to the purely academic debate on dialogue but scientists, philosophers, leaders, consultants, teams and others who are interested in the practical implementation of dialogue in order to enhance systems intelligence.

In systems Intelligence the helicopter view of systems thinking is replaced with a relational view. Following Midgley (2000) the observer of a system, is indirectly but necessarily, also the observed i.e. involved with the observed system. This is exactly what is at stake in a successful

dialogue. Participants are not merely observing the others and their points of view but recognize that they are observing *with* the other participants and *with* their points of view. The focus then becomes not to reach a pre-established goal in harmony with existing modes of thought but also to challenge existing modes of thought in an intelligent and creative way and with sensitivity to the system one is engaged in. As a general philosophy of work Dialogue enhances

- *Shared values*
- *Creativity*
- *Synergy*
- *Commitment*
- *Systems Thinking*
- *Systems Intelligence*
- *Emotional Intelligence*
- *Motivation*
- *Emotional Energy*
- *Results*
- *The good life*

Dialogue as a philosophy of work rests on the relational character of human systems. On this aspect Martin Buber philosophy of dialogue is fundamental. Bubers views on dialogue have been applied in counseling and to some extent in conflict situations (Schuster 1999) but when it comes to dialogue interventions in larger human systems his practical views on dialogue have remained somewhat in the shadow.

The importance of the relational aspects of dialogue cannot be emphasized strongly enough. Dialogue becomes first and foremost a way to engage in every situation of life.

Dialogue as a Way of Life and Work

The incorporation of philosophical views on dialogue into methods for dialogue interventions in organizations and conflict situations is fully in agreement with the original idea of how and where dialogue ought to be used (Buber 1947). Buber envisioned businesses where leaders of “great technological enterprises” create situations were people can meet each other not as leaders, managers and subordinates, but as persons engaging in dialogue. “No factory and no office is so abandoned by creation that a creative glance could not fly up from one working-place to another, from desk to desk, a sober and brotherly glance which guarantees the reality of creation which is happening – *quantum satis*.” (Buber 1947). The characteristics of a dialogical encounter are:

- *Relationality*
- *Trust*
- *Communication with*
- *Responsibility*
- *Room for surprise and creativity*

In the following I shall elaborate on these characteristics.

The pathway to dialogue is the realization that humans are relational creatures. According to Buber (1947) relationality takes place in "**the space between". Relationality** and the "space between" is not just something one might choose or wish to engage in; it exists independently of any particular action when two human beings meet. The "space between" is not observable in space and time as the single individual and the collective are but is re-constituted in every accidental and inevitable meeting between man and man. The ontology, i.e. the reality of human existence is therefore systemic, in the systems theoretic sense of the word. A human system and its nature are neither comprised of the sum of the individuals engaged in it, nor the individuals determined by the collective. The "space between" is the realm which two or more people can develop and nourish consciously if they set aside the prejudices that thought or ideas only can be communicated from an individual to another or that rules and forces external to these to individuals must determine what is spoken. The space between is a sort of common logos or reason where multiple voices create and work on single ideas. It is the playground for encounter.

The nature of a system comprising of two individuals is not only determined by the nature, attitude, values, and mindset of the two individuals. The relation itself determines the presence of what attitudes, values and mindset are present, created and communicated. The relation also affects the continuity and changes of attitudes, values and mindset of the individuals. Dialogue takes place when people act with this relation in mind.

When recognizing that the nature of human beings are determined by relationality and "the space between", it is possible to engage in dialogue. To engage in dialogue is to fully engage oneself in that relation in every particular situation. A **trustful** turning towards the other is what is needed for dialogue to come true.

"Nothing stands so much in the way of the rise of a Civilization of Dialogue as the demonic power which rules our world, the demonry of basic mistrust. What does it help to induce the other to speak if basically one puts no faith in what he says. The meeting with him already takes place under the perspective of his untrustworthiness. And this perspective is not incorrect, for his meeting with me takes place under a corresponding perspective."(Buber, in Friedman 1955, p. 260)

Without a trustful engagement with the other, a turning towards dialogue is impossible. Dialogue is not first and foremost a detached presentation of ones ideas or a detached inquiry into others ideas. It is not me communicating my opinions to you or vice versa. Dialogue is not communication *about*. **Dialogue is communication *with***. As we shall se the Buberian idea that

dialogue is creation, nourishing and fostering of the relation between individuals is of tremendous importance from both a personal existential point of view and in the design of dialogical interventions.

The systems intelligent approach of the Buberian dialogue can be illuminated by considering the following situations:

1. You meet the cleaner in the hallway of the office you work in
2. Your boss expresses that he is not totally happy with a project you done
3. Your spouse tells you that she thinks you spend too little time at home

If you happen to be a radical individualist and think that the interpersonal relationship and the collective established between the individuals in the situations are nothing but the sum of the individuals engaged in them this will have consequence for how you act in concrete situations. What is really at stake then, is you, your own "mind" and your feelings.

You greet the cleaner if it is in some sense advantageous for you to do so. You regard your boss remark as a treat that you must eliminate. If you think you spend enough time at home your spouse remark is an intrusion on your privacy. If you happen to think and feel that both your boss and wife are right you see their remarks as you failing as a person.

Also you define the other according to these personal feelings. The cleaner is merely defined as a person according to your personal ideas on the value of cleaning. If you dislike what your boss says he is labeled "tyrant" and your spouse gets the title "nag".

Paradoxically, radical individualism becomes a philosophy of re-action and you become a prisoner of your personal feelings.

If, on the other hand, you are a radical collectivist, i.e. believe that society or the collective you belong to determines individual action you greet the cleaner if this is something expected by the collective. If you don´t like your boss comment you doom it as the "fault of the system". Your spouse complaint is seen as the cons of the institution of marriage.

As it happens, the philosophy of collectivism becomes fatalism.

If you on the other hand live the life of dialogue, in general or in one of the particular situations, you seek for **responsibility** i.e. responding to the other and expecting him to respond.

"The idea of responsibility is to be brought back from the province of an "ought" that swings free in the air, into that of lived life. Genuine responsibility exists only where there is real responding". (Buber 1947, p. 18)

When this is realized, you see neither yourself, the cleaner, the boss or the wife as determined by anything but the relation you both create in that very moment. In the life of dialogue you recognize the cleaner as someone who cleans yet you can see something more. Something more which eventually manifests itself in the particular situation when you come to se him/her as a person. This has nothing to do with political correctness. To engage in dialogue does not necessarily mean to give up ones own point or fully accept the others. The individual sphere is untouched, but when both enter into the realm of dialogue "the law of the individual points no

longer holds" (Buber 1947 p.7). The two individualists become a system, but an intelligent system where responsibility resides. Therefore a dialogue between to men is never built on sole empathy of the other participants.

"Empathy means, if anything, to glide with ones feeling into the dynamic structure of an object, a pillar or a crystal or the branch of a three, or even of an animal or man, and as it were to trace it from within, understanding the formation of motorality of the object with the perception of ones own muscles; it means to transpose oneself over there and there. Thus it means the exclusion of ones own concreteness, the extinguishing of the actual situation of life, the absorbation in pure aestheticism of the reality in which one participates".(Buber 1947, p. 114-115)

Let us consider why dialogue must not be mistaken for pure empathy. Imagine that you see a tramp on the street and become overwhelmed with feeling sorry for him. You have not addressed him and he has not addressed you. But he looks miserable. You imagine all the ordeals he has been through, his loss, his addiction, his pain and loneliness and you feel sorry for him. If you had gone through all that, certainly you would feel sorry for yourself. But the tramp had not addressed you! Is not this feeling sorry, really you who is feeling sorry about your self?

The idea of responsibility is to be brought back from the province of an "ought" that swings free in the air, into that of lived life. Genuine responsibility exists only where there is real responding

If you engage with the tramp, if you see the person and your relation to him certainly it might be the case that he do not want your empathy and that he really affirms his predicament. Or is it not equally possible to see all the possibilities he still has? That is an open question which is answerable to the extent that you relate with him. The answer is unpredictable and has noting to do with your respective prejudices; it is perhaps manifested as an eye glance revealing mutual respect humor or friendliness. The Finnish word for empathy is more accurate: *myötäeläminen*, "living with".

"It is the extension of ones own concreteness, the fulfillment of the actual situation of life, the complete presence of the reality in which one participates. Its elements are, first, a relation, of no matter what kind, between two persons, second, an event experienced by them in common, in which at least one of them actively participates, and third, the fact that this one person, without forfeiting anything of the felt reality of his activity, at the same time lives through the common event from the standpoint of the other." (Buber 1947, p. 115)

Let us look at this idea from the radical individualistic point of view, and the monologue. Take for example the example of your spouse complaining that you spend too much time outside the home. The individualist sees the process between man and wife as happening in their "minds". The act of saying something is the act between a messenger, the message and the receiver. It is not much unlike the act of reading a newspaper. Someone or some has written the article you read. Through the mediation of the newspaper - which in itself is nothing more than paper and printing ink- you read and interpret the articles in your "head". Compare this to the man and the wife. She has "thought" of something in her head, addresses it to you, and you interpret it. If you both happen to be individualists of the same kind there is a danger you become engaged in a monological conversation.

A core idea of dialogue is to enhance human systems, be that, an organization, a team, or a family to recollect, create and strengthen its fundamental values. For example, possible fundamental values in a marriage are love, friendship, working for a mutual future, care and respect. Possible fundamental values in a team are synergy, effectiveness, trust, shared vision and team working.

Recollection: What are our fundamental values? Why do we live, work, play together? What is our aim, goal, dream seen as a pair, team or organization? Why did we start this ting?

Creation: What do we appreciate? What do we aspire for? What are my values, and your? Do we have common values? Are there values we should incorporate in our lives in order to succeed or prevail.

Strengthening: Deepening our understanding of our values. Acting according to our values.

Implementing dialogue

I have elsewhere presented that methods and techniques for dialogue interventions are to be used creatively in accordance with the needs, values and aspirations of the people who are going to engage in dialogue (Slotte 2004, Slotte and Hämäläinen 2003). I have great respect for the both Nelsonian inspired dialogue and Bohmian dialogue. Strictly speaking they are not merely techniques or methods but philosophies of life and work. It is, however, important to use them as philosophies and not as pre-established undisputable tools. The fundamental idea of dialogue is to encounter and engage with people in the most possible creative and energizing way (for a thorough discussion of this see Saarinen and Slotte forthcoming). There are no pre-established techniques for this to happen. Methods should rather be used as eye-openers and to overcome various hindrances to engage in dialogue. It is the conditions for dialogue that must be *fostered*.

The most influential philosopher with respect to the mushrooming of the practice of dialogue in work-life education and organizations today is David Bohm (Bohm 1992, 1996). His writings on dialogue have become a paradigm in Systems Thinking focused organizational management and have inspired practitioners in various fields to develop methods and guidelines for dialogue interventions. For Senge, following Bohm, dialogue becomes a way to align action. “Dialogue is not merely a set of techniques for improving organizations, enhancing communications, building consensus, or solving problems. It is based on the principle that conception and implementation are intimately linked, with a core of common meaning. During the dialogue process, people learn how to think together – not just in the sense of analyzing a shared problem or creating new pieces of shared knowledge, but in the sense of occupying a collective sensibility, in which the thoughts, emotions, and resulting actions belong not to one individual, but all of them together” (Senge 1994).

According to Senge, Bohmian type of dialogue gives access to such information and meaning that cannot be accessed individually, enhances new action, provides individuals with collective meaning and offers a place for innovation and inquiry (Senge 1991). Furthermore, all these capabilities are thought to improve effectivity in groups and in organizations.

Another dialogue method, particularly popular in the field of philosophical practice and the philosophy of management is Socratic Dialogue, developed out of Leonard Nelsons dialogue conception. Common for both is a) the view that dialogue ought to be an everyday practice and not merely a philosophical theory and b) that dialogue transforms human relationship by overcoming individual and cultural barriers for sharing meaning, values and understanding

According to both, genuine dialogue is the overcoming of private superficialities and defenses under which we normally submit to in everyday encounters, discussions and debates. Moreover, both were engaged in the developing practical guidelines and methods for dialogue.

Encourage participants to see themselves as a system. Dialoguers should be encouraged to participate in a systemic process. In dialogue the main focus is not on our selves, the other, our system, their system but the system that is comprised out of the dialoguers. For example in conflict and problem situations, emphasis on different viewpoints and problem-talk can in the worst-case scenario increase or maintain the conflict or crisis. The participants, as long as they engage in it, are primarily a part of the dialoguing system. When using dialogue in interventions have the following in mind:

System before method

Start with the human system that is going to learn to engage in dialogue and use appropriate methods to aid the system. Don't impose techniques on participants.

Mix methods

Mix methods playfully and creatively.

The power of the of Bohmian inspired dialogue methods lies in the enhancement of thinking and communication skills that allows individuals to see systemic complexity and how attitude, and position taken in a dialogue affect the whole group.

The power of Nelsonian dialogue is the concentrated focus on a given topic and the analytical approach.

The power of Buberian dialogue lies in the creation of a meaningful relation between individuals, a meaningful human system

Don't establish any metaphysical or religious goals to dialogue

Let every participant judge for herself.

William Isaacs (1999) presents four principal virtues of dialogue: listening, suspension of judgment, expressing and respecting. The virtues are not simply presented as virtues one can automatically turn to but rather as skills one should develop and learn to practice, not very unlike the practical thinking skills of ancient philosophy (Hadot 1995). Other important virtues of dialogue include thinking together, encouraging others to speak, focus on the issue and not on personal character of other participants, winning together rather than winning for yourself, speaking from experience, and changing the point of view.

In the following I will present some of the virtues and guidelines possible in a dialogue in a brief manner. They can be practice in dialogue session but also in the car or the buss, at the dinner table in a meeting or in a sporadic meeting on the street. It is not necessary to choose more than one virtue at a time. A common experience of dialogical thinking is that the virtues overlap each other: paying attention to one of the virtues generates attention to another virtue.

No Leader

In the dialogical encounter leadership is manifested in giving up authority and learning from and listening to so subordinates. Likewise subordinates must realize their potential and responsibility in the dialogical relationship.

No Agenda

No agenda means avoidance of predetermined agenda or hidden goals. This ensures the free play of thoughts and the discovery of new possibilities.

No Decisions

Dialogue is way to structure decisions and take relevant aspects in to account for a future decision. It can also be applied to evaluate and discuss former decisions.

Suspend Certainties

Everyday-life is filled with psychological certainties. If we for example always doubt whether the floor we walk on remains intact under us our lives will be full of anxiousness and far from pragmatic. However, if we forget ever to challenge our own certainties we will not learn, we will not be innovative, and we will be dull. Strive to be open for the riches that are in the palm of your hand.

Listen

The mainstream view on listening is that it is an on/off thing. A better description is that you can listen on scale reaching from say 0-100. Overcome merely hearing. Listen to your listening. The human voice talking to you can contain finer subtleties, levels and harmonies than a symphony orchestra.

Be vulnerable

Emotional agility is fun, sexy and strengthens survival." Cool is fear dressed in black" (Mau 1998).

Slow down the inquiry

In dialogue the old saying "rush slowly" is king. Taste your own and others words. Don't jump to conclusion before enjoying the debts of the premises.

Be aware of thought

Pay attention to your own thinking. When do you not agree? Who's ideas are constantly rasing your suspicion. Pay attention what it feels like to embrace that persons thoughts.

Suspend assumptions

Galileo, Archimedes and Socrates suspended any assumption on the objects of their inquiry.

Speak personally

Use your imagination. Don't stick to facts, quotations and authorities to prove your point. We have science for that. Use reason and feeling. Be playful though. Use the actors trick when he plays a drunk: do not play that you are drunk but play that u are doing everything to be sober.

Avoid generalizations

Generalizations are pragmatic for life. There are one word "hand" but billions of unique hands. Invent generalizations but do not make them dogmas. $E=MC^2$.

Don't fix or convert others

We fix and convert others all the time. Take a break.

Balance Inquiry and advocacy

Inquire in to your own certainties. Try advocating any view alien to you.

Respect individual differences

To be honest: love individual differences or learn to love them.

Seek the next level of understanding

Go deep, go high.

Care

Be interested, sensitive, open and warm-hearted with everyone and anyone you choose to engage with.

The dialogical relation is not necessarily established by conversation but a handshake, smile, glance or nod can be sufficient. Even a shared silence can occur in the dialogical relationship. That dialogue has this everyday dimension is far from trivial when it comes to dialogical interventions and dialogue in groups. After all, the incentive to arrange dialogical interventions is hopefully not brought on because we can not dialogue in everyday life and work. Even if everyday dialogue is rare, we engage in dialogical interventions precisely because we want to learn how to enter into dialogue in everyday life.

As it turns out dialogue is something existing not as a pure theory or method but as a possible way of life. The variety of the situations in life, the heterogenity of human relations and the

challenges of the everyday life does not obey one method. Therefore, sensitivity to the human system striving for dialogue calls for using whatever methods it takes for them to reach dialogue not vice versa, what ever dialogue for the human system to obey a method. Dialogue is of course also often unpredictable and above any method just as sex or music. In Donald Schön´s words dialogue is like

"jazz, because if you think about people playing jazz within a framework of beat and rhythm and melody that is understood, one person plays and another responds, and responds on the spot to the way he hears the tune, making it different to correspond to the difference he hears, improvisation in that sense is a form or reflection in action." (Schön 1987)

Because much of humans engagement with other humans takes place through language and language is the dominant way of describing other forms of human interaction, in philosophy and in science, we will now pay attention to the linguistic dialogue:

Dialogue as I use the term here is not obviously associated with dialogue as understood as a piece of literature, a dialogue in a novel or a play. But if we think of the spoken dialogue as existing in the space between, dialogue gets the characteristics of two or more people engaged in one and the same process of writing on one piece of paper. Dialogue is thinking, action and creating together.

Change towards a real dialogical work culture has to start by introducing dialogue as possible and potential philosophy at the grass-root level of work: Systems Intelligent people in a intelligent system.

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Systems Intelligence in Organization

Chapter 3

Systems Intelligence by Supervision

Jari Salonen

This article examines the manifestations of Systems Intelligence in the context of working life, in both individual and organizational levels. The possibilities for developing Systems Intelligence are the main focus of this article, and supervision is presented as a specific development forum. Also a model considering supervision promoting Systems Intelligence is outlined.

Introduction

In the story of Homer, Odysseus hired a personal guide for his son Telemakhos. Wise old sea captain Mentor was supposed to guide son's growth from youth to adulthood when Odysseus was away. According to Totro (2001), the first consultant in the history of manhood was Moses' father-in-law Jetro, who monitored Moses' aspirations when he was leading the people of Israel, paying special attention to the functioning of the community, its work practices and structures. A predecessor for modern supervision was Socrates, who helped with his questions those who were seeking his help to find their own solutions to the presented problems (Holmberg 2000).

To use an outsider in the service of growth and development has a long history. When the world is growing more complex there is also a growing demand for mentoring, consulting, coaching and supervision in the working life. Hyyppä (1997) defines supervision as the most intensive and systematic form of consultative work, where a person is supported with inquiring mind to identify his relation to his work again, to think himself in the work in a creative way and to find new possibilities for development and growth. Supervision has as a focus systemic triangle, which elements are the worker and his/hers personality, work role and the entirety of the organization where he/she operates. The major target of supervision is to investigate the interaction and dynamics between these elements.

Systems thinking have gained a more significant role as a tool for perceiving the world, which is characterized by increasing chaos and complexity. In the working life this is especially visible in the theories and models regarding a learning organization. The concept of learning organization has become a mega trend since 1990's and it doesn't show any signs of settlement in the beginning of a new century. This popularity is mostly due to the writings of Peter Senge (1990). Grounded on Senge's thinking, a new and fascinating concept of Systems Intelligence (SI) has

also emerged. SI refers to the individual's active and practical reason in action. (Hämäläinen and Saarinen 2003)

In this chapter, I will examine the concept of SI from the working life point of view, emphasizing especially the possibilities to develop SI. From my point of view, SI offers an interesting and promising tool to inquire into question about connection between psychic systems (individuals) and social systems. Work is naturally one of the most important social systems that we as individuals are a part, and work is always carried on in organizational contexts. Supervision is a professional tool, which has been developed to relieve the friction between working individuals and their work, and in that way it constitutes an interesting application area for the SI.

Expertise as Systems Intelligence…

According to Hämäläinen and Saarinen (2003) Systems Intelligence is "intelligent behaviour that perceives wholes, which include interactive feedback connections". Systems Intelligence is based on perceiving oneself as a part of the whole as well as on recognizing effective relationships between self and the whole. The recognition of this mutual dependency makes possible intelligent behaviour, which takes into account the effect that structures have to the beliefs guiding one's actions. It takes also into account the chances of influence that one has regarding to those structures. The striving for change is essential, and the change can be related to mental models, ways of perceiving, individual behaviour or system. The change is aimed at good life, which has an essential connection to the values that guide and inform one's behaviour. (Saarinen and Hämäläinen 2003)[1]

The concept of Systems Intelligence has interesting connections to the current discussions regarding the nature of expertise. The expertise is conceptualized as an ability of the networks and organizations to solve new and changeable problems in collaboration (Engeström 1992). According to Bereiter and Scardamalia (1993) it is just problem solving that separates real experts from even experienced non-experts. The problem solving by the experts is gradually advancing and progressive, and success in the problem solving activities does not lead to routine but rather to a more challenging and advanced problem solving. Thus the expertise includes a strong inner need for the development and growth. The essential feature of expertise is continuous learning in different situations.

Drawing attention to continuous learning has brought up the knowledge gained through experience and especially so called tacit knowledge as a central position in building the expertise. Tacit knowledge means intuitive knowledge, which is very hard to articulate. It is more like contextual understanding, which also forms the grounds for explicit knowledge. (Polanyi 1983). The quantitative expansion of information, increasing complexity of problems and growing importance of different kinds of knowledge lead to a situation where the expert's decisions and resolutions are based more on non-linear processes. Experts are acting on a basis of models that they have created by intuition and experience. Intuition and experience are for their part based on a deep understanding of facts and theory. (Ståhle and Grönroos 2000)

From a systemic viewpoint even skilled problem solving does not form a sufficient ground for innovative expertise. Focusing on problem-solving activities does also contain problems. Flood (1999) expresses a view that focusing on "problems" and "solutions" includes an illusion about possibilities to control things which is impossible in complex systems. Problems are treated as

[1] http://www.sal.hut.fi/Publications/pdf-files/msaa.pdf

they were real, detachable from their surroundings and solvable. Once the problem has been solved, things will continue as before. This kind of delusion of linearity may even lead the action entirely to a wrong direction. Better than by problem-solving, learning and development are served by the investigation of problem setting and critical inquiry into the grounds of these settings (Schön 1983).

Another problem related to problems is the static nature of problem-solving activities. Focusing on problems and solving them means reacting to the unexpected phenomena that has been encountered and it does not necessarily include active aspirations for altering the direction of change. Solutions may be new and that may contribute to learning, but the actual system doesn't change. By solving problems things are controlled, and development happens through these small and controlled steps. In a rapidly changing dynamic environment, where innovations are crucial, this is not enough. It is not enough for an organisation that aims at being in the van of development and not one step behind. (Ståhle and Grönroos 2000). Focusing on the problem-solving produces adaptive learning, but focusing on problem-setting and anticipation produces proactive learning. Pro-activity means that one recognises the effects his own patterns of though have on the actions as well the contribution that one self has to the origins of the problems (Senge 1990).

Although both explicit and tacit knowledge are of great importance in guiding the actions in dynamic environment, the major thing is to be able to act in the situations where exact information is unavailable. New knowledge can be produced only by giving up old patterns of thought and old knowledge structures. (Ståhle and Grönroos 2000) Because goal-directed action takes always place in the future, successful expert needs most of all the abilities to anticipate and foresee the action and it's possible consequences (Nowotny et al. 2001, Rescher 1998).

New knowledge is not created out of nothing. The essential prerequisites for knowledge creation are intuition and large amount of knowledge from various sources as a basis for this intuition. New knowledge, innovations and ideas are not possible without chaos. From innovative expertise point of view it is useful to take into account four principles, outlined by Ilia Prigogine (see e.g. Prigogine and Nicolis 1989), which are effective in all self-organizing systems. According to Prigogine, all innovations are based on chaos. To produce innovations requires lots of information, but all that information is not necessary for the end product. Innovations also require the ability to detect weak signals. And finally, innovations develop according to their own schedule. (Ståhle and Grönroos 2000.) For an expert this means that chaos and disorder must be tolerated for creative action to be possible. An expert must also be able to obtain more information that is needed in every particular task and situation. By weak signals it is referred to the sensitivity to small and apparently insignificant things, which can after all have a significant impact to the progression of events. The fact that innovations and creativity can not be coerced means that an expert needs to tolerate uncertainty, imperfection of knowledge and seemingly slow pace of progress.

Productive chaos is created in interaction between systems that represent different values and expertise (Ståhle and Grönroos 2000). Networked expertise refers to expertise that is born by tailoring and adapting own competencies to the demands of operation environment and is based on the shared capabilities of a certain expertise culture or network instead of the individual abilities (Hakkarainen et al. 2004). In the theories of learning organisation, much attention is paid to the growth of a team's or group's joint competency capital. The co-operation is seen fruitful especially regarding the growth of knowledge. Chaos theory brings out another vital aspect of co-operation: living in the midst of continuous chaos and complexity causes anxiety for an

individual. Co-operation in a team, a group or a network can considerably relieve the bearing of uncertainty and incompleteness. Networking means also the source of support.

To support the action, feedback information from the system is needed as well as deliberating the significance of that information. When chains of events are analyzed retrospectively, it is possible to learn what actually has happened, what phases the process has had and how it has been guided. Even though conscious action and decisions has their impact to the progression of the process, also spontaneous and unexpected things has their impact and these should be given special attention. This is what so called process evaluation (e.g. Patton 2002) is about. It aims at clarifying and understanding how the inner dynamics of some program, organization or interactive relationship shapes its function or results, and special attention is paid to surprising events or consequences. Evaluation is part of all actions targeted at improvement (Flood 1999).

Evaluation can be regarded as a sort of method for learning collectively from experience. It also means that things are examined from different viewpoints, which is essential in systems thinking. Individual counterpart of the evaluation is self-evaluation, which means reflecting one's own action. Reflection is needed to locate oneself in the system. According to Schön (1983) reflection means learning in the uncertainty and it helps to frame the situation on grounds of prior experiences. To define the boundaries or to specify temporarily and locally the confines of the domain of action is fundamental part of systemic way of action.

Jack Mezirow (1991) separates in his theory of transformative learning three possible focuses of reflection. Content reflection investigates what we feel, perceive, think and do. Process reflection means examining how we think and act and also how fruitful our action is. Premise reflection aims at making conscious why we perceive, feel, think and act as we do or the causes and possible consequences of our actions. Only premise reflection can lead to transformative learning. Normally learning means giving old meanings to new experiences, but transformative learning aims at attaching new meanings to old experiences. Other forms of reflection can only alter the meaning schemes (or specific beliefs, attitudes and emotional reactions) but premise reflection affects the meaning perspectives or the wholes of mutually connected meaning schemes. The change of the perspective is essential prerequisite for developing action in the adulthood. This perspective change is the same thing that Senge (1990) refers with the concept "metanoia".

To become an expert, one needs high-quality education and experience. But, to act as an expert, one needs the skills of communication, co-operation and reflection, which are not possible without Systems Intelligence. The general competencies related to the expertise can be summarized as follows:

Innovative action and continuous development
Thinking causes and consequences systematically and holistically
Creative interaction
Defining and confining the objectives of the action again and again
Tolerating uncertainty and lack of ready-made answers
Combining information from various sources to a flexible integrated whole in line with the objectives of action
Utilizing feedback information and examining critically the grounds of one's own action
Aspiration to act as an expert and engage with these abilities

Table 1. The fundamental competencies of expertise

Even though innovative expert needs high-quality knowledge regarding his own trade, in the end these general capabilities have more value. If we define following Sveiby (1997) knowledge as *a capability to act*, it means that the knowledge and know-how of an expert is always local and tied to a certain context and system. Then knowing or capability to act depends also on external conditions, which can change quickly. General abilities also make the action possible in new contexts.

Systems intelligence is the fundamental element of expertise.

Desire, of course, is the basis for all. Even though a person would have lots of knowledge and abilities presented in here, without desire to utilize and continuously develop them he will not be an expert for long. The mentioned capabilities are closely connected in the concept of Systems Intelligence, and hence Systems Intelligence can be regarded as the fundamental element of expertise.

…in a Learning Organization

The metaphor of learning organization represents the abilities demanded from an expert in an organizational level. The spreading of the concept "learning organization" is generally attached to the writings of Peter Senge, especially to his book *The Fifth Discipline* in 1990. Learning organization has been shaped and theorized by other researchers before and after Senge, but The Fifth Discipline made the concept well-known among the public. Senge himself has afterwards deepened and complemented his theory in other books (Senge 1994, 1999). Confusion may be caused because some researchers talk about organizational learning and some others about learning organization. Both concepts refer to the same thing, i.e. learning that takes place in the context of working life and benefits the organization as well as the learning individual and produces as a result something that is more than the sum of its parts.

Senge (1990) defines learning organizations as "organizations where people continuously expand their capacities to create results that they truly desire, where new and extensive ways of thinking are nourished, where room is made for collective aspirations and where people constantly learn how to learn together". Essential part is to pay attention to wholes, which means that learning and development does not apply only to the key players but refers to all persons working in the organization. Another essential feature is to notice that the success of an organization depends

mostly on the staff resources. According to Flood (1999) Senge's model has gained wide attraction at least partly because the elements of the model has an empowering effect.

According to Senge (1990) learning organization develops by five elements, which he calls disciplines. The most important of these, the Fifth, is systems thinking, which forms the basis of other elements and by that of the whole action. Systems thinking mean identifying the wholes, the mutual relations that various components of these wholes have as well as the dynamics between them. This is reaching for the mastery of the complexity and dynamics of complicated activity system, which has turned out to be impossible by means of traditional linear thinking.

The other element of a learning organization is the personal mastery, which consists of personal vision and action to realize it, the commitment to the truth and the contact with one's subconscious. This requires the integration of reason and intuition, conception of one's role as a part of the whole, compassion and empathy and the commitment to the whole. Defined by these characteristics personal mastery is another condition of existence for a learning organization besides systems thinking since in practice organizations can learn only by learning individuals. The personal mastery is identified here as expertise, which has also connection to the Senge's next discipline, the mental models.

Mental models that guide actions are often unconscious, automatic and also to some extent distorted. Thus they can form remarkable barriers to learning and development. Innovations can't turn into action, because they collapse with deeply held mental models. Metal models guide both action and perception. The problem is not whether the mental models are right or wrong but merely whether they and their impact on action are recognized or not. Identifying mental models by reflection is the core of the matter for learning organization as well as for learning individual. These mental models can be utilized in the service of learning by reflecting together, when productive chaos is created and different ways of thinking are confronted with each other. Mental models can be common action-guiding principles and ways of perceiving to the whole organization, and they can be just as distorted as individual mental models.

Shared vision in the learning organization refers to creating common goals and common vision regarding the future. This gives the direction for aspirations. By common commitment and spirit it gives also the required resources and energy to realize those aspirations in action. The roots of a shared vision are in the personal visions of individuals, and it is essential to reach by shared discussion a common picture about desirable future. Individuals can commit themselves to a shared vision only if it does not collapse with their personal vision. Values are the area where shared and individual visions can be reconciled with each other, and both need to be based on similar values. Commitment is the prerequisite of success for a shared vision. But to be able to create a shared vision, individuals need to recognize how they are creating (by their own ways of action and by structures) the present reality, which is only one of many possible realities. Shared vision is part of a larger whole, of the organizational credo, and it is composed of three questions and answers to them. "What?" refers to the vision – what is waiting for us and what kind of a picture we have about our future? "Why?" refers to the purpose of the organization or its mission – why do we exist? "How?" brings out the underlying values – how we would like to act according to our mission in our way to realize the vision?

The fourth discipline of a learning organization is team learning, and in connection with this Senge presents David Bohm's ideas of dialogue. It is about the improvement of the communication between individuals and recognition of defensive routines. In a dialogue group examines some complicated matter from different viewpoints according to the rules of dialogue defined by Bohm (e.g. Bohm 1996). According to these rules all participants are encouraged to

question their assumptions or reflect their own thinking and recognize that they are exactly assumptions instead of facts. Further the participants should aim to treat each other collegially (which means giving up hierarchies), with mutual respect, kindness and community spirit. To create a dialogue requires at least in the beginning phase a facilitator who supports and maintains it.

Organizational learning and individual learning are thus symbiotically related, as shown in figure 1 The left side of the figure represents the individual, as the right side of the figure represents the organisation. Individual's personal mastery is developed by reflecting on his/hers mental models, and his/hers personal mastery contributes to the team learning by co-operation. Team learning forms the ground for co-creation of a shared vision, which is the essence of a learning organisation. The systems thinking is the glue that ties these disciplines together. In this view, SI lives in the personal mastery and makes possible reflection, co-operation and participating to the co-creation.

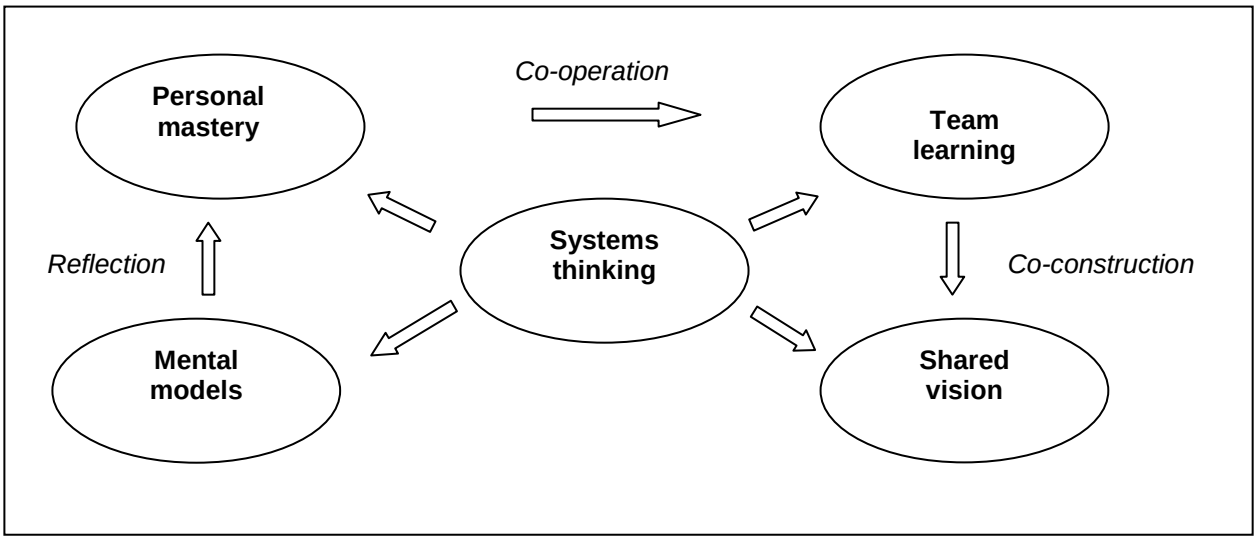

Figure 1. The relation between individual and organisational learning

Senge's vision about the joint learning is however somewhat insufficient and superficial, so it has to be complemented by opinions from other researchers. Although learning seems to require participation in Senge's thinking, Lave and Wenger (1991 (also Wenger 1998, Hakkarainen et al. 2004) describe in more detail learning as participating to the activities of communities of practice. The starting point is the thought that knowledge and experience are tied to a certain context. Knowledge and know-how are developed by participating to the action in the context and so by participating novices gradually grow towards expertise. Learning is transmitted by participants' different viewpoints and step by step novices are ready to take responsibility for the action and act independently. The question is about a sort of master – apprentice –relationship where learning is social and cultural. Participation enhances the motivation of the participants but it also cultivates their identity. Communities of practice are characterized by common objective or goal, which everyone has the responsibility of. Another feature is reciprocity, which means that things are done together. As a third element is the common tools for action, which can be shared stories, concepts or instruments. Communities of practice can be found everywhere, in workplaces but also among hobbies.

Communities of practice do have some problems. First of all, the model is developed under somewhat static circumstances and environments. In traditional communities knowledge is connected to the established practices and their attitude towards change is not generative

(Hakkarainen et al. 2004). Model doesn't necessarily allow high levels of innovation much less than require it. In the same way model seems to regard the transfer of existing knowledge and communities of practice do not necessarily produce new knowledge. As a model for joint learning producing new knowledge the theory presented by Nonaka and Takeuchi (1995) about the knowledge production in organisations might be more suitable. Nonaka et al. (2003) separate two forms of knowledge, namely the explicit knowledge and tacit knowledge. Knowledge is information (or codified knowledge) anchored to the beliefs of its bearer. The process of creating knowledge is about conversion between these different forms of knowledge. Innovations are about creating new information and shaping the environment by means of interaction.

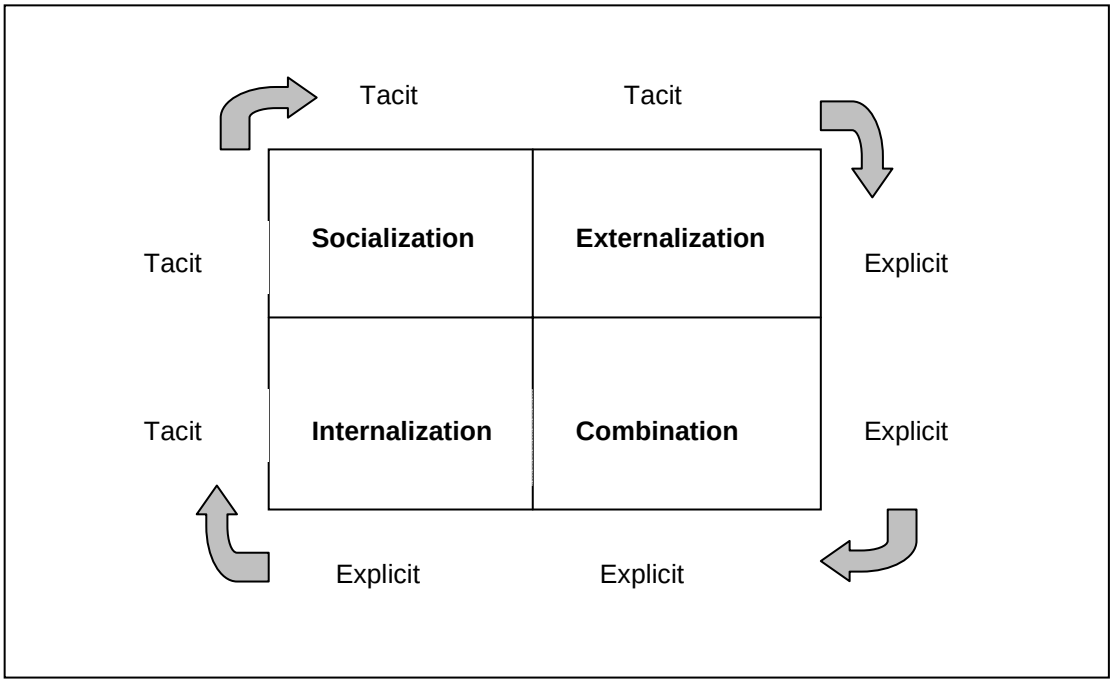

Figure 2. Knowledge creation according to Nonaka and Takeuchi (1995)

Socialization refers to sharing the tacit knowledge contained in experiences by the means of observation and imitation much like between the master and the apprentice. Externalization is a process where tacit knowledge is transformed to explicit knowledge. This is the most important phase because new knowledge is created especially by articulating the tacit knowledge. Metaphors, models and analogies can be used as tools here. Combination means reformulating the explicit knowledge and systematizing it in an appropriate way. Internalization describes the process where explicit knowledge is transformed to tacit knowledge, which happens mostly by learning by doing.

The context of joint learning and knowledge creation is called "Ba", which can be translated into "space". According to Nonaka et al. (2003) Ba is not necessarily a physical space but it can be virtual, mental or any combination of these. Essential feature of Ba is that it makes interaction possible, which means that Ba is a place where happens interaction aimed at knowledge creation. Following the phases of the process, four different kinds of Ba can be separated. Originating Ba is a physical face-to-face interaction which makes socialization possible. There the participants are sharing their emotions, feelings, experiences and ways of thinking or their tacit knowledge. Dialoguing Ba is a place for externalization where the participants conceptualize their skills and mental models or create explicit knowledge from tacit knowledge. This happens by the means of dialogue and reflection: dialogue makes it possible to share one's mental models with others at the same time when own ways of thinking are reflected and analyzed. Systemizing Ba is more a

virtual space where different elements of explicit knowledge are combined with data banks, information retrieval and information technology. Technology makes possible to spread information fast and easily. Exercising Ba includes the internalization of explicit knowledge when it is transformed to tacit knowledge by rehearsal in practical activity. When synthesis was formed by thinking in the dialogical space, here it happens by action.

Ba can arise spontaneously or it can be created systemically. In both cases it requires autonomy, instability and creative chaos, excessive amount of information and versatility of viewpoints. Other essential elements are love, care, trust and commitment. In this way Ba utilized chaos in the service of learning. From the Systems Intelligence point of view, Ba´s are special forums where an individual can practice and further develop his/hers personal mastery and Systems Intelligence.

Senge's theory of learning organisation can be improved with the theory of Nonaka and Takeuchi especially regarding the team learning part. According to Flood (1999) Senge's model has some other shortcomings, too. First of all, Senge doesn't pay attention to the boundaries of the system. In Senge's model the system is defined by defining the problem, and although Senge notices that all problems do not have solutions (divergent problems separated from convergent problems that have a clear solution model) this separation proves to be faulty. Convergent problems with clear solution models do not practically exist and what comes to divergent problems, the way Senge handles them is questionable. According to Senge, divergent problems are controlled by consensus. Even though the critique towards Senge might not be justified in all respects, the problem here is that consensus produces uniformity which knocks the bottom out of creativity and innovation.

Another defect in Senge's thinking is that he doesn't take into account the power relations and ethical decisions (Flood 1999). This is at least partly explained by the fact that Senge relies heavily on the action research in the form that Argyris and Schon have developed, which has somewhat individualistic starting points. Action research has different orientations, and e.g. the action research model developed in the University of Deakin differs considerably from the model developed by Argyris and Schon regarding this matter. The most famous representatives of this other model of action research are Carr and Kemmis (1983).

By ignoring the questions related to power and inner politics of the organization consensus is more easily possible but it may severely hinder the innovations. Power differences and hierarchies need no to be wiped out and that may not even be possible since it is extremely difficult to imagine an organization without any kind of hierarchy. Instead of that, the factors related to power and politics as well as their impact on the action needs to be recognized and they must be discussed with an open heart.

A learning organization is first of all a renewing organization.

Further Senge's model may be criticized about that it doesn't contain much interaction with the environment. Senge's learning organisation seems to somewhat miss the Systems Intelligent ability to perceive itself as a part of a larger whole. Senge's model is only apparently proactive, and it lacks the ability to renewal. To be really learning, an organization needs to be innovative and renewing. According to Ståhle and Grönroos (2000) the development of an organization is always related to the dysfunction of current organizational structure, which has made it too inflexible and ineffective in responding the needs of the customers. Innovative organization can utilize the self-organizing principle that is included in the chaos, and it is simultaneously sensitive to the

extraneous phenomena as well as to internal events. This is at least to some extent missing in the Senge's model.

Ståhle and Grönroos (2000), based on a German sociologist Niklas Luhmann, argue that a system has a possibility to act productively in chaos. Even though chaos can not be controlled, it can de tamed. This requires that organisation is able to adapt and influence its boundaries, create double contingencies and process as well as crystallize meanings. A renewing organisation has a capacity to adapt and adjust its boundaries because it knows what it is and where it is headed, i.e. it has a strong sense of its mission and values guiding the action. On that account an innovative organization is also able to discern which impulses coming outside are important and which are not. Double contingencies are the internal and external relations of an organization, from which depends the organizations capacity to renewal. The ability to renewal does not depend solely on people but also on relations. The quality of these relations is essential: the concept "double contingency" refers to an equal, mutually recognized dependency. This does not imply that hierarchies are abandoned but the equality refers to the quality of a relationship which benefits all participants of the co-operation. It doesn't also require consensus or unanimity, rather the opposite. Dissimilarity is also here enriching and creates surplus value on its part but it also requires substantial amount of trust. The meanings are created and crystallized in these relationships. The creation of meanings happens through interaction in an evolutionary process which never ends. Meanings can be temporarily crystallized and it is required to direct the action, but because of the accelerating power of interaction they always continue to flow.

To develop learning organization requires the creation of a common ground, which consists of at least vision, strategy, values and action principles. It also requires skills to form a contact, inside as well as outside the organization. Thirdly, it requires dialogue to create shared meanings. For the development of a Systems Intelligent, innovative and learning organization, dialogue and reflection seems to play a central role. Dialogue is best understood as a space or environment, where discussions aiming at development are performed. Ståhle and Grönroos (2000) describe as features of a dialogue in an innovative organization firstly an open theme which means that the focus of the discussion should not be predetermined. An equal participation is needed, i.e. everybody must have a chance to participate and all participants' thoughts have a similar importance. In a dialogue it is essential to listen to others and have discussion in a personal level. Every session needs to be terminated with a summary, conclusions and agreement on the future actions and there must be time for feedback discussion as well. Dialogue is also essential for the development of a learning organization (Senge 1990) as well as for the development of Systems Intelligence (Slotte 2003).

Reflection aims at recognizing one's own models of thinking, ways of perception and the impact they have in guiding the action as well as realizing and changing that impact. Reflection is introspection, and it is directed much towards the past and existing. Another method for making one's own beliefs conscious, investigating them and chancing them is scenario building. Flood (1999) calls attention to the fact that scenarios serve somewhat different purposes in building a learning organization than in forecasting. Instead of planning and securing the future scenarios help one to be mentally agile with respect to change. Scenarios help to be aware of what kinds of things can happen and how they can happen. Scenarios support the local decision-making and personal as well as common vision building, show how something can be learned of uncertainty and spontaneous self-organization and steer organizational learning and renewal. Where reflection is directed inwards and backwards scenarios aim outwards the system and sketching out the future. Dialogue does form the environment for reflection and scenarios, as presented in figure 3.

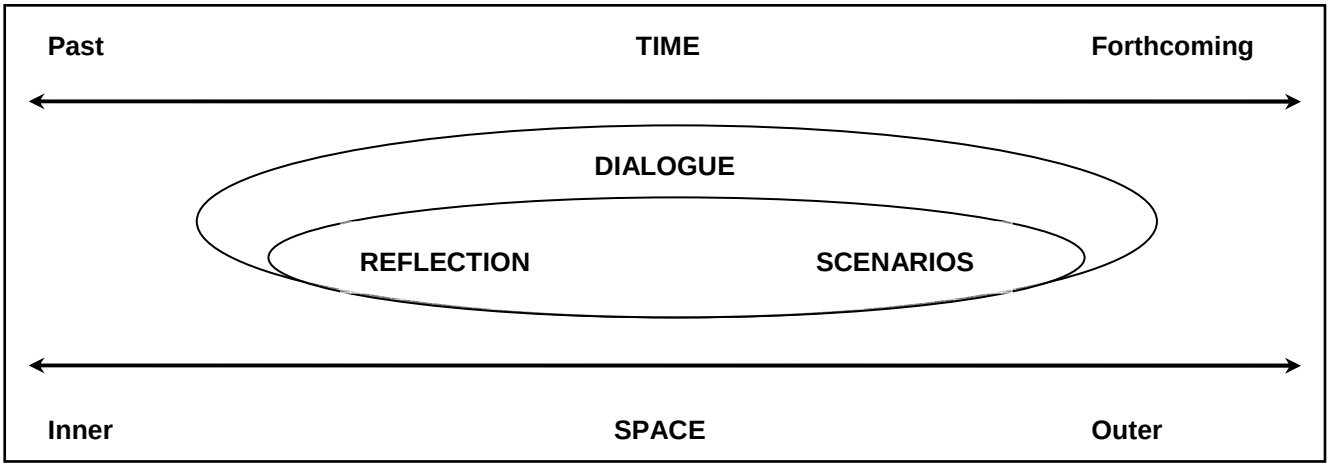

Figure 3. Methods for development in relation to time and space

Even though Systems Intelligence is still an evolving concept even in the individual level, this examination promotes in it's part the examination of Systems Intelligence in the organisational level. According to Saarinen and Hämäläinen (2004)[2] a Systems Intelligent organization is the next stage of development after the learning organization. If Systems Intelligence in the individual levels aims at good life (Saarinen and Hämäläinen 2004), in the organizational level Systems Intelligence is aimed at good working life. In the individual level Systems Intelligence is intelligent and proactive behaviour, and in organizational level it means exactly the same. According to Knaapila (2003) Systems Intelligence includes the creation of possibilities and correct timing, which are part of the thoughts of Ståhle and Grönroos (2000) as well. The creation of possibilities is that kind of proactive behaviour which seemed to be somewhat missing in the writings of Senge (1990), and it requires detection and utilization of so called weak signals. The importance of timing relates to the self-organizing principle that is included in chaos and it means that things and innovations need time and space to develop. It is a correct time to make choices and a correct time to refrain from making them. To separate these two points is vital to an organization. Systems Intelligence means recognition and utilization of mutual interdependencies just as was presented above in connection with the chaos-taming activities by an innovative organization. Senge's meritorious theory of learning organisation is an adequate basis for development of a Systems Intelligent organization, but it should be supplemented with the elements of chaos and innovation as presented here.

I interlude: reflection, scenario and dialogue

Before moving to treat the possibilities to develop Systems Intelligence we need to stop for a moment to examine the relation between dialogue, scenarios and reflection more closely. Reflection and scenarios has been described above as cognitive elements connected to thinking. Conventional intelligence is about skilful thinking but from the Systems Intelligence point of view concentrating on cognition ignores some essential elements of intelligence.

One of these elements is the meaning of intuition and insight for intelligent action. Connected with reflection, reflection-in-action and reflection-on-action is separated (Schön 1983). In a complicated and hectic environment successful action requires quick decisions which may be reflected afterwards and learn from that. In this way reflection-on-action can to some extent be a tool for developing reflection-in-action but successful action requires explicitly during the

[2] http://www.systemsintelligence.hut.fi/SI_tapaaminen.ppt

performance which is quite intuitive by nature. Ruohotie (1999, 2000) presents a concept "real-time reflection" by Seibert (1996) to describe reflection as a tool for immediate learning. Compared with traditional, rational and task-oriented reflection, real-time reflection is somewhat wider concept and it includes apart from technical tasks the relations between people, observation of work and the things that promote or prevent performing in work as well as the emotions and feelings of the one who is reflecting. The basis of real-time reflection is realizing the organization as a whole and knowing the contextual factors, and as such it comes very close to the concept of Systems Intelligence, even because it has as an essential feature the recognition of mutual dependencies. It is not enough to reflect one's self. Instead of looking to the mirror, one has to look through the mirror, as out of a window to the outside world and thus instead of self reflection, real-time reflection reaching other people as well will follow. Its goal is to form a clear picture about other people's needs and consider how those needs could be met. When self-reflection leads to self-knowledge, real-time reflection leads to service which is based on mutual dependency.

Real-time reflection brings out another highly important factor from the Systems Intelligence point of view, namely the effect that structures has on behaviour. The famous function by Kurt Lewin B=f(P,E) or behaviour is the function of observations that person does from his environment turns to B=f(S,E) or behaviour is the function of interaction between system and its environment from systems thinking and Systems Intelligence point of view (Agazarian and Gantt 2000). Then attention should be paid to the boundaries of the system.

To deliberate oneself one has to become aware of oneself.f

As a requisite for reflection is reflexion, which means self-reference where subject distinguishes himself as himself of defines himself as a system (Arnkil and Erikson 1996). It is possible to deliberate one only after one has become aware of oneself, which means that reflecting subject needs knowledge about boundaries and structures that define them. Reflective facilities, which are observing the multiplicity and complexity of things and ability to put oneself to the multi-actor situations where no one has straight control over things, are essential for the scenarios (or "forecasts") because one actor can not anticipate the extensive consequences of his actions widely. No matter how reflective one is, alone he can't reach reflexion. (Arnkil and Erikson 2003.) Reflexion requires interaction (dialogue) between different systems and it also connects reflection to the future orientation or scenarios. Scenarios do also bring the structures out as a target for reflection, because structures define the possibilities in each context and situation. This, of course, does not lead to subjection to the coercive powers of structures, but it may reveal needs to alter the structures to make action possible.

Reflection is communication with the past and scenarios with the future.

Despite this, structures can become obstacles for reflection. An example from an organizational level might be a concept describing flagging structures, "systems dictatorship" (see Saarinen and Hämäläinen 2004), which by fear suppresses creativity, sincerity and interaction in organization, i.e. everything that a dialogue struggles to advance. An example from individual level could be "bystanding" (Clarkson and Shaw 1995), which means refraining from action in a situation where one's help is clearly needed. It is a question about evading responsibility, submission and underrating one's autonomy and sense of power. This list could be easily continued both on organizational and individual level, but hopefully these examples are enough to show that the prerequisites for development are freedom, sense of inner power and autonomy which are together called ""empowerment".

From the Systems Intelligence point of view, reflection and scenarios are not “just” about thinking or communication but they should be understood as *communication.* Reflection is communication with the past, scenarios with the future and both can be practised alone or with others. According to the theory by Vygotsky, egocentric speech is a transition phase when moving from outer speech to inner speech. Self-reflection is the inner speech, and together with others it happens as thinking out loud or social reflection (Haarakangas 1997) Dialogue forms a communication structure where social reflection and self-reflection are developed. So, there is a structural equivalence between dialogue, reflection and scenarios and together they form the central divisions of the development of Systems Intelligence.

Systems Intelligence is composed of values, behaviour and structures. From the methods for development, dialogue bears the values that are essential for development of Systems Intelligence. Scenarios draw attention to systemic structures and their recognition and by reflection a person’s Systems Intelligent behaviour grows. Dialogue and its prerequisites have been considered above. Reflection and scenarios require practising guided by a competent coach in an environment that supports openness and autonomy, courage that practising requires and that has room for creativity. In a way it is a question about learning from a model, where critical questions and Socratic dialogue are essential principles guiding the progressive training assisted by feedback.

Sarja (2000) has described in her dissertation dialogic learning in small groups. Dialogic learning is composed of three phases: defining a common subject ties the group participants’ different perspectives to the same matter. The multi-voiced interpretation of the subject or forwarding the different points of view may arouse disagreement when the group is forced to negotiate their conceptions. In the third phase, the subject is constructed together consciously, utilizing the differences and supporting each other. The interpretation takes place as a reflective dialogue, where the individual become aware of their own as well as other participants’ thoughts and which results the extension of boundaries of the individual learning and action. Construction of a shared subject happens by critical reflection, which draws attention from the individual’s or group’s feelings, intentions and values to the discursive knowledge about joint social practices. Dialogic learning is not a separate method but merely an approach, that follows the rules and features of dialogues described above.

Another example from an approach that develops reflectivity and Systems Intelligence is “philosophical lecturing” developed by Esa Saarinen. As distinct from academic philosophy it doesn’t aim at passing information but mobilizing the audiences’ own thinking and stimulating reflection and investigation of one’s own life. The objective is to create a reflective context, where participants’ silent inner dialogue is encouraged. Where academic philosophy is dialogue with other academic philosophers (and with their texts), philosophical lecturing devotes to a dialogue with “laypeople” in themes that are relevant for their lives providing impulses, thoughts and concept that help people to enrich their lives. (Saarinen and Slotte 2003)

As a third example of methods enhancing reflectivity and Systems Intelligence is the primary subject of this article, supervision. Before examining the connection between Systems Intelligence and supervision, we need to look at the concept of supervision more closely.

The promise of supervision[3]

Supervision in its present form was born in 1920's both in USA and in Europe as a method for learning and guiding work in psychotherapy and social work. After that, supervision has become general among the helping professions, besides social work and therapy also among teachers, doctors and other workers in health and clerical professions. During the last decade supervision has been more and more utilized also in other branches and it is making its way to the business life. Partly this is due to the growing interest of personnel resources as a success factor which has evolved particularly with the learning organization models.

Because supervision has developed independently in different branches there doesn't exist a shared definition or theory base for supervision. This is positive regarding that it has made possible to develop different kinds of working models, but negative in the sense that it has to some extent prevented the systematic development of supervision and its utilization. Keski-Luopa (2001) calls supervision "a practice without a theory" and it has a special hindrance: the client of supervision has severe difficulties in trying to find out what supervision is, how it operates and what kind of a theory it is based on.

Usually the theory base of supervision has been a combination of various theoretical components. These components have been found especially from interaction-, learning- and organization theories. Different therapeutic frames of reference have been popular in the supervision field and especially the psychodynamic theories have had a central role. To some extent also cognitive theories, family therapy therapies and recently even more and more solution-focused therapy has been utilized. Partly due to the influence of family therapy and organizational theories systems theory has also played an important role as a background theory for supervision and it has been combined with some learning theories, particularly the experimental learning theory.

The emphasis on various frames of reference also varies with time, as Hyyppä and Totro show. In the 1970's the target of supervision was the person of the employee and it was aimed at developing human resources. The supervisor's role was to act as a supporter and facilitator, and theories were found from various therapy models and from psychology. In the 1980's supervision was mostly interested about the client's problems and the aim was to find solutions to them. Supervisor acted as an expert consultant, and theories came from systems thinking and casework. In the 1990's focus was especially the working skills and team work and aim was to develop work. Supervisor acted as a change agent and theories came from activity theory and learning theories. In the 2000 supervision in focused on co-operation and it aims to develop the work community. Supervisor is a process consultant and theories are based on learning, chaos theories and organization theories (Jabe 2001). Even though the development hasn't been this linear and distinct, this examination brings forward the expansion of supervision and its dependency on changes happening in time and environment.

When the attempts to define supervision have remained one way or the other imperfect its domain has been tried to define by clarifying its relation to the near methods. It has been seen that supervision differs from psychotherapy in respect that therapy focuses to the entire personality when supervision focuses solely to a person's professional role. Consultation is characterized by

[3] There is a severe risk of conceptual misunderstanding when one is talking about supervision. In English-speaking countries, "supervision" refers to a person who has some control over the supervisees (line managers, field instructors, probation officers etc.) In Nordic and German-speaking countries supervisor is usually external to the organization and does not occupy any hierarchical position regarding the supervisees. It seems that the concept "coaching" is gaining more significance as a concept meaning supervision in the same sense that it is used here.

aspiration to solve a clearly predetermined problem, its relatively short duration and expert authority when supervision is a process which contains the inquiry into work and work roles in order to develop in work. Supervision can be defined in relation to training which differs from supervision in that it is based on a curriculum. Management differs from supervision in that it is based on the hierarchical power relations of an organization (Paunonen-Ilmonen 2001, Hyyppä 1983). Even this way of defining supervision is problematic: e.g. process consultation (Schein 1987) is placed somewhere between consultation and supervision and as a part of training supervisory methods can be utilized. In American supervision tradition supervisor has usually been supervisee's line manager. There has also been born some new working methods (mentoring, coaching) which has some common features with supervision.

The essence of supervision has been searched also by investigating its functions. Alfred Kadushin (1976) divided the functions of supervision into three, namely to learning, supportive and administrative functions and this division is still standing (e.g. Hughes and Pengelly 1997). Emphasizing the administrative function is characteristic to American supervision where the supervisor is also the leader of the supervisees. Also in psychotherapy the monitoring of work performance as a function of supervision has been essential. Proctor (2000) divides the functions of supervision into formative (to support learning), normative (to monitor ethicality and complying with standards) and restorative (to refresh). In Finnish literature supervision has been approached e.g. from the point of securing the quality of action (Paunonen-Ilmonen 2001). The examination of the functions of supervision clarifies its instrumental role in achieving some goals but they don't contribute to the theoretical understanding of supervision.

Perhaps it is not essential to find a fully covering and exhaustive definition for supervision and it might be that it is not even possible to create one. Supervision can and must be defined separately in the beginning of the process and again and again during the process. The form and content of supervision depends on what kind of needs it is supposed to fill, what is tried to achieve with it, where it is applied, what kind of input the client is ready to make, what kind of a frame of reference and working method the supervisor has and along what paths the process proceeds. Instead of an exhaustive definition it might be a good idea to examine what supervision at least contains and which could be the least common denominators.

Quite a far-reaching general agreement seems to prevail that *supervision is a process*. This does not necessarily mean that supervision should last long or proceed slowly. Although the optimal duration for supervision is considered to be about two years, solution-focused thinking has brought up shorter supervision models lasting only few meetings or months. Process refers to the fact that the progress and final contents of supervision can be discerned only afterwards. Supervision can not be planned far in advance and it contains very much unpredictability. This doesn't mean that supervision shouldn't or couldn't have objectives in the beginning of the process but the process includes that those objectives can and must be defined again during it. According to Schein (1987) process refers to how things happen in distinction from what happens.

Process nature of supervision is closely tied to another thing: *supervision is about interaction.* The parties to the supervision could be besides supervisor one supervisee, a group of supervisees, the entire team or in a direct supervision also the clients of the supervisee. There are always at least two parties and the supervision process does happen in relationship between these. In an encounter between two different people something new is born, something that in its best benefits all and which any of the parties couldn't achieve alone. By comparing different viewpoints and experiences everybody's thinking and consciousness is expanded and at the same time

consciousness about one's own thinking habits and about the grounds as well as consequences of those thinking habits grows. Interaction makes possible learning in supervision.

Consensus seems to prevail about that *supervision aims at learning*. Learning in supervision is essentially learning form experience, and the process of learning has been described by theories of experiential learning. Especially the circle of experiential learning by Kolb (1984) has been popular. In Kolb's model learning happens through four phases. The starting point is experience, usually some problematic matter that one hasn't been able to solve. In the second phase these experiences are examined by reflection and in the third phase they are tried to conceptualize. In the last phase application and testing in practice of views that has been altered in the process takes place. In Kolb's model, knowledge is created by transforming the experiences and learning is aimed at developing the critical thinking skills. Learning happens mainly by investigating and altering one's experiences although the conceptualization of tacit knowledge is also of importance.

Supervision is based on problems in a sense that usually the need for supervision originates in some unsuccessful solutions of problems encountered in work. The challenge of supervision is to move beyond these problems so that the own capabilities of the supervisees may develop and supervision would became unnecessary in the duration of the process. This does not mean that the original problems can be forgotten. Holmberg (2000) refers to a dual task of supervision. *Supervision has an instrumental and an emotional task.* The instrumental task is to deal with concrete and practical questions, i.e. those problems that caused the need for supervision. The outcome after reflection and analysis might be that the original problem was phrased incorrectly or it doesn't actually exist or alternative ways to handle the problematic situation can be found. The emotional task relates to the person of the supervisee and aims at developing his ways to act in the work role, his strengths, developmental needs and the feelings that work has called forth. Work role means that part of personality that activates in work or that energy a person utilizes when answering the demands that work has placed for him. Work role is an intersection point of many different systems, a common area which is besides an outer reality also an inner experience. Work role thus connects a part of the personality and the demands of work. (Hyyppä 1983)

Learning aims at change which means in the experimental learning theory the transformation of the supervisee's beliefs. Supervision is not revolutionary action and it doesn't aim straight at changes in the structure. Decisions are usually made in other forums in the organization. Besides own views change may be connected to relations. Especially in a work group supervision change can refer to change in the mutual relations between members of a work group, but it can also refer to change in relations between supervisee and his work, task, organization, clients, subordinates or co-operation networks. Change and learning happen by examining and transforming the boundaries of these relations and systems. (Hyyppä 1983) In accordance with systems thinking change in one part of a system affects the operation of the whole system. The central role of these relations as a focus for investigation and as the outcomes of supervision raises *systems theory as the essential background theory for supervision*.

The altered views that learning has produced can de related to the treated subject or problematic situation, and the targets are ways of action, thinking habits, ways of perception, definitions given to a problem or meanings attached to it. The view may be altered also considering one's own place and task in the system, the distribution of work in it and the demands that task makes on one. Third important area is the supervisees' beliefs regarding their own abilities, competencies and opportunities for action. This way supervision has also supportive and empowering effects which are visible in growing satisfaction, motivation and commitment.

Transforming the beliefs and thus learning and change is strived for in supervision especially by *reflection*. Reflection means introspection, investigating one's own thinking and world of meaning openly to understand and make conscious own actions and things that guide it. It is essential also to know what one doesn't know. Reflective action is opposite to authority-based and routine action, which is the most common hindrance to development. Reflection is also a way to gain distance to one's own experiences and in that way to examine them as from outside, which means evaluation. It can also be considered as a method to create new knowledge which connects information, feelings and action. In practice reflection is the only way to change one's own beliefs, thinking and action permanently. The obstacles for reflection are excessive certainty or the lack of tolerance for uncertainty. Reflection operates by making things questionable, and it means that one has to give up thighs that are kept certain and step into uncertainty. One obstacle can be the difficulty to learn reflective way of action, and one result from supervision could be that supervisees learn how to reflect. (Ojanen 2000)

According to Keski-Luopa (2001) the life of all living organisms is realized in a *dialogical relationship* with growth milieu and they have to adapt to the changes happening in the environment. A human can also effect to those changes himself, or become conscious that he has an active part in that interactive relation. The characteristic feature of dialogue is openness, and it emphasises more listening than speaking in turns. There is no room for debate in an open dialogue. Dialogue is a process that gives a chance to learn and grow, but it requires commitment and trust from all parties. For supervision dialogue means that both the internal and the external learning environment have to be built in a way that makes a dialogue possible. External learning environment refers to i.e. the time, place and frequency of supervision. Frequency and duration has to be in proportion to the goals that have been set and supervision must be regular and last long enough. Place has to be such that participants can concentrate to a dialogue in peace. These things are defined in the supervision contract. Internal learning environment means that the supervision situation and its atmosphere are created to be safe, open and favouring commitment.

Learning and change are not ends in it but *the context of learning and change in supervision is always the work of the supervisees*. Supervision gains its content and targets from the task of the supervisees and the aims are related to that, too. The aims of supervision have to be in same direction as the aims of the organization, because usually employer is responsible from the costs of supervision. This means also that those worries that supervisees might have but are not related to work are not considered in supervision.

For dialogue to be possible and favourable learning environment could be created *supervision has to be voluntary and confidential*. The supervisees are participating to supervision of their free will, and everything that is discussed in supervision is confidential. The supervisees have to be able to trust that the things they say remain in that situation and do no spread outside it. Otherwise the trust that is a prerequisite for dialogue can not be born, and without voluntariness is no commitment. Regarding voluntariness, sometimes as an exception might be supervision of the whole work group, where everybody must attend despite their will.

Confidentiality is partly supported by supervisor being an outsider. Supervisor rarely belongs to same organization as the supervisees and much less is their manager. Some things may be more easily discussed with an outsider, but there are more grounds to that as well. With an outsider the reflection skills are more easily rehearsed, and also the dialogue seems to require an outsider as facilitator at least in the beginning. If supervisor comes outside of an organization, he is not part of the same system and can better observe it from another point of view. This gives also a special input for the interaction, when supervisor is able to bring one different viewpoint more. On the other hand, supervisor can not be too outsider and he should to some extent know what the

supervisees are doing and he also has to be able to speak the same words as the supervisees. The supervisor's role is to manage the process, take care of its boundaries and progress in the direction and look after that the discussion proceeds in the spirit of dialogue.

Supervision is a dialoguing Ba.

So the promise of supervision is to create such space where reflection and open dialogue are possible and where own thinking models and own relation to the other parts of a system can be examined. This process produces more conscious action, motivation, commitment and welfare which make possible continuous development of the operations. For a learning organization supervision is a unique forum because it connects both individual's and organization's profound learning. The essential thing is that learning is also generative and not just adaptive (Hawkins and Shohet 2000). Supervision can also act as a buffer against anxiety that rapid change, uncertainty, complexity and chaos can possibly call forth (Karvinen-Niinikoski 2003). Supervision resembles the dialoguing Ba described by Nonaka et al. (2003), a space for externalization where participants conceptualize their thinking models and skills and create explicit knowledge from tacit knowledge by dialogue and reflection.

From these elements a quite comprehensive and proper definition for supervision can be sketched, and it can be applied in different contexts in a way that is adequate regarding the goals. From Systems Intelligence point of view future orientation is lacking from these elements. Reflection is introspection, directed inwards which focuses in the past and it in a way contains a thought that action will be automatically change in future as a result from reflection. The emphasis of developing expertise and learning organization is in action that happens not until future and therefore supervision that aims to develop these has to take this explicitly into account. It has to orientate towards the future and external reality. Although it is quite common in supervision to think about alternative options for action, their possible consequences and possibilities to act differently this point of view has not been generally expressed.

II interlude: supervision, theories and Systems Intelligence

Even though supervision has not its own, clearly defined theory, it is built on theories. What kind of theoretical orientation is prevailing in supervision depends on supervisor's own professional background, the supervisor training he has received and predominating trends. Naturally the objectives of supervision have their effects on the theory base. In helping professions and their clinical supervision theory base is somewhat different than in supervision that aims at developing an organization or the teamwork.

As stated, supervision has developed simultaneously during the last hundred years in two quarters: in Europe as a part of the training of psychotherapists and in the USA in the field of social work. In social work, own theory base for supervision has not been developed, and in therapy it has paralleled with the theory base of various therapeutic approaches. Perhaps due to these historic roots the theory base of supervision has been dominated by the theories about human growths and developed which originate in the therapy sphere. These have, of course, been supplemented with theories about learning and interaction.

The theories at supervisor training programs are mainly based on (at least in Finland) two approaches beyond others: psychodynamic and solution-focused. Psychodynamic theories have been dominating supervision for decades, while solution-focused thinking has gained more significance during the last couple decades. Psychodynamic theory draws attention to increasing one's consciousness, psychic processes, emotions and individual's developmental history (e.g. Clarkson 1998). The basis for solution-focused thinking is paying attention to the language and

ways that problems are talked about, positive reframing of the problems and strengthening the existing resources (e.g. Miller et al. 1996). Solution-focused or strengths-based approach has not developed as exclusive theory base than psychodynamic thinking, but it utilizes different theoretical ideas pragmatically. The representatives of this approach do not speak about solution-focused theory but merely the solution-focused method. It as to be noticed, that in supervision theories are not utilized solely but each supervisor applies different theoretical ingredients to his best knowledge in the service of the respective task. Instead of a supervision *based* on certain theory it is better to speak about supervision *inspired* be certain theory or approach.

	Psychodynamic	Solution-focused	Systems Intelligent
Starting point	Object relations theories, group dynamic theories	Short therapy, family therapy, social constructionism	Systems thinking, organization theories, chaos theory
Focus	Attention to the inner experience of an individual	Attention to the ways of thinking and strengths and resources	Attention to the interaction between individual and environment
Method	Reflection	Alternative ways of action (~scenarios)	Reflection and scenarios
Goal	Increased (self) awareness	Problem solution	More creative relationship between individual and environment
Direction of change	Towards self	Towards definitions of problems	Towards self and environment
Risks	Focuses excessively to the individual's inner world, external realities (work) are overlooked	Change remains superficial and same problems are encountered again and again	Submission to the power of structures and comes to aim at adjustment

Table 2. Mutual differences between various supervision approaches

Table 2 describes differences between these supervision approaches which are inspired by somewhat different thinking. While both psychodynamic and solution-focused approaches utilize systems thinking, Systems Intelligent supervision takes it explicitly as the most important starting point. Systems Intelligent supervision focuses on the relationship between individual and its environment while psychodynamic and solution-focused supervision are clearly individual-orientated. Systems Intelligent supervision utilizes as methods both reflection and future-orientated outlining of alternative ways of action, scenarios. When psychodynamic supervision aims at change in relation to self by increasing self-awareness, solution-focused supervision change is tried to obtain regarding the encountered problems by altering the definitions of the problems. Systems Intelligent supervision includes both these elements, but principally it aims at change in relation between individual and environment by increasing creativity and "degrees of freedom" in that relationship. In psychodynamic thinking, the risk is to focus too much to the inner world processes of an individual when external realities and especially the work of supervisees may pass unnoticed. Solution-focused thinking has been criticized about

superficiality, which might mean that even the definition of encountered problem is altered successfully the change does not effect permanently to the thinking and behaviour of the supervisees. Systems Intelligent supervision has a danger to subordinate to the prevailing structures when change can't be connected to the environment but it remains as action that adjusts supervisees to the existing structures.

The differences described in the table are, of course, somewhat exaggerated. When on is considering so multidimensional and multi-faceted action as supervision, exacerbation is the only way to point out differences. New thinking can not be created out of nothing, but it grows either by juxtaposition or by combining different components. Solution-focused thinking has evolved perhaps in contrast to the psychodynamic thinking, while Systems Intelligent supervision is developing by combining also elements from both of these approaches. Psychodynamic and Systems Intelligent supervision share the view that an individual can successfully place himself in relationship with other people and environment only after he has gained substantial self-awareness. Solution-focused and Systems Intelligent supervision have a common outlook that individual can, by altering his behaviour, have influence to the operation of the whole system.

Supervision promoting Systems Intelligence

When supervision seems to be action that is defined only with difficulty and also takes shape in local application contest, is it even sensible to aim to crate any models considering it? Wosket and Page (2001) present as benefits of models that they offer knowledge, security and reliability in the form of a frame of reference. They give the process a direction, secure from the dangers of random ecletism, build trust, make managing the uncertainty and complexity easier and offer a heuristic base for interventions and strategies. Even though the writers are describing models related to the supervision training, same things apply to supervision in general. Model is a frame that creates setting to a process that is unpredictable, directs it and provides information to both supervisor and the supervisees whether the process is progressing in the direction of the goals. It has to be flexible and loose enough to leave room for local application. A model becomes (local) theory when it is applied in different contexts.

I have before (Salonen 2003) examined with limited empiric data the possibilities of supervision to enhance the development of expertise. I separated three tasks for supervision promoting expertise which all have to be present although the emphasis might vary in different phases of the process. I have named these tasks as *empowerment*, *conceptualization* and *contextualization*. The following figure relates these tasks to the development of the Systems Intelligence in the individual and organizational level by the elements Senge (1990) has presented:

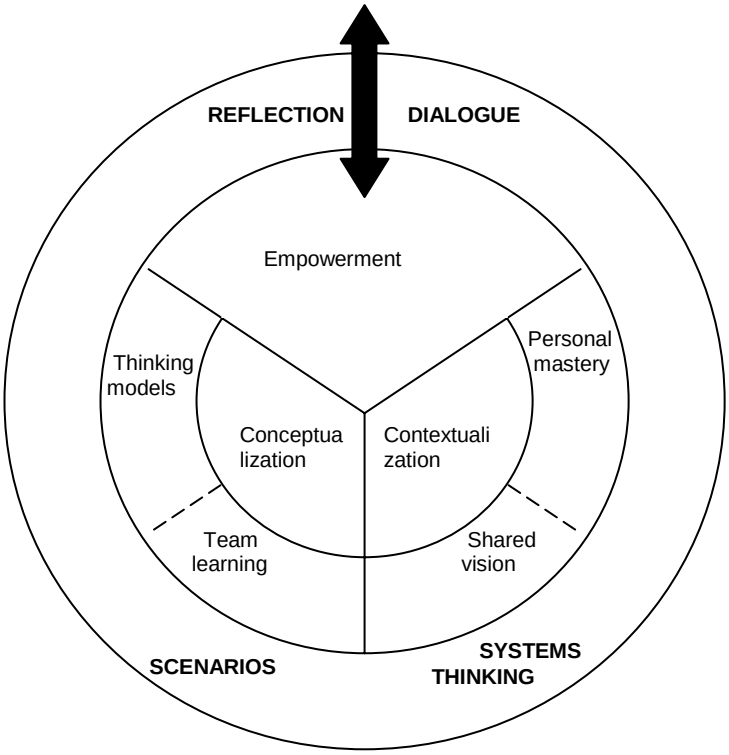

Figure 4. The tasks and functions of supervision promoting Systems Intelligence

In the core of the figure are the tasks of supervision. Empowerment is the starting as well as the ending point of the process. Supervision begins with creating the favourable inner and outer learning environment as described above. This means that a contract is made about the frames of supervision, definition of at least preliminary objectives and preparing the atmosphere as such that open dialogue and reflection will be possible. Reflection and dialogue require at least some amount of empowerment from the participants, which means that acute crises and conflicts need to be dealt with first. Successful supervision process also ends on empowerment, which means that it produces more self-conscious supervisees that enjoy more about their work and are more motivated and committed. This doesn't mean that supervision should or could be adjusting action. The process can lead to a result that a supervisee changes his job if he arrives at a result that current workplace does not offer opportunities to utilize his potential or he can't influence it.

Contextualization means that one perceives and defines his own place in the system and in the network, clarifies and defines his task and evaluates his own resources and capabilities in relation to the task. This means working with the system's boundaries. Contextualization answers to the questions "where (environment)?" and"what (needs to be done and achieved?)". Conceptualization includes reflection of one's own thinking models, clarifying the values that guide action, conceptualization of tacit knowledge and sharing of experiences. It answers to the questions "how (we achieve the things that we are reaching for, act in this situation)?" and "why (exactly these things are worth reaching for)?"

In practice these tasks are intertwined and their separation is possible only in very abstract level, Process is following the systemic way of thinking non-linear and circular and all of its parts impact on each other. Empowerment makes possible reflection that is a prerequisite for conceptualization and realistic examination of one's own position regarding the system or

contextualization. Contextualization helps to create a more realistic picture of the demands of the task and in that way creates empowerment. Conceptualization supports empowerment by calling forth and strengthening one own abilities and what is already known as well as creating new knowledge which enhances the sense of mastery. Contextualization supports conceptualization by bringing up besides the capabilities one has but also the value base that is guiding action which makes it easier to define one's position and task in the system.

The next sector includes the elements of a learning organization as Senge (1990) has presented. Personal mastery is promoted by investigating one's own vision and own role as a part of the whole. In the organizational level corresponding element is creation of a joint vision which is based on the personal visions of the participants. This happens mainly by contextualization. Investigation of thinking models that guide action relates to conceptualization, which in the organizational level means team learning. Together these elements produce empowerment, as Flood (1999) describes. Broken line in the figure separates individual level and organizational level and corresponding elements from each other. Supervision may be individual or group supervision, although group supervision is undoubtedly more recommendable because it includes several different viewpoints that create surplus value. Of course, this is not always possible. The essential thing is that the elements of supervision are the same despite the form of application.

As stated before, individual's Systems Intelligence is developed by personal mastery, thinking models and systems thinking. Organizational Systems Intelligence is developed by team learning, shared vision and systems thinking. In this model system thinking is placed to the outermost ring together with other methods of supervision: reflection, dialogue and scenarios. Methods can't be separated according different tasks, but all methods are needed in every task. It should be noticed that it is a question besides the means of supervision, also about the ends of it. Successful supervision process enhances the participants' capabilities for dialogue, reflection, building scenarios and systems thinking. The features of dialogue and reflection have been considered above. The essential feature is the aspiration towards critical reflection, making the premises of one's thinking and acting questionable although supervision has to contain also the other forms of reflection, namely content and process. Scenario building might seem to be a new thing in this connection, but future visions are present in e.g. solution-focused methods. Interesting practical applications for scenario building are presented in the "future workshop" –method developed by Robert Jungk (Jungk and Mullert 1987). In business enterprises scenario and vision building are especially as a part of strategy processes seen fit (Mannermaa 1999) but this usually happens in a consultation process. Supervision process might offer even better opportunities to create and modify visions and scenarios than temporally restricted, short consultation. Visions and scenarios are important for the supervision process as well, since by them the task which gives an organization the base of its existence which is also the basis for orientation of the supervision. They also define the direction that the organization is on the way which supervision must help it to reach.

System thinking is the connecting thought of the whole model, ant it is related to the progression of the supervision process, development of the expertise and individual Systems Intelligence as well as development of the learning and Systems Intelligent organizations. Without systems view and systems thinking this is not possible. Systems thinking means intelligent action which contains interactive wholes with feedback as described in the beginning (Hämäläinen and Saarinen 2003). Supervision as well as the work of the supervisees is always placed in a system and they have several connections to the outer world which need to be taken into account. Supervision, as well as learning, is always based on change of individual action despite the community context. By developing individual Systems Intelligence develops the organizational Systems Intelligence and supervision is a strong tool for both purposes.

Epilogue

It has been empirically verified that group process and reflection has remarkable possibilities to develop emotional intelligence skills and sense of community (Isokorpi 2003). Group process and reflection are essential features of supervision, and it is more than probable that by supervision Systems Intelligence and Systems Intelligence skills can be promoted. The model described here is a basis for practical development aspirations, and even though it has to be refined in the conceptual and theoretical level, the most important thing is to test it empirically in practical development projects. With action research projects it is possible besides to elevate the model also to develop theory for applying supervision in developing Systems Intelligence, expertise and learning organizations. The model presented here is not trying to be the last word about the possibilities of supervision but merely an opening of discussion towards a somewhat new but promising and inspiring direction.

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Chapter 4

Systems Intelligence in Business Organisations

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Why do some projects and companies succeed better than others? Which characteristics could explain this success? Could we explain the success of some change initiatives in business organisations with the notion of systems intelligent behaviour? Is it possible to describe systems intelligent behaviour with practical examples? What can be seen as enablers and what prohibits the use of systems intelligence in the business environment? In this paper, I have described some of my experiences of change programs and compare the success of these initiatives with elements described in Systems Intelligence.

Introduction

Today, we are facing major changes inside business organisations as well as in our external environment. We keep hearing that managing change is a key to success in development projects. However, few succeed in successfully implementing change. Why?

Senge (1990) states "People want to change but not to be changed". How could we help and enable organisations to change without being changed? Most people would like to have continuous change in their life. Most companies are facing continuous change pressures in their markets, organizations, and way of working, products and customers. *There seems to be a change generating system in place.*

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One could think that there is a match between the needs of an individual and the needs of companies. Unfortunately, this is not the case. There seem to be a system in place that introduces changes mostly based on the economical and profitability reasons, not for the sake of creating better products for their customers, more competencies and skills for their personnel and new opportunities for their suppliers.

The challenge is: How to manage the change and how to run change programs where:

"New organizations are built, jobs are created or reduced"

"New ways of working are introduced"

"New products are launched"

"New markets are conquered"

All the above questions include a system with several involved parties like: customers, suppliers, personnel and their families, labour unions, politicians, media, auditors etc; the list is endless. Seldom are the overall system and its interactions understood by the companies driving the change. The key thing is how to "outline the system" where the change is going to take place and who are the actors involved.

The approach and thoughts introduced in Systems Intelligence emphasis the important elements needed in Business Organizations in order to succeed. By Systems Intelligence (SI.) (Saarinen and Hämäläinen 2004) mean intelligent behavior in the context of complex systems involving interaction and feedback. A subject acting with SI. engages successfully and productively with the holistic feedback mechanisms of her environment. She perceives herself as part of a whole, the influence of the whole upon herself as well as her own influence upon the whole. By observing her own interdependence in the feedback intensive environment, she is able to act intelligently.

Senge (1990) identifies five key themes as cornerstones of learning organisations:

I	Personal Mastery
II	Mental Models
III	Shared Vision
IV	Team Learning
V	Systems Thinking

By integrating the concept of SI. with Senge's five disciplines, a link between Personal Mastery and Systems Thinking has been found and the outcome is SI, (Saarinen and Hämäläinen 2004), defined:"We propose Systems Intelligence is as the link between I and V. The way we see it, Systems Intelligence is Systems Thinking having become an integral part of a person's Personal Mastery. Like Senge's Personal mastery, it is about the way a person conducts her life, and at the same time, it is about Systems Thinking, i.e. the focus is on the impact and workings of the holistic and systemic structures that encompass the environment of the person".

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How could change managers in a business organisation utilise the above thesis for the benefit of the company and its counterparties?

The key success factors in my experience have been the following:

1. Understand your system, who are involved and what their perception to the subject is.

2. Don't underestimate the need of sharing the big picture and vision. This gives the people the opportunity to see themselves in the whole.

3. Build an environment where different perspectives are collected and listened and let the interaction take place openly.

4. Create tools to visualise and simulate the change and the steps to the vision.

All these 4 elements can be found in the description of systems intelligence.

Case studies

I will share in this paper few examples, how I have experienced and managed the above elements of systems intelligence in big organisational changes. In all these cases the impact on the organisation has been substantial; there have been new roles and responsibilities as well as layoffs. There are links to be found to the basic elements of systems intelligent and learnings how one could manage the change better.

Case 1a & b. Personnel down sizing (layoffs) situation in a Banking Branch, two opposite experiences

Case 2a & b. Building global horizontal support organisation, two different experiences

Case 3. ERP (Enterprise Resource Planning) system project and implementation

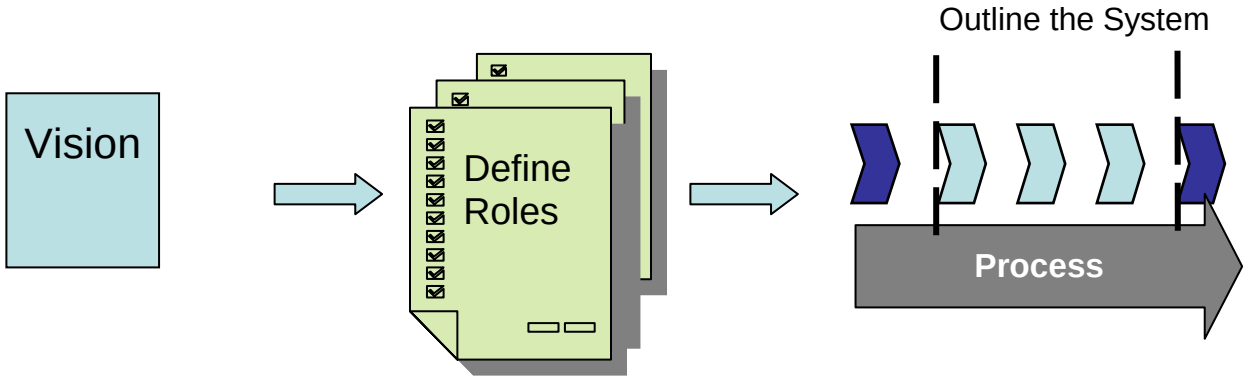
While analysing these cases myself, I have found clear similarities with at least *three systems* intelligence enablers: *The first* being how the vision has been shared, *the second* being some simulation or prototyping to illustrate the change of roles and responsibilities and *the last* but not least the visibility of management support and management's capability to drive the change. The above-mentioned 4 success factors should be in place when conducting successful change programs. You can find a summary after each case, what has been the outcome of the appearance or non-appearance of these three enablers.

Systems intelligent operating model

One of the biggest change resistance elements is that people cannot understand what and how the change will impact in their future life, job or interdependences in their existing system environment. This will create fear and uncertainty among people in the organisation and they become resistant to the change. The capability to decrease the factors to change resistance will in fact have a straight link to the implementation time of the desired change.

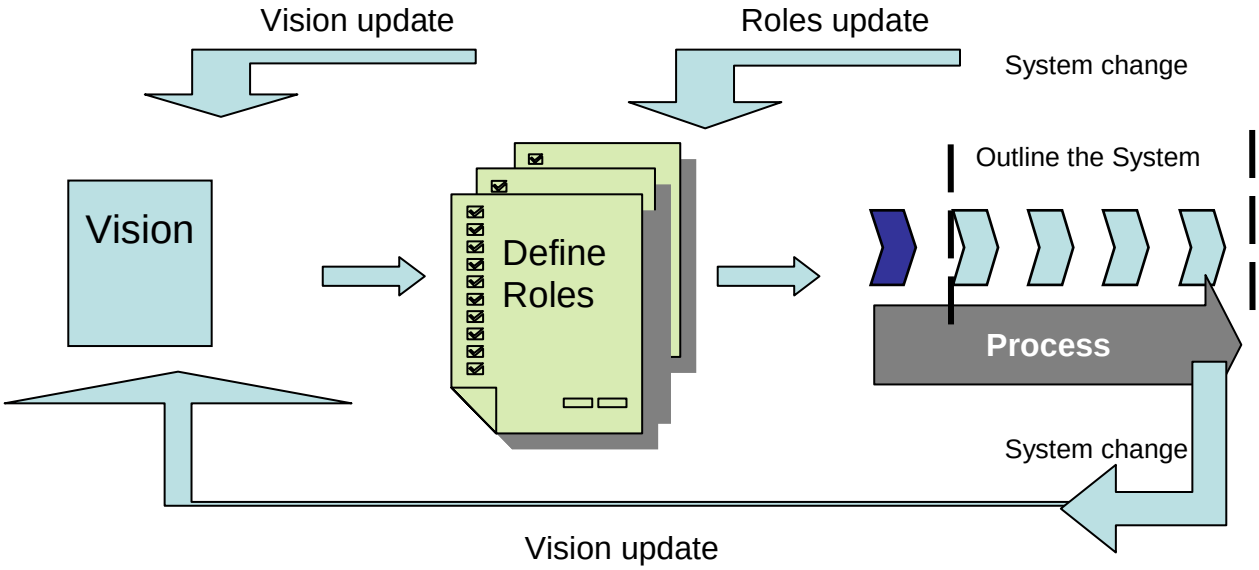
In picture 1 I illustrate how I see the systems intelligent operating model. The *process starts* with sharing of the vision. The *second step* is defining how current roles and responsibilities in the

system will change. The *final step* in the process is to outline, what is the overall system (people, organisations) and specify the interactions in the whole chain.



Picture 1. Systems Intelligent operating model

I have found it vital to understand and continuously track what is the system environment where my organisation and company is today. It is equally important to be sensitive when there are changes happening on the borders between different parties in the system and outside. The process to manage this system intelligent operating model is described in the picture 2. The change in the system will most often have impact also on the roles and responsibilities within the members of the system or even increase the pressure to update the vision. This has been the key process (picture 2) to be managed in all my change management experiences. Shouldn't sharing of the vision and commitment building be continuous effort in all business organisations by default?



Picture 2. Change in the system triggers different update processes

A Change in the system environment has always an impact on roles and responsibilities and will also create a potential need for the vision update. The different process steps are described in picture 2.

Tools to illustrate the change

Often big change plans and visions are based on intuition or experiments and new innovations. Any means to illustrate or simulate future change will help to build a concrete and common understanding about change and reduce the change resistance. You can utilise different types of prototyping methods to build the picture about the future state and illustrate the magnitude of the change. The modelling or prototyping will of course be based on your best understanding about the new state, based on today's facts, but it can also be the source for new innovations as well as bridge to something new.

I have created and successfully used some tools to support the understanding of the magnitude of the change. A useful tool that has helped in the agreement making of roles and responsibilities has been a simple A4 template, where all roles are defined activity by activity together with the parties in the system. This discussion paper acts afterwards as an arbitrator and finally as an agreement between the members in the system. This agreement making process covers: who is responsible, who will make the decisions, who should be informed etc.

I have also used another tool to visualise how different activities and roles connect different activities in the process and what their interdependencies are. This tool has been especially useful in transformation projects where functionally organised companies are implementing process thinking. This tool has helped the organisation and its members to see the big picture, understand their own role and the borderlines within their system. Any error that occurs in the front part of the process has an implication on the following activities and the ultimate result. By utilising different simulation and prototyping tools I have found most efficient to describe these interlinks for the personnel, especially when the roles and responsibilities have changed.

My inspirer in *learning from Simulations and Pilot Installations* has been Karl-Erik Sveiby, professor in Knowledge Management at the Swedish Business School of economics and business administration in Helsinki. He opened my eye's, how important it is to give tools to enable people to understand the change and generate the "click" by themselves.

Personnel down sizing (layoffs) situation in a banking branch, two opposite experiences

Through these two opposite cases I will describe how two different approaches ended up. What where the elements that made the results of the Case 1 a successful? And why the Case 1b turned out to be not so successful.

Case 1a

Background

In the Finnish Banking sector in the mid 1990's, it was inevitable to downsize internal operations to meet requirements for long-term financial competitiveness. It was not easy to convince the personnel in a profit making company, that one third of the personnel had to be laid-off, because of the financial situation. The change was due to the heavy restructuring of the finance market and the development of end customer self-service services.

My role in this change was to support the Chief Executive Officer (CEO) with the simulation tool and support him in all financial areas. The person to drive the SI. operating model was my boss, the CEO.

Common vision creation:

After severe discussions with the management, we decided to create a simulation tool to visualize the business model attributes. This tool was designed to enable us to simulate and visualize all profitability factors and their relations to the next 5-year profitability. The power of this exercise was that all personnel groups were involved in the processing of the financial 5-year plan and could see the big picture and understand that the only conclusion was that we had to size the internal operations by 30% in order to survive in the long run.

We invited representatives from all functions, departments and labor union to participate to this "strategy creation session". The actual session started by sharing the shareholder expectations. Then different teams started to estimate their figures in the 5-year plan. The sales team was estimating the sales and margin levels, HR team headcount and the compensation plan, the finance teams the financial market expectations, level of funding cost etc. Then the actual exercise started by collecting the different teams' inputs and after many iteration rounds, it was crystal clear to everybody in the room that with the existing cost structure and revenue estimates the target result would not be achieved and it was unanimously understood, that heavy decisions and actions were a head of us all.

What made this "strategy creation process" different from a normal business planning process? All people that would be involved in making the change happen in practice were involved in the planning process and they could understand the urgency of change, and could approve of the coming actions. This simulation session took us one day for 100 people, and as a result, we could start the down sizing process and everybody felt that their view had been counted and respected. One has to remember that at the beginning of 1990's it was not common at all to involve personnel in decision-making. The normal approach would have been just to kick people off without any explanations. The system intelligent approach in this case did not totally sweep away the fear and uncertainty, but it did diminish it.

Management support

The actual layoff process was built on the following principles:

Open communication about the decision-making process and criteria's were considered highly important. Afterwards you might say the communication was almost over killing. Good So!

Transparent employee assessment rounds: We made assessments to all personnel in order to define competence levels and to find the best match for existing jobs. Managers held one-to-one discussion based on the assessment and listened to the expectations of each individual. This enabled also cutting employees' expectation levels.

CEO openness: The CEO was very open and committed to take all responsibility about the change and he also put his personal character at stake. He was famous for his value based management, and high respect for individuals. He had been very successful in the good times with his management style and now it was the time to test if his approach could be successful when things got hard. He was acting as he was speaking. He promised that he would ensure equality throughout the decision- making process. So he did indeed. He had the courage to fight for justice, although there were many sceptics during the long and painful change journey. His

personal vision was to make the process the way that all the laid off people were employable and positive after our process. He could indeed prove that his personal characteristics and courage did make a big difference!

Conclusion

After the process we wanted to observe how we had succeeded. Obviously there are no explicit measurements in a situation like this, but we collected as a "heat meter" the number of visits to the occupational health care during and after the process. Although health care people have to keep their information confidential, they could report the overall "atmosphere" level and compare that to other companies. We also collected information about how well our personnel were re-employed through the outplacement processes. On the other hand the employee satisfaction figures from the remaining organisation were also reflecting the success. This kind of process will have an impact on all the people involved.

The summary of these analyses was that almost all dismissed persons were employable after the process and many found interesting new careers through the offered outplacement program. Even the remaining personnel could continue their daily efforts for the company in a normal way. The CEO kept his promise and he was trustworthy. So he was the individual to drive the change with a SI. capability and understanding already in the beginning of 1990's.

Case 1b

The following experience is from a similar type of layoff process, but with totally different outcome. Background: During the mid 1990's the Finnish banking sector continued major restructuring that ended up in many mergers, which then inevitable resulted to big layoffs. Ironically, the Bank from the case 1a was merged to another Bank (case1b) the very same night their lay off process ended. I was nominated to be the responsible for the layoff process by the new CEO. I tried to implement the learnings from my experiences in the case 1a, but this was not accepted. My role turned out to be more theoretical than practical, because all instructions and policies were defined by the CEO and I could not run the process as I would have preferred. The irony in this case is that I was also laid off after the overall process had ended, mainly because I did not follow the "rules".

Common vision creation

It was not seen as important to share the vision nor the reason for the change. The layoff process was handled like a juridical process, without any space for human interaction and the communications were kept to a minimum.

Management support

The management involvement was business as usual, not showing any interest on the organizational or people issues. Sharing of neither different opinions nor criticism was allowed and the organization was under "fear". The management was seamless. Management used lawyers as their spokesman and tried to hide from the organization and their employees

Conclusion

How did this process end-up? The remaining organization's recovery time was long, the customer interface was impacted by unhappy customer service people, the layed off personnel were bitter and spread that feeling among their environment and in the media. In other words, the poorly handled process had severe impacts on the business and results of bank 1b. The management underestimated the impact of the badly treated personnel's interaction inside and outside the system. This had major impact on the company's profitability and image within customers and other stakeholders. More systems intelligent approach would have made total different outcome.

	What was driving the change?	Systems Intelligent behavior that enabled the change	Outcome	Sharing of the Vision	Systems Intelligent Leadership exísted
Bank A	Lonf term Financial competitiviness reduction	Simulation of the facts together with personnel representatives,SI leader	Organisation understood the reason for the layoffs and could accept the activities	+++	+++
Bank B	Merge of 2 banks	none	Personnel was in fear and did not trust that the layoff process was fair	- -	- -

Table 1. Summary of these two Bank branch cases

As a conclusion, these two cases are one another's opposites. The key long term successful result of the case 1 a is that the people that were laid off as well as the remaining personnel could accept the activities and the actions, whereas in the other case; the personnel could not trust nor accept the process and its results. So what does this mean in the long term? It means that people involved in these two cases will remember for their whole life how they were treated in this situation and also act accordingly. I must say, I have not forgotten it yet, though it is already 10 years past. And what are the consequences of this on the company's results, on the people's individual lives and ultimately on our society's well being?

Case 2. Building a global horizontal support organisation

The following two cases cover similar types of organisational re-structuring projects, but the companies described have different backgrounds and cultures, though both are international companies with roots in Finland. Case 2a is retrospective, but in case 2b I will explain how I have planned to utilise systems intelligent thinking (or systems intelligence) and my previous experiences in practise in my present engagement.

Background: Global multinational organisations and their challenges

Today many multinational organisations are functioning in a complex matrix model. They have global common horizontal organisations to support global and local business units. When global processes and procedures manage the operations, it is vital that all stakeholders (businesses, countries, functions) are equally involved in the design phase and that the concept is to continuously improve the processes. Already this fundamental base puts organisations in different starting points.

Often the change resistance is created by non-existent systems intelligent behaviour. Horizontal organisations use a "tell" approach and expect the vertical business functions to implement changes without sharing the vision, asking their viewpoint nor letting them have their own footprint on the plan. It is not possible to implement anything successfully by just saying, this is

mandatory or decided by the management. So you need to get the commitment from the organisation and listen to their viewpoints and perspectives.

Very often travelling is seen as cost element and not as an enabler to the awareness and commitment building. Not very systems intelligent! You often make cost savings in travelling and underestimate the power of face-to-face discussions and relationship building. People located in foreign subsidiaries greatly value the visits of staff from the headquarter and them listening to the local organisations' concerns.

The power of having an ongoing dialogue in the organisation is very often underestimated, as is its capability to involve people and have different perspectives. In Sebastian Slotte's article in Chapter 11 you can read more: "The difficulties involved in improving communication and conversation through dialogue are not due to a lack of dialogical methods, programs and software which there are plenty of. In dialogue and in conversation in general nothing is settled by a communication program, software or espoused rules since developing, learning and sustaining creative conversational patterns is an ever recurrent challenge. In order for a dialogue intervention to be successful, every participant must, so to speak, reinvent the wheel again, by continually challenging her own basic ways of thinking. There is no shortcut."

Case 2a

Background

The company is fairly young and their products are among the most fast developing consumer products. The culture is international, though the organization remains managed in a Finnish style. I was nominated from outside the company to build the strategy and implement a new global indirect sourcing and purchasing organisation.

The starting point was, that this functionality was scattered into all business units and countries. No sharing of information existed, nor seeking for better global agreements. Everybody was just focusing on their own needs and did not care for total cost efficiency. The eye opening happened, when the first calculations were made on the overall company level of spending. It was understood, that the potential cost savings could be achieved only by centralisation of the sourcing function globally.

Common vision creation

Looking back, I would say today that though we had a great vision and mission statement, followed by a sound strategy, we did a few big mistakes. First of all, we did not fully understand (at least I did not) the system environment we were in and who our customers were. Secondly we did not either have clear picture about the roles and responsibilities in our system. These two things lead to the situation, where

- we could not implement our vision and strategy
- we were focusing on the wrong system (i.e. organizations)
- we didn't get the credibility among our customers
- we underestimated the change resistance, as the roles were not clear

- we started to have high internal pressure (conflicts) and disbelief in the project from within our own organization

In other words we did not understand what our system environment was. And we did not understand the coupling link between vision->roles->system (picture 1) This ended up with many conflicts inside the new global organization and with our customers.

How did we continue? After we had understood the situation we started to find some ways to build up the credibility and clarify roles and responsibilities. We also involved people from different organizations to build common ways of working.

To clarify roles and responsibilities, we used a template where we together agreed activity by activity who is responsible, who will be involved and who is informed. This was one way of simulating future roles and responsibilities in advance. All organisations could now "see" the future set-up and understand the common development of new processes and procedures.

We collected teams across business unit, country and function to define together the global procedures and processes. We involved people from different cultures and locations in order to understand their requirements and reasoning for specific information or level of support. This is how they could have their own footprint on the plans and we could get their commitment in the end.

I have found the above method very useful. Even very difficult conflict issues have been agreed between different parts of the organisation. This method ends in creating an "agreement" and I often have asked people to sign it.

Management support

The Management of the company was supporting the project, but probably they were also underestimating the magnitude of the change and the importance of the involvement of the parties involved. The effort was seen more as a cost efficiency improvement project than a big organisational restructuring project.

Conclusion

We lost almost 2 years of valuable time and money. We had many conflicts inside the new organisation; people were uncomfortable mainly because of the big pressure coming from the customers. We lost some good people and also some credibility in the organisation. If we would have understood (including myself) the system environment that we were in and how important it is to first understand your own role in this system and then others, we would have a totally different story to tell today. Nevertheless, today this organisation is running, with new competent management and more learnings. After 3,5 years, I decided to move on and start again the same thing in my present position, and I hope, that this time I do understand how important enabler SI. is to make a successful change journey.

Case 2b

Background

The Company is 170 years old, one of the Companies that have been the base for Finnish industrialisation since the country's independency. The product's lifecycle is 20-30 years, so the culture is also quite "traditional" and it is more difficult to introduce new ways of thinking and working principles. I am now in the driver's seat. The project is as we speak in the design phase, so I have now all the possibilities to make it a success. So what will be my key learning points from the previous experiences and how will I utilise my knowledge of systems intelligence to make this project a success?

Communication of the vision

First of all I must say that it is not that simple to implement something you know would be the best way, as the company cultures are different and the overall decision making and communication principles varies. Anyway, I feel again, that I have a "mission" to fulfil. I will introduce new ways of thinking and I believe that I can gradually make changes in the overall culture I will use a systems intelligent approach as much as it is possible. I have decided to fight to ensure continuous communication and involve personnel in the process. In short, I will do my best and let's see how far it takes us.

Though the target of the project is to seek for cost efficiency and profitability, I am sure it can be done with respect for the individual. This I learned during the case 1a.

In order to have all needed perspectives I have build the evaluation team so that all our businesses, biggest countries, our corporation and also process knowledge has been covered. I see that this approach has been very important to ensure, that the results of the evaluation phase can be widely accepted. The team has been large, but I am convinced, that this will be the beneficial at a later stage.

Roles and responsibilities

As learning from my previous case 2a. I have realised that we need to clarify the roles of all the parties in the system, not only the new roles. It is also self-evident that I will make all the efforts to understand and correctly define the system environment and the stakeholders in it. We will use Conference Room Pilot (CRP) as a method to illustrate the future roles and responsibilities. In the CRP we will define together the work split between our new global organisation and our internal customers. We will even illustrate the process roles by using coloured caps: corporate green, business blue and support function has the red cap.

Conclusion

I am now at the beginning of my journey and the success of the implementation will show if we have done the right things, at least now I know more or less what to focus on. Still it is good to remember, that all companies and projects are different and the same approach does not always apply, so you need to adapt your approach to the situation at hand.

	What was driving the change?	Systems Intelligent behavior that enabled the change	Outcome	Sharing of the Vision	Systems Intelligent Leadership exísted
Global Support Organisation A	All Business Units had their own support function in all countries.No communication in between	not understood. Roles and responsibilities were not clear, though large number of people were involved	Lack of buy-in in the Business Organisation, conflicts in the new organisation	++	- -
Global Support Organisation B	All Business Units have their own support function in all countries.No common processes nor applications	Cross business unit teams to define the roles, extra focus on employee perspective	TBD	TBD	TBD

Table 2. Summary of these Two Cases

Case 3. ERP implementation project

While companies have been implementing Enterprice Resouse Planning (ERP) applications (for example SAP) there have been many failures as well many success stories. When collecting experiences from these projects, I have found clearly few areas where successful projects can be recognised:

1. All different parts of the organisations have been involved in the define phase (business, production, finance, human resources, suppliers, customers, management) of the project.

2. Focusing on building the understanding of what it means to transfer from a functional organisation to process thinking.

3. Building a view on the future way of working by utilising tools and methods to simulate or prototype the future state. One method is to build process maps from as-is processes and the corresponding to-be processes, and the understanding of the change is then communicated through the gap analyses of the current state versus the future state. A more IT -system related prototyping method is to build a CRP to record and test and approve together the future way of working by simulations.

It is important to guide people to understand their new role and ensure that they have the needed competences. This will support their capability to change and make the change happen by the people themselves. In the new way of working in a process mode, it is also important that people understand their own role in the chain and its impact to other people's job in the same chain and to the overall deliverables.

Background

I was nominated as the Project Manager of a large IT renewal project. This was the third effort to implement a new ERP system in this manufacturing company. The two previous attempts had been interrupted or freezed, for different reasons. This third attempt had to be conveyed, because the existing systems were not year 2000 compliant. So we were facing a tremendous pressure to make it happen and also many doubts that the third effort would succeed. An additional challenge was that the chosen application (SAP) had not been implemented anywhere in Finland with that large a scope and as extensively within such a short timeframe. This meant also that experienced consultancy support was not locally available. So all risk elements were there.

Common vision creation

The vision creation and communication was done systematically. The strategy and scope was communicated widely with different communication channels using creative new ways to attract the audience.

The project was focusing on automating the whole value-chain process from sales to production and from delivery to payment. This meant that the exercise was to impact all functions in the company and new process thinking was launched. This put extra effort on the communication and sharing of the big picture. All departments were involved in the design work. Special positive feedback was received from the factory floor "blue-collar" employees, who were invited for the first time to participate in the design work together with the "white collar" workers. We cannot underestimate the impact of these interactions as one success factor of the overall process.

Management support

From day one, the support was there. The request for the very best resources for the project was accepted, even the odd decision about using our competitors consultants in the project were approved. Top management dedicated a lot of their time and literally managed the project by being around; this really gave a great support to our effort.

How to measure the success?

The project was on time and on budget. The production process was up to normal level form day one. The first closing of the books could be processed in normal schedule. But the final success was when the organization started to function according to the defined processes, with increasing efficiency, effectiveness and higher quality.

During the project the project management collected weekly the feelings from each individual. The analysis called Dr. Feelgood (picture 3) showed clearly how differently individuals perceive the same situations. The curves per team were floating between a scale of 1-5, in different sequences. This explains how important it is to collect all team members' perspectives, as people perceive same things different ways.

Now, 7 years later when I last month met the company HR manager on a business trip and she said to me: "Do you know? Merja, that your SAP project is still recognized as one of the best driven projects in the whole history of the company". This kind of feedback you seldom hear…though I think she was quite much exaggerating.

	What was driving the change?	Systems Intelligent behavior that enabled the change	Result	Sharing of the Vision	Systems Intelligent Leadership
ERP project	Third effort to implement a new ERP system to the company. Many doubts that the third efford would succeed	Involving fairly all businesses and personnel groups in the planning and implementation.Lots of all types of communication	Successful project, in time, on budget and supporting all BU*s	+++	+++

Table 3. Summary of the Case 3

Summary of key prerequisites to create systems intelligence in the business environment

1. Sharing of the vision and strategy. How could you expect people to change in the right direction, if they don't understand the vision and the overall big picture?

2. The company atmosphere should support and approve outbox thinking and allow for different perspectives to emerge. Otherwise, how could you expect to have innovations and synergies in your initiative, if you don't allow people to express their viewpoints and concerns? Consider all feedback as potential building elements of your future state, not as threats.

3. People must have a strong self-image and courage to express different opinions in order to avoid the fear of loosing their job by expressing their attitude or comment on issues that would be for the best of the company's future development, but are currently opposite to the leader's opinions and mindset.

I continuously ask myself the following questions:

How could we create more secure change programs?

How could we prepare our personnel to change?

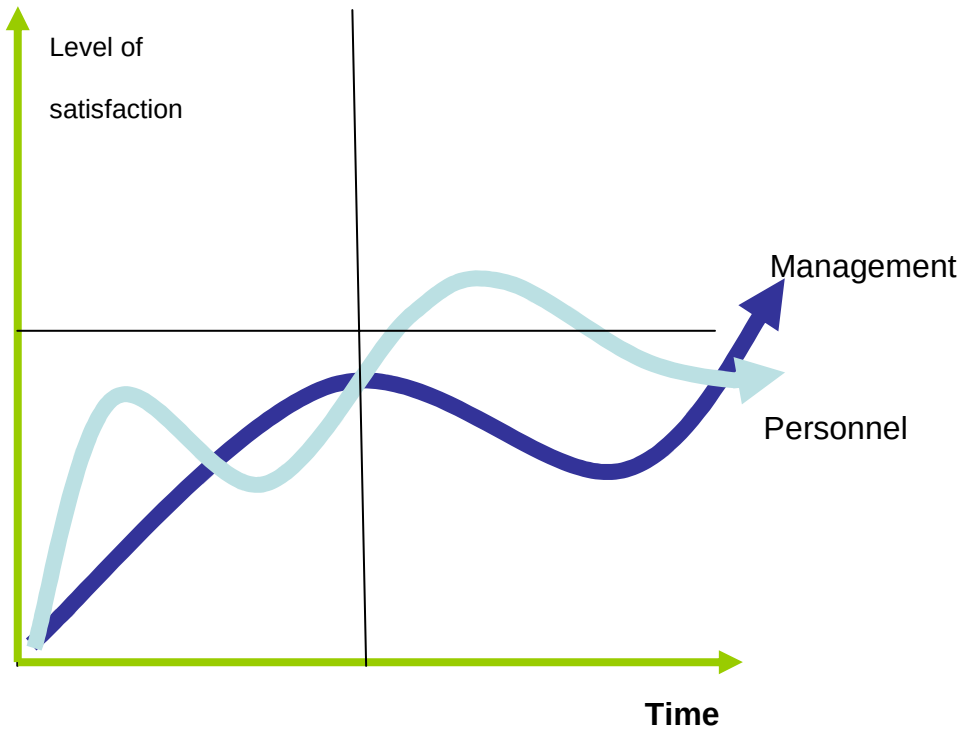
What kind of management style is needed to ensure that people in our organisations would maintain high self-esteem in spite of continuous change?

How to diminish the level of fear in the organisation?

"Flexibility" is an often-used word today. With all the above-mentioned arguments I would say, that only the most open and courageous systems intelligent companies can be flexible. And those who are flexible can react to the continuously changing external market expectations and they will be the winners.

How to analyse the commitment and feelings of the organisation?

A weekly web-questionnaire has proven to be a useful way of collecting the feedback and feelings within the organisation. This barometer has shown that different teams do have different perceptions of the same situations and this also supports the systems intelligent thinking, that people have different perspectives about the same issue or situation. See below the Dr. Feelgood barometer, picture 3.



Picture 3. Dr. Feelgood Barometer

Closing words

My personal inspiration in my working career has always been to create something new to make possible the impossible and to stretch the goal. I have a mission to fulfil and that gives me the ultimate drive and enthusiasm to go on and on. As Professor Esa Saarinen presented in his famous lectures at Helsinki University of Technology: “Why target for 1, if you can reach 1000”. Adapt the conveying attitude: “anything is possible”, “micro changes can start a major organizational change”, you can make it happen!

We should not underestimate the interactions and interdependencies inside the system and with other systems. I have the belief that the way companies’ function inside creates also their external image. If the company treats its personnel badly and creates an untruthful atmosphere, the “behaviour” will be the same towards all the members in the big system, also customers. So it is increasingly important to understand what interactions exist inside our system and external systems, and how far the negative rumour can spread.

The Systems Intelligent behaviour can be promoted by personal excellency, atmosphere, values and organisational structures. The main driver in success stories, often has been one person, who has been able to convince others and had the leadership capability needed to build the “system” and let all involved parties to participate in the change process. One should have the courage to ask other’s about their opinions and respect them having their own perspective. A good team can and should have conflicting ideas in order to create something new. A Change Agent must have the will and personal sensitivity to involve him/her and is willing to risk his/her personality to drive the change. This means, that anybody can be the catalyst to start a micro-level change that will then spread around and in the end end-up to major business and organisational changes.

How can we describe a person, with systems intelligent capability? He/She must have the sensitivity and capability (will) to put him/her in other people’s positions. My conclusion is that

we need more systems intelligent individuals, who are dedicated to drive the change process and seek for new way of thinking. I would say by my experience, that system intelligent approach has proven successful in my business career; even though I have not always understood that I have been using the elements of SI. What a tremendous strong internal power we can empower to harness the personal change factors to enable people to see the potential to change and encourage them with all the opportunities there exists.

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Chapter 5

Systems Intelligence in Expert Interaction

Kristiina Hukki and Urho Pulkkinen

This paper discusses Systems Intelligence in the context of expert interaction in complex work. The focus of our approach is on the cognitive aspect of Systems Intelligence from the knowledge mediation point of view. We introduce our analysis method which has been developed for improving multidisciplinary expert interaction in complex work. We first describe the challenges of multidisciplinary expert interaction and the principles of the systemic significance-based analysis. After that, we present our approach to Systems Intelligence, the basis of which is on the theoretical concepts underlying our analysis, and discuss some methodological aspects and the applicability and practical potentials of our approach.

Introduction

The expertise of organizations working in complex, knowledge-intensive fields is nowadays increasingly constituted as an integration of expert contributions representing different disciplines. Knowledge is the central aspect of expert interaction. The way knowledge is mediated among the experts should support interaction but there may be many preventing factors on the way, related to the relevance and informativeness of the knowledge. Multidisciplinary expert work is challenging due to lack of "common language" and difficulties in understanding each others' points of view. The experts' beliefs of the other experts' work and ways of thinking may be erroneus. One's own contribution is often preferred to others' contributions and one's own opinions are not easily questioned. Protection of and strict pertaining to one's own field of expertise are not rare phenomena in expert interaction. This kind of problems contribute to deficiencies in mutual knowledge transfer.

Saarinen and Hämäläinen (2004) defined Systems Intelligence as intelligent behaviour in the context of complex systems involving interaction and feedback. Furthermore, a systems intelligent person perceives herself as part of a whole, the influence of the whole upon herself as well as her own influence upon the whole. On the basis of the examples above it is obvious that a Systems Intelligent view on interaction is often missing in multidisciplinary expert interaction. Due to the lacking overall perspective, the experts are not willing or able to see oneselves as part of a whole. The consequencies of these problems may be manifested in the quality of the work, and, in safety-critical expert work, in the safety of the activities of the organizations.

The purpose of this paper is to introduce our approach to Systems Intelligence. We examine the concept of Systems Intelligence in the context of expert interaction in complex work. The focus of our approach is on the cognitive aspect of Systems Intelligence from the *knowledge transfer* point of view. The approach is grounded on an analysis method, which is currently under development (Hukki and Pulkkinen, in preparation). The theoretical background of the method is based on the integration of systems view and psychology (Holmberg et al. 1999, Hukki and Pulkkinen 2003 a, b, in preparation). The aim of the method is to serve a conceptual tool for the development of expert interaction in organizations working in complex fields and utilizing multidisciplinary expertise. The analytical framework makes it possible to identify the development needs of knowledge transfer in expert interaction from the systems point of view.

Challenges of Multidisciplinary Expert Interaction in Complex Work

In the following introduction we describe the challenges of multidisciplinary expert interaction in complex work, by using the safety-critical context of our previous study as an example. (Hukki and Pulkkinen 2003 a,b)

Our case is the company Posiva, the responsibility of which is to take care of the final disposal of the spend fuel of the Finnish nuclear power plants. It has an own staff of experts of nuclear waste management, but the major part of the work is carried out by external contractors from universities, research institutes and consulting companies representing different kinds of expertise in science and technology. The work is characterized by efficient utilization of expertise from several disciplines, such as geology and other earth sciences, physics, chemistry, mathematical modelling and computing. In addition to this, the work at Posiva includes technical design and construction of the waste repository and the waste encapsulation plant.

The work at the company requires integration of knowledge from several disciplines. The individual experts' tasks contribute in different ways to the process of gaining understanding of the bedrock in the planned disposal site. This means that the results of the experts' judgments, leaning on theoretical and empirical models and model interpretations, have to be integrated (see Figure 1). The experts' tasks are connected with each other by knowledge but due to the complex and abstract nature of the phenomena to be investigated and the multidisciplinary character of the work, it may be difficult for them to recognize their contribution to the whole and identify the connections with the other experts' tasks. The experts work usually independently and due to the sometime loose contacts between them, it may not always be apparent for them how the knowledge they are producing will be used and interpreted by the other experts.

The differences in the domain-specific working practices and in the ways of thinking are another reason for the difficulty to integrate the knowledge produced by the experts. It is difficult for the experts to understand the experts from other domains because they look at the subject matter from different perspectives and use different methods and models. To enable mutual communication, the expert of one discipline should be able to understand the basic reasoning principles characteristic to the other disciplines. In addition, complex expert work often requires subjective judgments. This is a particular problem for multidisciplinary expert interaction because the transferred knowledge is not always transparent enough in this sense. Due to the differences in the domain-specific working practices and ways of thinking, all the important knowledge, characteristic to the field, is not necessarily mediated. Moreover, currently the change of the nature of the company's work towards practical construction work and subsurface investigations brings the organization into a new situation. Extensive interaction with new types of expertise, like the representatives of construction, sets new requirements for mutual understanding.

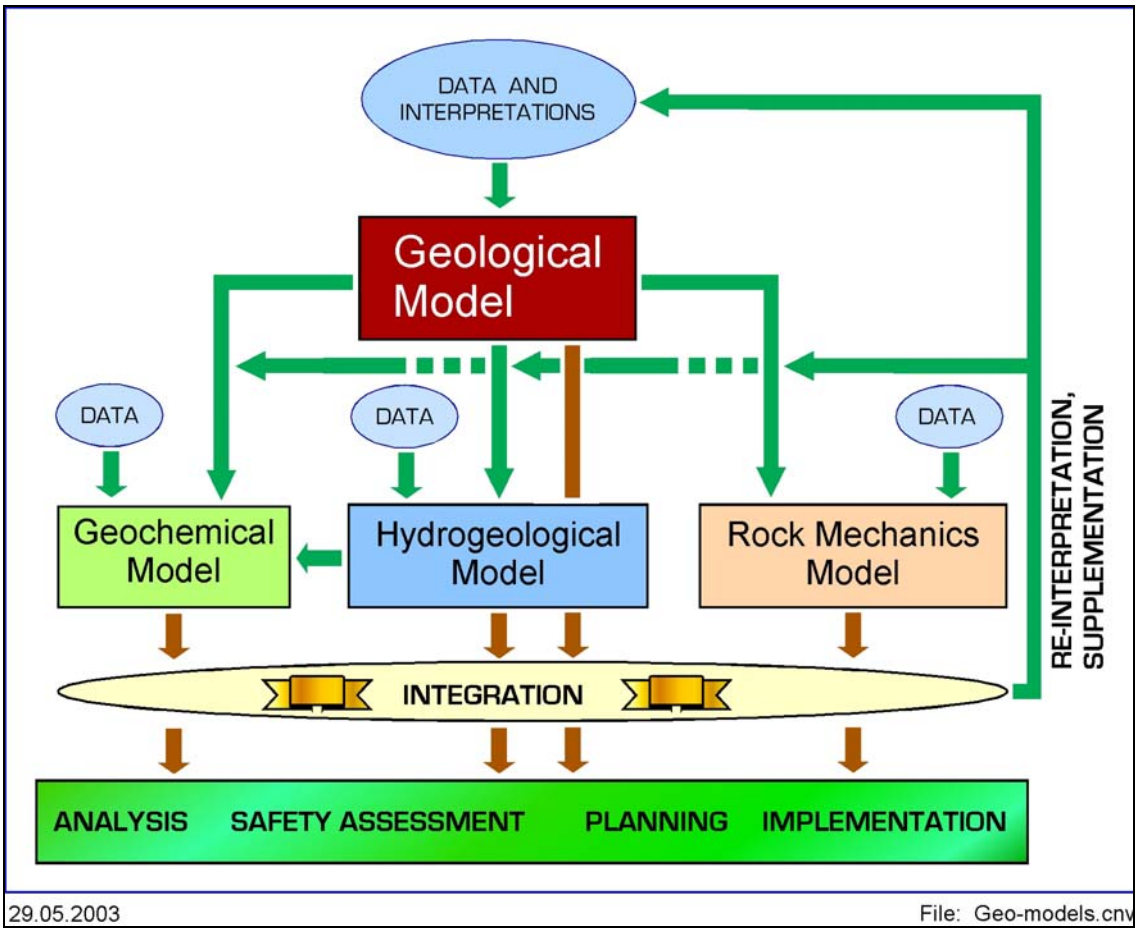

Figure 1. The individual discipline models are all integrated (from Posiva 2003)

Another perspective to the experts' interaction comes from the safety-criticality of the company's work. The expert work at Posiva has, until the year 2001, been concentrated on the selection of the site for waste disposal and on the analysis of the long-time safety of waste disposal solutions to pave way for the policy-decision by the Finnish parliament ("Decision-in-Principle"). In this connection, safety is more or less an abstract concept, and the experts must consider the safety of the designed disposal facilities over very long time scales. Safety is connected to the decisions made in the daily work only indirectly which makes the recognition of the safety-informed working and communicating practices difficult. The safety-critical questions of the work have been such as the selection of scenarios and phenomena for analysis, the transparency of arguments behind these decisions, and the sufficiency and completeness of the analyses. Thus, safety manifests in the work in two ways, firstly as the safety of the technical or scientific solutions produced in the work, and, secondly, as the inherent quality of the expert work procedures, i.e. in the ways of action in performing the work tasks and in communicating with the other experts.

One of the goals of the company's work is to collect the information on safety to a consistent body of evidence. The understanding of the bedrock is a process of creating the geological basis for the safety case. A safety case consists of a set of claims, inference rules or inference mechanisms and pieces of evidence. The claims correspond to statements about the safety related properties of the disposal facility. Some of these claims are also requirements set by the safety authorities. The evidence are facts, observations, measurement results, models and conjectures

produced by groups of experts from several disciplines. The inference rules aim at combining the multidisciplinary evidence into a consistent chain of argumentation supporting the credibility of the safety claims (see Figure 2).

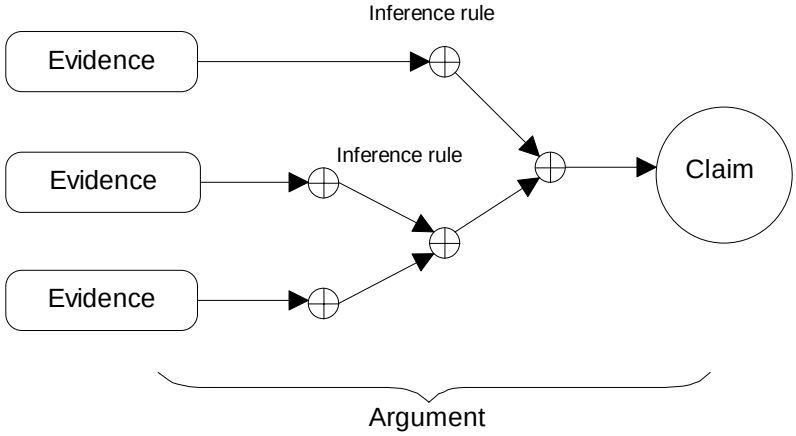

Figure 2. The structure of safety case

The challenges of making a consistent safety case for waste depository are diverse. First, the experts should have a common understanding of the concept of safety and the safety policies of the company. Secondly, they should understand the safety requirements of authorities and society in a consistent way. This includes understanding the various technical and scientific requirements and the social requirements. Only through this understanding is it possible to develop a sufficient and consistent set of safety claims. Thirdly, the safety assessment of nuclear waste disposal, of which Vieno et al. (1999) is an example, requires knowledge from several disciplines, which look at the problem from different perspectives, using different methods and models. Safety assessment has to bring these, in some cases even contradicting approaches, to one well-structured and well-argumented analysis. This means that it has to be understood that the disposal facility may not be built exactly as it was designed. Moreover, it can not be modelled in its full details for safety assessment. Often the contradictions arise between the assumptions used in the individual scientific models and model calculations, on the one hand, and the real situation, on the other. In order to solve these contradictions the safety analyst must be able to abstract and simplify the contributions from different disciplines and expertise and to justify the simplifications he makes. This requires the identification of the most important domain-specific issues and the cognitive constraints the individual scientist are facing.

Safety assessment is based on defence-in-depth thinking, and describes how the different barriers prevent propagation of the harmful phenomena. The work of each expert can, in principle, be identified as support for the analysis of a certain safety barrier. Safety assessment collects knowledge of the phenomena related to each safety barrier to a holistic view on safety of the whole waste disposal solution. The role of safety assessment is thus central for the company's work but due to its holistic and reduced character it may be difficult to understand for the experts from other domains.

On the basis of the description above, the major common factor underlying the problems of multidisciplinary expert interaction at Posiva is lack of the experts' shared understanding concerning their work both from the substance and the safety point of view. This constitutes a challenging target for the development of knowledge transfer at the company.

Significance-based Systemic Analysis of Expert Interaction

In the following we introduce the basic theoretical principles of our analysis and the way of carrying out the analysis in expert organizations.

The analysis method is based on a previous study which was conducted for improving multidisciplinary expert interaction in the field of nuclear waste management (Hukki and Pulkkinen 2003 a, b). The method and its theoretical background are described more comprehensively elsewhere (Hukki and Pulkkinen, in preparation).

The aim of our analysis method is to facilitate the integration of multidisciplinary expertise. The starting point in the development of the analysis is the importance of *understanding* in expert interaction in complex work. We wanted to find out what the experts, representing different disciplines, should actually understand in order to be able to interact in an adequate way, what kind of knowledge is relevant and what is the informative way of presenting this knowledge. The aim was to develop a way of analyzing, which would make it possible to gain comprehension of these issues and to utilize this comprehension for improving expert interaction in organizations. The analysis is described more detailedly elsewhere (Hukki and Pulkkinen, in preparation).

Multidisciplinary expert interaction requires sufficient mutual understanding.

It is important, from the interaction point of view, that the mutual needs for knowledge between the experts are understood. This requires *mutual understanding*. One should understand the other's work to the extent which is necessary from the overall point of view. This is not, however, possible without understanding the role of one's work in relation to the whole work process which one is participating.

The understanding of one's contribution to the work process requires systemic understanding of the overall activity of the work process and of the relationships between the experts' tasks. It seems to us, however, that this is not enough but there is something additional that should be comprehended. To our mind, understanding the *significance* of one's way of mediating knowledge is crucial for expert interaction (Hukki and Pulkkinen 2003 a, b). The question is, what is the meaning of this concept and how can it be operationalized. In the following, we describe our comprehension of this issue.

The way the experts mediate knowledge to each other has an effect on the adequacy of the work process. The lack of transparency of the mediated knowledge may be critical from the overall point of view. In order to be able to understand the significance of one's way of mediating knowledge the experts should comprehend how knowledge transfer is related to the functional goals of the work process and to the division of work. They should understand *the significance of one's work*. This requires, firstly, comprehending what is the bigger whole in which one is participating, what is the purpose and the goals of the activity of that whole and what is one's own contribution to the fulfillment of these higher level goals. Secondly, it requires an understanding of *the significance of the task dependencies*, that is, of the connections between one's own and the other experts' tasks in the work process, for one's work.

In order to be able to identify the appropriate ways of choosing and presenting the knowledge to be mediated to the others, the experts should understand, in addition, for what purposes the knowledge they are producing will be used. This requires comprehension of the knowledge dependencies related to the task connections. The way knowledge is mediated in the task interfaces is crucial for the fullfilment of the goals of the work process. Therefore, there is a need for understanding *the significance of the knowledge dependencies* for one's work.

Moreover, the experts should be aware of the ways that the knowledge to be mediated can be deficient in the sense of the transparency of the knowledge. For us, lack of transparency means lack of knowledge which does not represent the substance aspect of the work but which facilitates the understanding of the other experts' work practices and ways of thinking. This meta-knowledge type of knowledge, here called the *supplementary knowledge*, may concern e.g. the grounds of interpretations and inferences, which remain easily implicite but could be very important for the others in their task performances (Hukki and Pulkkinen 2003 a, b, in preparation). The experts should also be aware that the reasons for the lack of transparency underly in the differences of the working practices and ways of thinking of the experts representing different disciplines.

Understanding the significance of the dependencies within the work process is crucial for expert interaction. This type of understanding can be called significance-oriented systemic understanding.

On the basis of the fore mentioned demands concerning the experts' understanding, we make the following conclusion: Appropriate knowledge transfer in multidisciplinary expert interaction in complex work is comprehension which is holistic and integrating and aimed at recognizing the significance of the dependencies within the work process. We have called this type of understanding *significance-oriented systemic understanding*.

Shared Thinking Models as Support to Understanding

In complex work it would be difficult for the experts to gain significance-oriented systemic understanding by themselves. This kind of comprehension can usually be acquired only on the basis of the experts' co-operation, by developing a *shared understanding* of the whole in which they are participating. The experts' representations concerning the work process and the task dependencies within the process should be unified enough for the development of a shared overall view. The problem is, who should have shared conceptions, what should be collectively understood and what degree of shared understanding is enough?

The organization should provide the experts with sufficient prerequisites for gaining significance-based systemic understanding.

In our opinion, it should be on the organization’s responsibility to provide the experts with sufficient *prerequisites* for gaining a shared understanding of the relevant issues. This is not, however, possible without systematic investment for the development work.

The necessary knowledge to be mediated and an adequate way of mediating it can be identified by creating *shared thinking models*, which are conceptual tools for integrating multidisciplinary expertise. The common consideration should be focused on objects that are as concrete as possible, instead of on values, goals and general definitions (Launis 1997). With the help of the common consideration the differences in the experts’ perspectives become visible. Construction of shared models help in bringing out the experts’ implicite knowledge (e.g. Nonaka and Takeuchi 1995). The shared conceptual frame makes it possible to develop the experts’ understanding of the work process they are participating in (e.g. Bechky 2002). According to Boreham (2002) the knowledge concerning the work process is more comprehensive than experiential knowledge because one of it’s elements is theoretical understanding. Work process knowledge is created as the result of the integration of experiential and theoretical knowledge.

Implicit in the concept of work process knowledge is the key notion that understanding work involves understanding how individual or group actions are connected to the work process as a whole (Norros and Nuutinen 2002).

The construction of the shared models is based on an analysis which is kind of a cognitive network analysis developed for the conceptualization of work process from the experts' interaction point of view. The characteristic feature of the analysis is the consideration of expert interaction from the systems point of view and, at the same time, the emphasis of the significance of the experts' understanding. The models are created in a group work, by the experts participating in the target work process. The issues to be analyzed are illustrated with the help of schematic diagrams, tables etc. The analysis can be made on the level of the whole organization or, for example, of an individual work chain.

The experts' collective conceptualization helps in gaining a shared understanding of the work process and, at the same time, of the role of knowledge transfer as part of the process. By making the systemic nature of knowledge transfer in expert interaction visible, the constructed decriptions illustrate the significance of the ways of acting in mediating knowledge. The models make it possible to recognize the necessary needs for knowledge and the deficiencies in the mediation of this knowledge.

The shared thinking models make it possible to make the systemic character of knowledge transfer in the experts' work process visible.

The construction of the shared thinking models is a collective learning process based on discussions and requiring time. It is, however, worth doing because it results to a more unified understanding of the work process and of the significance of knowledge transfer in the organization. In addition, it makes it possible to identify the domain-specific differences in the work practices and in the ways of thinking. Discussion of the significance of these differences helps in diminishing the deficiencies and obstacles of knowledge mediation. Improving the awareness of the systemic nature of the work process and facilitating the mutual understanding of the participating experts contribute to the creation of better prerequisites for the integration of multidisciplinary expertise.

The knowledge gained as the result of the analysis can be utilized for developing the organization's knowledge management. Enhancement of the proportion of systemic and integrating knowledge facilitates expert interaction.

Significance-based Definition of Systems Intelligence

Significance-oriented systemic understanding can be considered analogous with the cognitive aspect of the concept Systems Intelligence.

In this chapter we discuss our approach to Systems Intelligence, based on the analytical framework described above. We attempt to define Systems Intelligence in the context of multidisciplinary expert interaction in complex work from the perspective of knowledge transfer. The basis of our analysis is *significance-oriented systemic understanding*. We think that this type of understanding can be considered analogous with the *cognitive aspect* of the concept Systems Intelligence.

The adequate functioning of a work process requires that the individuals participating in it, act in a way which enables the system to fulfill its goals. According to our view, the experts' ways of mediating knowledge should support the fulfillment of these goals, that is, the functionality of the

process. This, for its part, requires a significance-based systemic understanding both on the individual expert's and on the organization level. Therefore, we suggest the following characterization of Systems Intelligence in the context of multidisciplinary expert interaction in complex work:

On the *individual expert's* level Systems Intelligence means understanding the significance of one's way of mediating knowledge to the other experts. This requires the following kind of systems thinking: First, one has to understand the connection of one's own work tasks with the goals of the work process and with the other experts' tasks, since this makes it possible to comprehend the significance of one's work in relation to the whole. Second, one has to understand the nature of the knowledge dependencies between one' own and the others' tasks because it makes it possible to comprehend the significance of the ways of mediating knowledge.

On the *organization* level Systems Intelligence mean, firstly, understanding the significance of the experts' ways of mediating knowledge for the integration of the knowledge produced by the experts representing different domains. This means comprehending the knowledge dependencies in the process of integration. Secondly, it means understanding the significance of a sufficiently unified conception that is needed for facilitating knowledge transfer in the organization. The systems intelligence needed is the comprehension of the influence of the discipline-specific ways of constructing, interpreting and presenting knowledge on the integration of the individual experts' knowledge.

Methodological Aspects Underlying the Definition

Our approach to Systems Intelligence is based on the integration of systems analysis and psychology in a way which pays attention to the characteristics of human nature. A fundamental aspect of the activity of human beings is need for making sense in their environment. Humans provide subjective meanings to actions in relation to their goals and, respectively, orientate on the basis of these meanings. It is obvious that understanding the significance of activity is a fundamental feature of human life. This is the core concept in our definition of Systems Intelligence in multidisciplinary expert interaction.

The significance-based definition of Systems Intelligence integrates the systems view with the functionality of the experts' work process.

When the concept "Systems Intelligence" is applied to human systems it is, in our opinion, important to pay attention to the fundamental difference existing between them and the technical and natural systems, that is, to the inherent nature of human beings to orientate themselves on the basis of the experienced meanings. We think that when trying to comprehend Systems Intelligence it is essential to pay attention to these meanings. By integrating systems view on expert interaction with the demands on the experts for understanding the significance of their activity in this interaction, we have, in this sense, taken the human nature of the system into account. This integration manifests the *context-sensitive* aspect of our approach to Systems Intelligence.

In chapter 1 Saarinen and Hämäläinen (2004) have also pointed out the enormous possibilities of re-framing or a vaster universe of options for possible behaviors of a person adopting the Systems Intelligence perspective. In our target context the amount of alternative possibilities is not the point but the possibility of re-framing in the most appropriate way in relation to the situation at hand. By emphasizing the situational adequacy of re-framing we press the significance of Systems Intelligence in practice. In our approach the individuals are considered as participating in

knowledge transfer, which concerns the work process. The essential issue here is that the fulfillment of the goals of the work process poses demands on the way the experts' should mediate knowledge. The consideration of knowledge transfer from the systems point of view and, at the same time, from the viewpoint of its contribution to the functionality of the work process makes it possible to anchor it to practice. This, for its part, enables gaining an understanding of its significance. This integration of the systems view and the functionality of the work process manifest the *pragmatic* aspect of our approach to Systems Intelligence.

When describing the concept of Systems Intelligence domain-independently Saarinen and Hämäläinen (2004) have the perspective of an individual. Systems Intelligence has been considered a behavioral capacity or a demand on an individual. In their article there are mentions concerning the necessity for an individual to take a new, systems intelligent perspective, meta-level reflections of one's own framing systems, etc., all of which are points that emphasize the need for re-orienting of an individual. We think that in multidisciplinary complex work, the creation of systems intelligent ways of interacting should not be left on the responsibility of the individual experts. The possibilities for significance-oriented systemic understanding can be created only with the help of organizational support, on the basis of the experts' organized co-operation.

The significance-based definition integrates Systems Intelligence on the individual expert's level with that on the organizational level.

In our approach the focus includes both the individual experts' and the organization's points of view. Connecting the demands on the experts for understanding the significance of knowledge transfer with the demand on the organization for providing them cognitive prerequisites for fulfilling these demands makes it possible to conceptualize Systems Intelligence on the individual expert's level and on the organization level at the same time, as integrated to each other. This integration brings out the importance of the environment as the source of possibilities and restrictions for the activities of the human beings. Therefore, it can be considered to manifest the *ecological* aspect of our approach.

We believe that taking these aspects as the basis of the conceptualization of Systems Intelligence enables taking account of the most important demands for multidisciplinary expert interaction in complex work, that is, the demand for understanding the significance of one's way of mediating knowledge in practice and the demand for being provided with the adequate prerequisites for this understanding. We also believe that this way of conceptualizing makes it possible to operationalize the concept in a way which facilitates practical development procedures in this context.

Discussion

Our approach to Systems Intelligence described in this paper is based on the importance we put on understanding the significance of knowledge transfer in multidisciplinary expert interaction in complex work. According to our context-specific tentative definition, Systems Intelligence on the individual expert's level means understanding the significance of one's way of mediating knowledge to the other experts. Developing this kind of understanding in the organization cannot, however, be left on the individual experts' responsibility.

It has been pointed out that persons' beliefs about co-operation are a limiting factor in their attitude to interaction (e.g. Saarinen and Hämäläinen 2004). We think that in the context of expert organizations there is need for knowledge which could help in changing the beliefs to

understanding. The necessary knowledge can be gained with the help of collective conceptualization and reflection of work processes which facilitate making the significance of one's work and of one's way of mediating knowledge visible. This kind of Systems Intelligence on the organization level makes it possible to change the perspective. By creating, in co-operation, shared thinking models it is possible to provide the experts with an overall view of the work process they are participating in. This can be done with the help of the significance-based systems view on the dependencies between the work tasks and on the knowledge dependencies related to the task interfaces. The common creation of the models facilitates crossing the boundaries between territories of expertise (Launis 1997) and diminishes bipolar subject-object thinking (see Saarinen and Hämäläinen 2004) and self-centeredness. It enhances the experts' mutual understanding and learning which makes it easier to integrate knowledge from different domains. We believe that it enhances also their motivation by increasing interest in one's own and in the others' work.

According to Schoonhoven (2002) relatedness in knowledge content and the relationship between individual and collective knowledge in an organization belong to the important questions in current research concerning knowledge in organizations. In our approach knowledge transfer from the content point of view is the fundamental integrating element in expert organizations. The systemic view, based on conceptualizing the practical importance of the significance of the ways of mediating knowledge, creates a theoretical framework which makes it possible to consider the individual and the organization level as integrated to each other. This framework may also offer an integrating link between the five disciplines in Senge's theory concerning learning organizations (Senge 1994).

Our conceptualization of Systems Intelligence is applied to the context of multidisciplinary expert interaction in complex work but the general principles of the framework can be applied to other kinds of expert interaction, too. In those contexts where the interacting experts do not share any goals the systems intelligent way of using dialogues might, however, be more appropriate.

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Chapter 6

Systems Intelligence, Knowledge Systems and Darwin

Juhani Timonen

This chapter analyses Systems Intelligence concept using systems theoretic tools constructed by combining the traditional input-output presentation of a dynamical system with a model for organizational knowledge creation. The analysis reveals that the concepts of internal models and perception filters describe aspects of Systems Intelligence. An introduction to evolutionary models of knowledge generation is presented and a link between Systems Intelligence and favourable conditions of knowledge generating evolution is established.

Introduction

My aim is to dig deeper into some essentials of Systems Intelligence (Saarinen and Hämäläinen 2004) by using tools of System Analysis and applying an evolutionary model of knowledge generation. I hope to find explanations for some Systems Intelligence fundaments and answers to the question: Why is Systems Intelligence a good idea?

First I introduce the concept of Knowledge System, which is a uniform way to present knowledge processing agents, including individual human beings and their communities. I refer to the 5-A model of organizational knowledge generation, originally presented by Tuomi (1999a), and use the combination of Knowledge System concept and 5-A model to analyze an 'archetypical' example of lacking Systems Intelligence, presented by Senge (1990). The analysis reveals two sources of poor performance: narrow internal models and restricting percept ional filters. The connection between these findings and Systems Intelligence essentials is discussed.

In the second part of this text I discuss an evolutionary model of knowledge creation (Dennett 1995, Calvin 1997, Blackmore 1999). This model is based on a process that resembles biological evolution, but instead of processing genetic information takes place in the domain of ideas, thoughts and concepts shared and processed in human communities. I point out the connections between some Systems Intelligence essentials and conditions of this evolutionary process, and

propose that advantages of Systems Intelligence arise from its capability to amplify and accelerate the evolutionary knowledge creation process.

A Knowledge System and 5-A Model

I use the word System for an entity that has input, output, and state. I use the name **Knowledge System** (KS) to denote an agent capable of communicating, processing and storing information/knowledge. This definition covers as well a single individual human being as any community of people. I think that this viewpoint is useful here because it helps to illustrate one of the key characteristics of Systems Intelligence: the capability to see an individual as a part of a bigger system, and communities as subsystems of still larger systems. This is also one of the essentials in Systems Thinking as presented by Senge (1990).

Boundaries of a Knowledge System can be selected to include an individual or a community of people.

Communities and organizations are knowledge systems, and so are all individuals within them. Knowledge systems also may include the tools of the people for storing, processing and transferring data. What is a single system is purely a matter of definition of the boundaries, as illustrated in Figure 1. Selection of boundary defines what is input and output of the observed system. If we look an individual as a system, then the input is the information she receives, the output are her actions, and the state is her mood, state of knowledge, emotions, beliefs, mental models etc., i.e. all that affects her behaviour in a given situation. If we choose to observe a company as a knowledge system, then input is the information flow from the outside into the company and any of its employees, and outputs are all communications or actions outwards from the company. The state is the combination of mood, emotions, values, knowledge, etc. of all employees, the 'spirit of the company', plus all knowledge that is stored in company's files, documents, structure etc. The mutual communication of the employees is an internal process of the system and not its input or output.

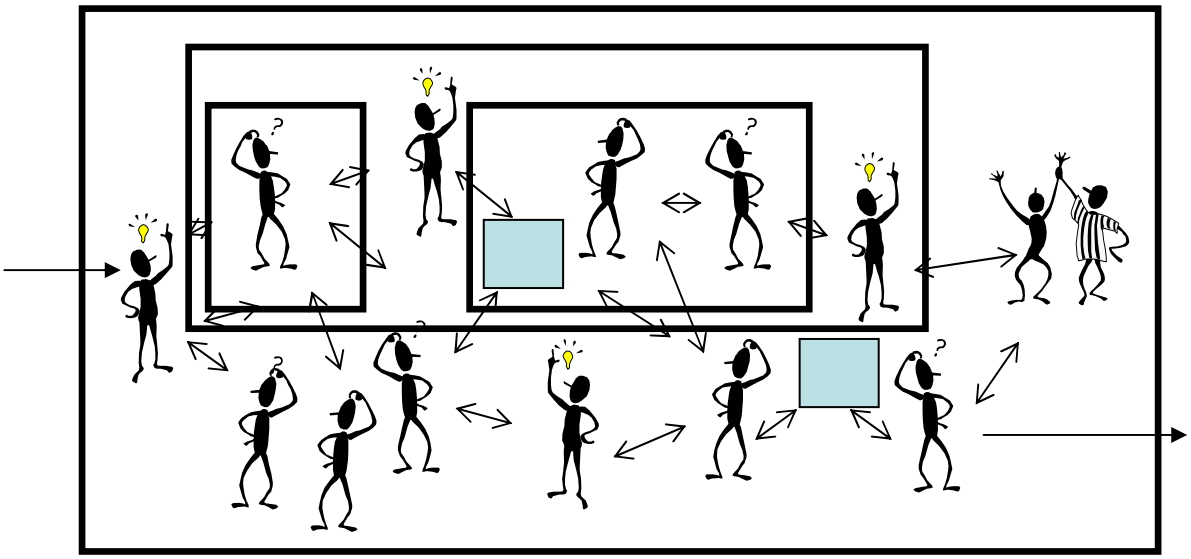

Figure 1. System boundaries can be selected according to the point of view

What do the knowledge systems have in common, independent of the definition of the boundaries? What makes something to be a knowledge system? Tuomi (1999a) has introduced a

framework that he calls 5-A model. It defines the five essential knowledge processes of any knowledge system as shown in Figure 2.

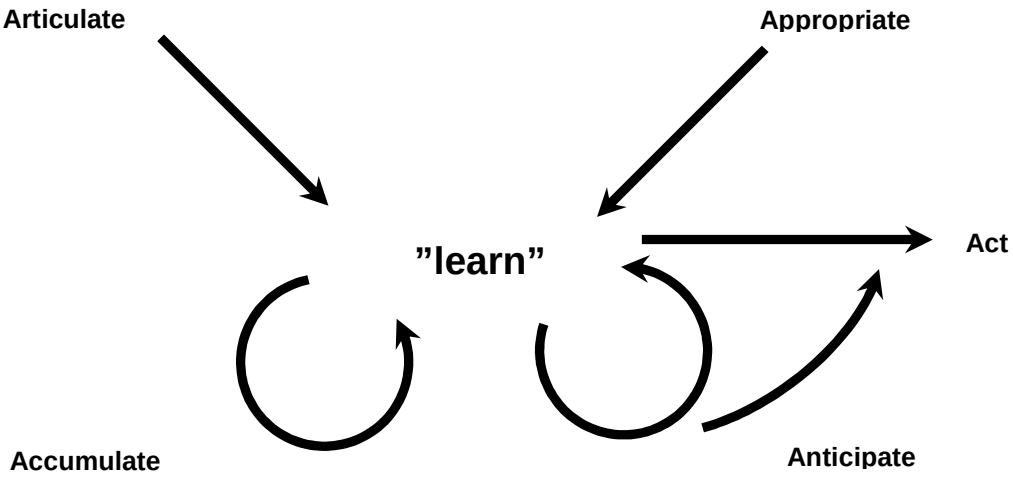

Figure 2. The "5-A model" of knowledge generation according to Tuomi (1999a)

The 5-A model has been applied e.g. by Happonen (2001) to analysis of Communities of Practice in product development work using real life development project case examples.

All Knowledge Systems have five basic processes independent of the level of hierarchy.

Figure 3 shows the 5 A's of a Knowledge System emphasizing the input, output and the boundary of the system.

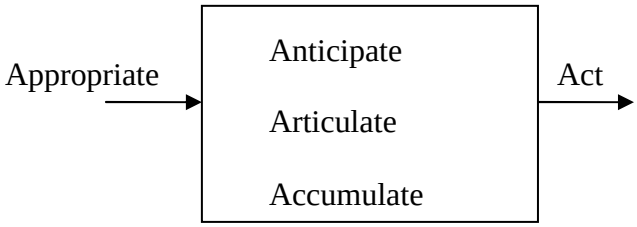

Figure 3. The 5 A's of a Knowledge System

According to Tuomi (1999a), knowledge generation, 'learning' of a knowledge system can take place in three different modes, that he calls *Appropriation, Articulation and Anticipation*.

Appropriation is learning through input of information from outside the borders of KS. Anticipation is use of the system's internal model of the world to produce forecasts about what is going to happen. There is a potential tension between the observations from the outside world and the results of anticipation. In cases when the information obtained from outside is in conflict with the anticipation, the system's world model may suddenly break down causing surprises and producing new knowledge.

Articulation is reconfiguring meaning relationships, such as classifying, finding similarities and other relationships between objects of thinking, or creating entirely new aspects around the existing accumulated or appropriated material. Thus this is the place where the creativity of a KS takes place.

Accumulation is needed because learning is incremental and always based on memory. Action means communication to outer world. This may take place in form of different languages or practical actions. Generally, the result is some kind of physical artefact that is carrying data that can potentially be observed by some other KS. Examples are speech, written document, body gesture, a manufactured product or musical performance.

	Human-in-society	Community of practice	Society
Articulation	Conceptualization; Imagination	Dialogue; development of collective concepts, tools-in-use, practices, dialects	Languaging; production of institutions and practices
Appropriation	Imitation; acquisition of language and systems of theoretical concepts; socialization	Integration of boundary objects; interpretation; adoption of institutions; adoption of language	Structural drift; expansion of community practice
Anticipation	Creation of models; formation of habits	Formation of routines; creation of plans	Formation of routines; legitimation of institutions; negotiation of interests?
Accumulation	Models; habits; history; abstractions	Praxis; tools; stories; metaphors; paradigms; systems of concepts; dialects	Culture; customs; language; institutions
Action	Communication; practical action	Communication; practical action; activity	Communication; reproduction of culture; integration of communities

Table 1. Knowledge processes on different levels of hierarchy according to Tuomi (1999a)

Our illustration of knowledge system is ‘scale-invariant’. It can as well be applied to an individual human being as to a community, the five A’s can mean a lot of different things, depending what level of hierarchy we are talking about. Table 1 shows the contents of the five knowledge processes at three different levels of analysis: individual human-in-society, a community of practice, and an entire society (Tuomi 1999a).

Internal world model

Internal dynamic world models are a very essential part of the accumulated knowledge of a knowledge system. The system uses these models to produce anticipations of events either in physical reality or in the world of concepts. Senge (1990) speaks about Mental Models. As a matter of fact, an individual mind mostly interacts with its own (mental) world model and the senses are used to validate the model and to add new material to it. So also the appropriation of new knowledge is guided by the model and any data that does not fit into the model tends to be ignored, and not recognized as data at all (Tuomi 1999b). Furthermore, our feelings and opinions about people or groups of people mostly reflect our mental models, i.e. assumptions about how other people are. These models are only occasionally verified or adjusted based on the cues and clues that we obtain by (selectively) observing the actions of others.

Internal Models are used to anticipate what is going to happen.

In the following, I shall use the term Internal (world) model instead of Mental Model to emphasize that like individual persons, also communities have their models that enable the anticipation. These need not necessarily be only mental, but can be partially explicit data structures, forecast methods, written statements, etc.

Internal models are not limited to anticipating events and developments in the real world, but they have the capacity for simulation, i.e. we use our internal world models to find out what would be the likely outcomes of our alternative actions towards the external world. This simulation capability is essential for intelligent behaviour and could be the most essential feature that differentiates humans and their communities from other animals. As far as we can know, other animals have to try and err in real world terms, whereas we can imagine consequences of alternative actions and abandon those approaches that according to the model response seem likely to fail. As Popper (1963) puts it, the use of models allows ‘our hypotheses to suffer in our stead’. An erratic mental model may cause unintended inadequate actions, surprises and disappointments, when the responses of our environment to our actions are not as we expected.

Only a small part of our world models is explicit knowledge, i.e. in the domain of our consciousness. There is a large background of tacit knowledge that consists of emotions, automatic skills, association links etc., which are not articulated consciously, but which shape the knowledge processes.

Analyzing an example of lacking Systems Intelligence

Business organizations are knowledge systems that have been formed around some processes that exist by design. A business organization brings together a group of people who, besides running the well-defined business processes, bring into the organization all their human capabilities and richness of social interaction. This is essential because the business processes are always only a

part of the business. The survival and success of an enterprise asks for high adaptivity, problem-solving, innovation and capacity of renewal.

Human crew brings into the company the blessings of human creativity and growth potential and the richness of social interactions. Humans and teams may, however, also act in ways that are counterproductive regarding the organization's fundamental objectives. Peter Senge has been searching patterns of regularity in the unplanned 'side effect' behaviour of business organizations. He calls his findings 'archetypical systemic behaviours'.

Let's take Senge's "Shifting the Burden"- archetype as an example:

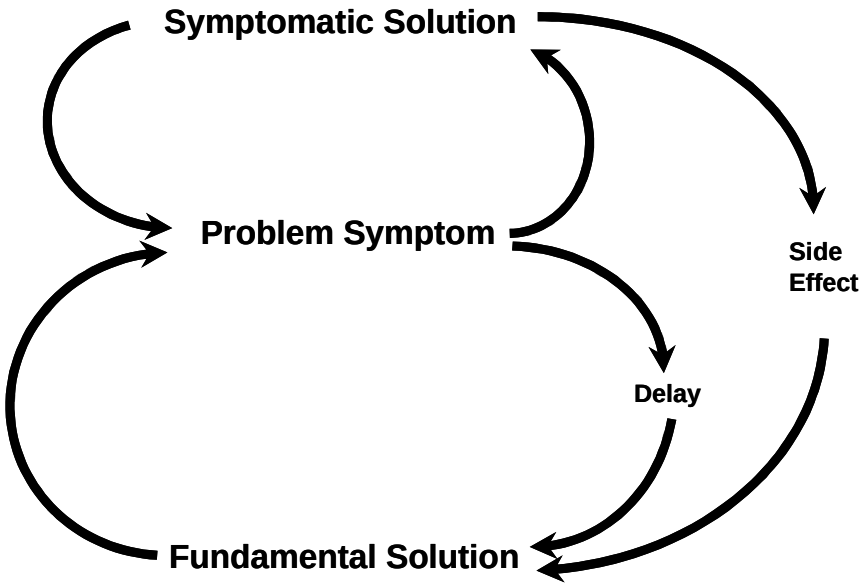

Figure 4. 'Shifting the burden'- archetype by Senge (1990)

In this archetypical case, an organization is facing a problem. Certain symptoms of the problem are visible to the organization (e.g. the management team), but the real problem behind the symptoms may be poorly understood. A short-term 'symptomatic solution' is used to correct the problem, with seemingly positive immediate results. The symptomatic solution can, however, have adverse side effects that make the fundamental problem worse, maybe with delay. The situation leads to increased use of the symptomatic solution and worsening of the problem.

The dynamics become more transparent if we use the input – system – output- notation, like in Figure 5:

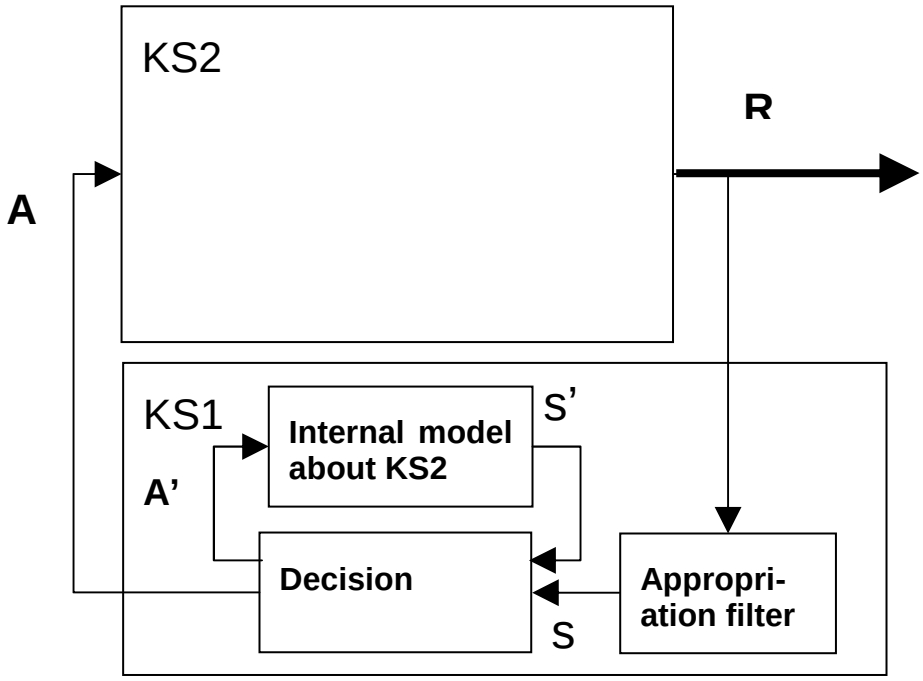

Figure 5. Illustration of 'Shifting the burden'- knowledge systems and processes

The whole system consists of two Knowledge Systems KS1 (the actor) and KS2 (the system observed and influenced by the actor). Of course they form together a composite knowledge system as well, but we select the (sub)system boundaries in order to make the relevant inputs and outputs visible and to name them.

The output of KS2 is R, which is here thought to include rich information about what happens in KS2. KS1 observes R but since the appropriation capacity of KS1 is limited by a 'filter', KS1 is capable of appropriating only S (the symptom), which is only a part of R.

Furthermore, KS1 uses an internal model to anticipate the behaviour of KS2, and to decide about an action A in order to influence KS2. In the presented case the internal model is limited so that it only gives answer to the question

– If I do an action A', what is likely to happen to S?

KS1 performs thought experiments with different imagined actions A', and compares the imagined outcomes S' with the actual observed symptoms S. Based on this, such action A is selected, which according to the internal model should improve the observed outcome S of the actual system KS2. To decide, what is an improvement and what not, KS1 uses values and criteria that are part of its accumulated knowledge and in a sense a part of its wider internal world model.

The non-optimal behaviour of KS1 is caused by two sources of non-intelligent systemic behaviour:

1. The appropriation *filter* prevents KS1 from seeing the whole problem, which would be manifested in R

2. The *internal model* used by KS1 is about action-symptom only and does not include the relationship between KS1's actions and the fundamental problem

These two reasons can be found in most of the archetypical cases presented by Senge (1990). For instance, in the case of the 'Tragedy of Commons' the adverse effects of archetypical systemic behaviour rise from the fact that knowledge subsystems optimize their own behaviour within their own subsystem limits only. This means that the internal models of the players are too narrow to include the benefits of cooperation and the ultimate catastrophic result of maximal hogging of shared finite resource.

About filters, internal models and Systems Intelligence

Business science literature provides some interesting views to the concept of filters. Igor Ansoff in his classical book (Ansoff 1979) speaks of *perception filter*. In a later work (Ansoff 1984) the perception filter has been divided in three parts: *Surveillance filter, Mentality filter, and Power filter*. Ilmola and Kotsalo-Mustonen (2003) have presented a commercially available computer-aided method that assists in bypassing these three filters, when business organizations are looking for signals (especially *weak signals*) as input for their strategy formulation. The authors report dedicated methods for opening the three filters:

Systems Intelligent Techniques can be used to open filters.

The surveillance filter, that defines the field of observation, is opened by

- diversity of participants
- non-restrictive focus in briefing the participants
- allowing observations in the form of paradox or contradiction
- using face-to face- context to transfer tacit information

The mentality filter is caused by the previous experience and the mental model in the way that information not fitting with the mental model tends to be neglected to ease the handling of the information. Mentality filter is opened by:

- explicating the mental model so that the 'empty' areas become visible
- relaxing the argumentation requirements
- using multiple interpretations, symbols, and metaphors

The power filter stabilizes and delimits the results by aligning them with the existing, position- or expertise- related power structures. Ways to open this are:

- anonymity of participants
- avoiding formal, well- defined measurement systems for assessing the results
- making decisions in the late state of the process

It is easy to see that the concept of filters has a lot to do with Systems Intelligence, or the constraints of it. The methods to open the filters are precisely same type of techniques we propose for enhancement of Systems Intelligence: ways to help the seeing through the eyes of

another person, ways to get rid of narrow self-centered viewpoints, ways to see multiple truths and opportunities, ways to deal with fear and power games.

Systems Intelligence means better mental models.

It seems that in the literature more emphasis has been given to the shortcomings and drawbacks of internal models of knowledge agents than to the necessity of adequate models. Ansoff (1979) mentions *forecasting filter* meaning the limitations of the formal forecasting methods that a company uses. Also Senge (1990) emphasizes the limiting and erratic elements of mental models. An complementary 'positive' approach to this problem would be, trying to develop new sensitive *receptors* for new kinds of inputs, and trying to develop new better models to replace the abandoned stiff and erratic ones. This would mean that:

- We recognize that we have and we need to have mental models
- We try to bring as much as possible of the tacit models into domain of consciousness
- We utilize the diversity of people to develop new kinds of models, to look from different angles, to look into the futures together
- We actively favour opportunity-oriented models
- We approve a multitude of parallel possible models and possibility of bifurcations
- We question the 'not doing'- options against 'doing'- options
- We do not build upper limits to our models by habit

Internal world models – our window for looking into the future – are in the core of Systems Intelligence, both on individual as on organizational level. Advanced understanding, skills and practice in this field are worthy goals.

Themes and memes

Since the seminal work of Charles Darwin (Darwin 1859)[1], it took a while for the scientific community to adopt the idea that all life forms on earth have been created by a blind process that through random variations and adaptive selection pulls order from chaos. Nowadays it is the commonly accepted explanation for the diversity of living things. Since 1970s, also many social behaviour patterns of human species have been explained through biological evolution within *sociobiology*, introduced by Wilson (1975).

The time scale of biological evolution is so slow that we need the evidence of fossils to really see the process. Even during the time of known history of mankind, there is not much documentation available about observed change of the species. Also the results of sociobiology mostly refer to invariant instincts and behavioural tendencies that are on the background of human societies. We

[1] http://www.literature.org/authors/darwin-charles/the-origin-of-species/index.html

need more than the process of biological evolution to explain the dynamics of culture, politics, science, business, technology, and other rapidly advancing social activities of mankind. We'll now look at a possible explanation in terms of another evolutionary process, which resembles biological evolution, but is parallel and much faster, and owes much to Darwin's basic discoveries.

The apparent similarities of biological and cultural evolution have led the scientists to look for similar underlying drivers of these two phenomena, and actually all processes where complex design is being created from scratch. Biologist Dawkins (1989) introduced in 1976 the concept of *meme*, which is a term denoting the unit of cultural evolution, analogous to gene in biological evolution. This has given name for a new science of memetics. A basic outline of memetics can be found in a book of Dennett (1995), and a good popular introduction is presented in a book by Blackmore (1999).

Since mid 1990s, memetics has gained a lot of popular exposure, but is still seeking its place among the established scientific disciplines. There is a reflective discussion going on whether memetics is a real science, or just a conceptual framework (e.g. Edmonds 2003)[2]. Dawkins himself utters a warning about foolish use of analogies in places where they would not be useful (Dawkins 1986). There really may be the danger of stretching the parallel between gene and meme a little too far, since e.g. defining what is an unit meme and finding examples of such has not been an easy task. Also the central role of cross-breeding and the Lamarckian nature of memetic evolution process are clearly different from genetics.

Generalized Darwinian process is capable of bootstrapping quality from scratch.

Nevertheless, there are such striking similarities between biological and cultural evolution processes that it is worthwhile to have a closer look at them. I think that it might be useful to replace the concept of meme in some cases e.g. with *theme* to enhance the general usability of this great conceptual framework, and e.g. to link it with the theory of Communities of Practice.

The basic assumptions behind memetic models are summarized by Calvin (1997)[3], who defines the essential conditions for a Generalized Darwinian process, which is capable of 'bootstrapping quality from scratch', i.e. to create complex design from simpler structures. The essential six conditions of Calvin are:

[2] http://jom-emit.cfpm.org/2002/vol6/edmonds_b_letter.html

[3] http://jom-emit.cfpm.org/1997/vol1/calvin_wh.html

1. *There must be a pattern involved.*

2. *The pattern must be copied somehow* (indeed, that which is copied may serve to define the pattern). (Together, 1 and 2 are the minimum replicable unit - so, in a sense, we could reduce six essentials to five. But I'm splitting rather than lumping here because so many "sparse Darwinian" processes exhibit a *pattern* without *replication*.)

3. *Variant patterns must sometimes be produced by chance* - though it need not be purely random, as another process could well bias the directionality of the small sidesteps that result. Superpositions and recombinations will also suffice.

4. *The pattern and its variant must compete with one another for occupation of a limited work space.* For example, bluegrass and crab grass compete for back yards. *Limited* means the workspace forces choices, unlike a wide-open niche with enough resources for all to survive. Observe that we're now talking about *populations* of a pattern, not one at a time.

5. *The competition is biased by a multifaceted environment:* for example, how often the grass is watered, cut, fertilized, and frozen, giving one pattern more of the lawn than another. That's Darwin's **natural selection**.

6. *New variants always preferentially occur around the more successful of the current patterns.* In biology, there is a skewed survival to reproductive maturity (environmental selection is mostly juvenile mortality) or a skewed distribution of those adults who successfully mate (sexual selection). This what Darwin later called an **inheritance principle**. Variations are not just random jumps from some standard starting position; rather, they are usually little sidesteps from a pretty-good solution (most variants are worse than a parent, but a few may be even better, and become the preferred source of further variants).

With Table 2, I would like to point out the intuitive appeal of evolutionary models as explanation of knowledge generation. I have collected some examples of processes, where I think that knowledge is generated (from scratch) through a process that fits quite well to the above definition of generalized Darwinism.

Process	*Replicator*	*Vehicle*	*Variation*	*Limited work space*	*Selection factors in the environment*
1.Biological evolution	Gene	Individual of a species	Combination, Mutation	Ecological niche	Probability of finding a partner, fertility, survival of offspring
2. Culture evolution (according to memetic theory)	Meme	A person	New ideas, modification, misquoting	A person's mind capacity	Easiness of meme replication, remembering and proliferation
2a. Democracy	Political agenda	Voter	new ideas, modification through debate and experience	Total number of votes available	personality of proponents, the agenda's match with the interests of the voters money available
2b. Science	Scientific theory	Publications	new ideas, modification through critique	Approval and attention of science community	Capability to explain/predict data, elegance, fit with existing results
3. Business	Business concept	Company	Strategic changes and innovations	Markets (=money of customers and investors)	Customer value, price competitiveness

Table 2. Examples of generalized Darwinian processes

Systems Intelligence and Darwin

Let us take the six essentials of a Generalized Darwinian Process of Calvin (1997) and look at them through Systems Intelligence glasses. It seems that the essentials of the evolution coincide with a few of the essentials in Systems Intelligence. I would interpret and combine them in the following way:

1. *There must be a pattern involved.* - We are talking about thought patterns that are or at least could be shared between individuals. Such patterns are ideas, valuations of things, beliefs, terms to be used, concepts, mental models, etc. These are the raw material of any intelligent activity, individual or shared.

2. *The pattern must be copied somehow* – Communicating is essentially copying thought patterns, more or less faithfully. Systems Intelligent practices like talking same

language, sharing ideas and feelings, listening to others, appreciating the viewpoints of others all improve the copying of thought patterns.

3. *Variant patterns must sometimes be produced by chance* – Combining of the ideas of different individuals - the cross breeding - is an important generator of variety. So are unexpected systemic interventions, openness to fresh viewpoints, and conscious search for higher order change opportunities and multiple opportunities. Systems Intelligence stimulates the production of variant thought patterns.

4. *The pattern and its variant must compete with one another for occupation of a limited work space.* This is not explicitly a Systems Intelligence item, but whether we want or not, the limitations are always there; Any single person's capacity to consciously focus on several thought patterns simultaneously is after all limited. This forces us always to do selections.

5. *The competition is biased by a multifaceted environment:* When selecting, which thought patterns will live and which will be omitted, the value concepts like Good Life, Interest of the Whole System, and the forming of Shared Vision of the community will be favoured. That the selection criteria themselves are subject to evolution, adds a 'double evolution' dimension that increases the unpredictability of the process.

6. *New variants always preferentially occur around the more successful of the current patterns.* The idea of positive feedback that leads to the explosion of creativity is one of the essentials of Systems Intelligence concept: Successful joint innovation in a proper communication atmosphere produces enthusiasm and trust that spur innovation. Biological evolution sometimes produces similar explosions. Dawkins (1986) gives an example of such positive feedback dynamics by explaining the evolution of peacock's fan.

Could it be that Systems Intelligence is essentially about creating and maintaining environments and circumstances, where the evolutionary knowledge creation process is amplified and accelerated?

Systems Intelligence means favorable conditions for evolutionary knowledge generation.

One important question needs still to be addressed: Is the evolution, biological or memetic, really working towards a better world or only towards better fit of biota or knowledge with environment? Is a bird better than a fish? Is a tiger better than a sable tooth cat? This question could be approached by noticing that all human concepts of good and bad are parts of internal models of knowledge systems, i.e. individuals or communities. They have presumably been generated by memetic evolution process, and are subject to constant competition themselves for better fit with the world where they exist. Competence of political, ethical and ideological systems about the minds of people is a manifestation of this process. If one does not claim to possess the absolute and final truth, the only possible fixed definition for *better* would be 'better fit with the environment'. So yes, a bird is better than a fish in the air. A fish is better than a bird under water. A tiger is better than a sable tooth cat in this world. A prevalent ideology is better than its predecessors, and worse than the sprouting one that will replace it in the future.

Final remark

Systems Intelligence is defined to be intelligent behaviour in the context of complex systems involving interaction and feedback (Saarinen and Hämäläinen 2004). A central part of the concept of systems intelligence is the understanding of the role of oneself as part of knowledge systems. This is analogous with adequate, rich and flexible internal models about the surrounding system. The models are essential on all levels: the subconscious intuitional model helps to handle complexity in fast mode and the conscious articulated models help to understand and foresee the dynamics of the system.

According to the hypotheses presented, the knowledge of evolves in human communities as a Darwinian process. From this viewpoint it is easy to see why Systems Intelligence is a good idea: It amplifies and speeds up the process that produces thoughts, ideas and meanings that are superior to their predecessors. We do not know in advance where evolutionary process leads, but we know two things: it leads to better and better forms and THERE IS NO UPPER LIMIT!

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Chapter 7

Systems Intelligence in Mergers and Acquisitions – a Myth or Reality?

Satu Teerikangas

This article explores the concept of Systems Intelligence in the context of mergers and acquisitions. Throughout the article, we wonder what happened to the explosive potential for change that Systems Intelligence ultimately looks for, when looking at the example of mergers and acquisitions? In so doing, we argue that the successful management of mergers and acquisitions requires Systems Intelligence in terms of 1) taking a holistic view of the phenomenon, 2) accepting that minor changes and acts can have breakthrough consequences, 3) understanding the power of our underlying mental models in guiding our action, 4) the importance of our ability to reframe in novel situations and systems and 5) the need for Systems Intelligence at the levels of individuals and organizations. We conclude by arguing that a Systems Intelligent organization has the drive to utilize the potential for an explosive future that is provided by the combination of two previously separate organizations in the context of mergers or acquisitions.

Introduction

What makes mergers and acquisitions (M&A) succeed? And why do we keep on reading about either dismal failures or difficulties in the clashing of cultures, as in the case of Daimler-Chrysler? Despite the huge increase in the amount of mergers and acquisitions over the last two decades and the knowledge existing on the topic, many deals still seem to be going wrong.

Reading through the basic tenets of Systems Intelligence in Saarinen et al. (2004a, 2004b), something struck me. Indeed, whilst the themes introduced by Systems Intelligence seemed important to the success of mergers and acquisitions and today's organizational life in general, the passion, excitement and opportunity for personal and organizational elevation and expansion advocated by the notion of Systems Intelligence seemed to be lacking in at least the mergers and acquisitions experienced and studied by the author. In other words, whilst mergers and acquisitions might be termed "successful", none in my experience came even close to what was termed "breakthrough thinking" or "large-scale changes through the means of minor initiatives".

Indeed, how often does one hear of organizations being truly excited at having being merged or acquired?

However, many of the themes introduced by Systems Intelligence, such as holistic thinking, seeing and leveraging hidden systems, the notion of mental models and the ability to reframe seemed to be particularly salient in expressing the implicit dynamics that seem to explain why many mergers and acquisitions go wrong. With these questions and observations in mind, we propose in this article to expand further on the notion of Systems Intelligence in the context of mergers and acquisitions. We hope that by so doing, the hidden explosive potential in mergers and acquisitions be unearthed and new ways of seeing just why they go wrong and how they could succeed better be identified.

Systems Intelligence in the form proposed here has been elaborated by Saarinen et al. (2004a, 2004b) as well as the contributions in Hämäläinen and Saarinen (2004a, 2004b). Whilst drawing from ideas dear to Systems Thinking (e.g. Ackoff 1999, Jackson 2000), such as "the whole is more important than the parts", it moves further toward a more actor-based and action-oriented approach. In other words, it does not contend in understanding systems from a holistic perspective, it seeks to provide practical steps for any individual in gradually learning to live in our complex world, full of systems, some explicit, some implicit, and for individuals to become "system-free" instead of becoming prisoners of the systems they live in. Indeed, the basic tenet behind Systems Intelligence is that we are all part of many systems, though we are most often not aware of them. Thus, instead of understanding the implicit ways in which the systems (e.g. family, society, educational system, workplace, societal / national culture, religion) we live in mould our ways, choices and behaviors, actually narrowing down our opportunities for both personal growth and each system's improvement, most of us end up being "System Prisoners", engaged in "System Dictatorships" (Saarinen et al. 2004b).

How often does one hear of organizations truly excited about having been merged or acquired?

In this sense, Systems Intelligence is a call for individuals to become more aware of the mental models guiding their behavior and their environment and thus become readier to make initiatives and moves that from the System Dictatorship perspective would have sounded counter-intuitive, but that actually enable both the actor and / or the system to reach new limits. Breakthrough thinking through small-scale change or action is thus another feature dear to Systems Intelligence. We begin to see how the ultimate aim guiding Systems Intelligence is a moral one – the improvement of the human condition and individual's everyday lives. Habits and traditions as such would be harmless were it not for the fact that they have the tendency to provide a set route instead of letting individuals chose the route that suits them and the situation at stake best. Having become prisoners in System Dictatorships, it becomes difficult not only to find a way out, but also to be innovative enough to come up with new exciting ideas as to how to live one's life or how to improve societal or organizational life.

The interest in using the example of mergers and acquisitions as a means of illustrating both the potential and the challenge of Systems Intelligence has two key drivers. Firstly, mergers and acquisitions have become a key contemporary corporate mania. They provide the platform for growth, expansion and learning that top managers are greedy of. Setting aside the often euphoric feelings accompanying the announcement of such deals, most press releases fail to reveal the less encouraging truth: hardly half of these ventures ever end up reporting success. So we are all left with the question – what's the problem? The dismal failure rates of mergers and acquisitions speak words of the challenge in making them work. It seems that mergers and acquisitions

represent today's executives with a challenge that is too complex and multi-faceted to grasp with ease. Whilst financial calculations about the expected profitability of a merger might be computable and understandable, it is the actual implementation of post-merger change and integration measures where difficulties begin. The post-merger change phase brings together people from different organizations that gradually have to learn to work together. This means different people and personalities, different organizational affiliations and habits, but also different national and regional cultural backgrounds. Behind the logic and "ease" of financial evaluation comes the reality of integrating people and organizations. It is often the difficulty of human and organizational integration that is a key challenge in mergers and acquisitions. Setting both of these in a cross-border setting, where organizational and national affiliations and behaviors differ from one's own, an additional source of difficulty is created. Existing research results support these arguments. Research into the challenges involved in mergers and acquisitions has shown that as much as the early phases regarding the strategic decision to buy, partner selection and negotiations show signs of challenges, the post-deal implementation process seems to be even more difficult (Haspeslagh and Jemison 1991, Cartwright and Cooper 1993). The international context of today's inter-organizational transactions provides an additional dimension of challenge stemming from the cultural diversity of the partners engaged in the venture (e.g. Sales and Mirvis 1984, Buono et al. 1985, Nahavandi and Malekzadeh 1988, Buono and Bowditch 1989, Olie 1990, 1994, Datta 1991, Chatterjee et al. 1992, Cartwright and Cooper 1993, 1996, David and Singh 1994, Morosini and Singh 1994, Morosini 1998).

Behind the logic and "ease" of financial evaluation comes the reality of integrating people and organizations.

This brings us to the second reason why mergers and acquisitions are an intriguing example for Systems Intelligence. The merging of two previously separate organizations provides a setting and a mirror, where not only the Systems Intelligent behavior of the parties involved can be assessed, but also reasons as to why they do not engage in Systems Intelligent behavior become apparent. It is a setting, where the two parties are faced with a novel situation, endowed with potential for both learning and explosive change. Moreover, it is a situation where the morale and behavior of especially the buying firm is at stake, as in order to be able not only to report successful figures years after the deal but also explosive and positive change, behavior respectful of the newly-acquired company is essential. We feel, thus, that it is an example that fits well with the moral aim of Systems Intelligence – the improvement of individuals' and organizations' lives.

In this article, we argue that a Systems Intelligent approach would enable organizations to explore the full potential inherent in merging two organizations.

Throughout the article, we will proceed to a presentation of those themes in Systems Intelligence that seemed most salient in highlighting the challenges and explosive opportunities inherent in mergers and acquisitions. In so doing, the article focuses on five main themes within Systems Intelligence. For each theme, subchapters are provided for illustrative purposes. We will begin by looking at the need to take a holistic perspective in order to succeed in the merging of two organizations. Thereon, we will pause to look at how minor changes do impact today's mergers and acquisitions, and why opportunities for major breakthroughs are more often than not left unexploited. In a third part of this article, we will move on to looking at mental models and their powerful impact on guiding our implicit behavior. Fourth, we will show the importance of reframing. Finally, in a fifth part of this article, we will see how the successful implementation of mergers and acquisitions requires Systems Intelligence at both individual and organizational levels. In doing so, we realize that Systems Intelligent behavior is not only a key to making

mergers and acquisitions work but also a key to making them an arena of explosive renewal and change, precisely what seemed to be lacking from our everyday experience. Section six concludes.

We note that the article does not intend to provide a thorough overview of the merger and acquisition phenomenon. Rather, it uses mergers and acquisitions as an example to both illustrate and illuminate the concept of Systems Intelligence as well as its applicability in today's organizational life. Thus, throughout the article, examples are provided as a means of highlighting the most interesting examples instead of attempting to provide an all-exhaustive overview of the challenges involved in mergers and acquisitions.

The experiences related in this article draw from both the researcher's PhD research and her personal experience of living through a global merger. In the context of the PhD research project made at Helsinki University of Technology, Institute of Strategy and International Business in 1998-1999 and 2001-2004, four Finnish multinationals and a total of eight of their mergers or acquisitions have been studied. Each studied merger or acquisition was treated as a case. The analysis of the results is ongoing. The current paper draws from earlier insights in Teerikangas (1999), Teerikangas and Hawk (2002), Teerikangas and Laamanen (2002), Teerikangas and Véry (2003), as well as case per case analyses that detail the progress of change separately in each of the cases studied. An overview of results will be published in the researcher's PhD in 2005. The aim of the research project has been to understand how to successfully manage the inter-organizational change process following mergers and acquisitions in a cross-border context. Each merger or acquisition has been treated as a case and a grounded theory – based inductive research approach has been undertaken. In-depth open-ended interviews were carried out with staff, middle and top managers from each of the acquired and buying firms. For each case, a minimum of 10 and a maximum of 30 interviews were made, totaling 140 interviews. Of the studied mergers and acquisitions, one was a domestic acquisition in Finland, five were cross-border acquisitions in France, Germany, Denmark, the UK and the USA respectively, and two were cross-border mergers in France and Germany.

By taking a one-sided or too focused a view when involved in mergers and acquisitions, one is unlikely to succeed.

The author's personal experience relates to the intra-firm merging of formerly domestic and regionally based operations into a globally integrated organization in the context of a European multinational. The experience of uncertainty, search for cues, rising levels of anxiety and frustration among colleagues resonate well with the experiences of the interviewees. We find that where mergers and acquisitions might be today's corporate mania, in practice, for employees they more often than not are hard to live through. In such a context, thinking of opportunities for growth or radical change toward the positive remain illusions from an alternative reality. In this article, we argue that a Systems Intelligent approach would enable organizations to explore the full potential inherent in the merging of two organizations, and thus to truly succeed in making them work.

Before proceeding on, we note that the paper uses a "we" form, as ultimately, the results presented in the paper are a combination of all interviewees' contributions and the researcher's insights developed along the research project. In other words, the paper would not appear here as it does without the interesting and elevating dialogues held with the persons interviewed in the cadre of this research project. The researcher remains deeply indebted to each interviewee's individual contributions, characterized by a great amount of wisdom, experience, personal insights and openness to talk about their experiences.

The Importance of Holism

We begin our exploration of Systems Intelligence and its illustration in the context of mergers and acquisitions with the argument that managers involved in them need to take a holistic view in order for the merger or acquisition to succeed, instead of relying on a one-sided or too focused view. Successful examples of mergers and acquisitions show that their managers have been able to understand and blend in the multiplicity of perspectives relevant to make their decisions. In other words, they have been able to understand the types of systems (and System Prisons) guiding the merging activity by taking a systemic and holistic view.

In this and the following chapters, we will make an exploration into the types of systems involved in the merging of organizations. However, as we will see later in this article, Systems Intelligence calls for more than a holistic view. Thus, engaging in a thorough understanding of the systems involved is a first step toward being able to take action within and toward these systems. This is why we begin this article by exploring the holistic view in mergers and acquisitions, whilst realizing that ultimately, success requires even more.

In short, the search for "holistic and expansive" thinking as compared to "reductionistic" thinking has been the claim behind Systems Thinking (see e.g. Ackoff 1999). Whilst in its current form, we refer to authors from the 20th century, the ideas behind Systems Thinking can also be traced back as far as both Greek and early Eastern philosophers. Whilst they were somewhat forgotten in the years of Enlightenment and the birth of modern science, Systems Thinking was found again at the end of the 19th century, as it offered a scientific worldview that stood in contrast to the prevailing Newtonian paradigm. It evolved in response to a concern in natural sciences, including physics and especially biology, that the Newtonian scientific paradigm did not provide sufficient means for understanding living phenomena. Problems in living systems tended to be holistic, and not open to a reductionistic view only. Systems that would combine into greater systems and not be reducible into parts gradually became an idea that emerged in the natural sciences and then leaked into other scientific arenas, e.g. the social sciences (see e.g. Burrell and Morgan 1979).

Successful M&A require holistic thinking, but it is not enough.

The key tenet of Systems Thinking is how best to view a system as a whole that is interacting with its environment, and consists of a set of complex, interrelated parts and subsystems. Coupled to this is the need to avoid seeing a system only as an additive relationship, where the whole is greater than the sum of its parts, but as a whole where the parts are richly connected. Systems research wants to remain interdisciplinary in nature in order to gain this perspective. In the following, we will proceed to a chapter-by-chapter overview of three areas in mergers and acquisitions, where we feel a holistic approach is particularly conducive to success.

Holism through a Process Perspective to M&A

In the realm of mergers and acquisitions, the search for a holistic view brings us in a first phase to consider the merger and acquisition phenomenon as a process (as introduced by Haspeslagh and Jemison 1991), comprising of two interrelated parts, the evaluation and integration (or post-deal/merger implementation) phases. Challenges incurred in the integration phase can often be traced back to the evaluation phase.

In the examples of mergers and acquisitions studied by the author, there seemed to be a constant overshadowing of organizational evaluation to the profit of financial evaluation. In other words,

little else than financial figures mattered. Whilst their importance should not be under-estimated, the findings consistently showed that the most difficult and surprising aspects of the post-merger phase revolved around issues that had been overlooked in the evaluation period.

For example, difficulties arose e.g. as to the actual status of research projects, new project pipeline, and challenges related to project management in the research and development function. As they had not been foreseen in the evaluation phase, they became aspects to deal with, and difficult ones in the post-deal era. As such, the lacking new product pipeline meant in one case that the short-term earnings from the unit were to be significantly lower than expected. In another case, the difficult project organization meant years of wasted investments into a research project, whose parties did not get along for historical reasons.

> "We knew one side of the company well, but not the side that they had acquired some years earlier. The consequence of this being that our understanding of that side of the business, as well as its integration has been much more difficult than for the side we knew better upfront. This also resulted in positive news: from the part we knew less at the beginning we ultimately gained our today's most respected asset on which we are basing our current business activities. We didn't recognize this at the time." (Finnish interviewee – buying firm)

> *"The problem in the two-site two-country new product development project was seen during due diligence, but not in its full magnitude. It was seen that the problem resulted from the owner himself, but we realized later that it had deeper roots that had spread across the organizations in their years of working together." (Finnish interviewee – buying firm)*

Likewise, where the analysis of intangible sides of the organization was made well, the managers were able to take the right measures in the post-acquisition phase and focus on areas of potential difficulties. For example, by understanding the importance of the founder-owner to the small company's culture and leadership style, the buying firm ensured that they sent an experienced leader of their own to head the operations until a local leader was found. They wanted to avoid the creation of a leadership vacuum and also to ensure that the new unit gradually moves away from its patriarchal leadership style to one of greater responsibility taking and transparency.

This calls into question the mental models guiding today's organizations, where only aspects directly traceable to financial performance are accounted for.

Aspects that were left without consideration in the evaluation phase often seemed to be ones that were difficult to trace back to business plans or company performance. Thus e.g. all the intangibles and human elements are easily left without notice. This does not mean that they do not have an impact on the forthcoming integration. Quite on the contrary, their influence cannot be maneuvered away. As long as they remain unseen, they will continue to impact the merging activity negatively and thus ultimately also the business performance of the organizations.

This calls into question the mental models guiding today's organizations, where only aspects directly traceable to financial performance are accounted for. It seems that our very own mental managerial models and performance measures are keeping us away from a more holistic understanding of organizations, one including all aspects influencing organizational behavior and ultimately firm performance. Are we engaged in a System Dictatorship, where by only seeing some part of the pie we are taking away from ourselves the possibility of both increased overall performance and well-being that we would gain if we were able to see the full pie?

Holism through a Long-Term Historical and Future Perspective to M&A

A second arena illustrating the need for a holistic approach in looking at mergers and acquisitions is the historical and evolutionary view, i.e. ensuring that the successful management of mergers and acquisitions also draws on an understanding of the organizations' histories, cultures and prior affiliations. Indeed, whilst the merger-related work might begin at the time of due diligence, the way both organizations will react to the deal and post-deal changes will depend on their mutual pre-deal relationship as well as both companies' individual histories and cultures. We are not dealing with a once-off project, but rather with a project that has roots in both the recent and the more distant histories of both the buying and acquired companies and a project that will not end a year from the deal, but that has long-term consequences on both participating organizations.

... we are not dealing with a once-off project, over in either 100 days or a year after the deal.

To take an example, organizations that merge or acquire one another have often competed against one another for years, thus they rarely engage in the merger as "neutral parties". Instead, they begin their cooperation endowed with an existing relationship that can be of a competitive nature. In one of the cases studied, this resulted in the acquired firm's managers starting up a competing company on their own that today has become a significant competitor to the merged firm. Their allegiance toward their past was stronger than their willingness to be part of the new "Viking-Finnish" organization. In another example, the buying firm's top management team was so satisfied personally at their company having "won" the race and having been able to buy out their year-long competitor that the message from upper management remained for the initial years one of silent pride and satisfaction at having won the race. Thus, whilst middle management did their best to ensure that the acquired firm's staff was well incorporated into the organization, little mutual learning took place as long as top management kept to their "we won them – how proud we can be of ourselves" attitude. As long as a "hunting-style" mentality is prevalent in the buying firm, you cannot expect the target firm to be treated as an equal or a wanted partner. And as long as this happens, what is the expected level of well-being in the acquired firm?

> *"Acquisitions are like opium to management. Managers are greedy for increased returns, they are blinded by sales volumes, as the size of the company says words about the importance of the manager himself. Why? Well, you compete against your competitor for years. When you get the opportunity to buy them out, it is indeed very appealing, and it is very difficult to say no. In a way it is the last step in extinguishing your dearest competitor. The greed to extinguish your competitor as well as the opium-greed of management together explain why many mergers fail. You go into a merger for the afore-mentioned reasons, not for the sincere interest of making the best of the deal and wanting to cooperate." (Finnish interviewee– buying firm)*

Also, we are not dealing with a once-off project, over in either 100 days or a year after the deal. Lasting change and integration in terms of behaviors, identity or cultural change will take years, or even decades to accomplish. Whilst textbooks might suggest taking a milestone approach e.g. at 30, 100, 300 day intervals, this should not lead us to conclude that the integration is over after this period. In contrast, the case studies seemed to point toward two integration phases, and thus two integration "time zones". The first one refers to the immediate activities taking place after the deal, the so-called integration measures. These might relate to administrational changes such as changing letterheads and company flags, technical changes such as changing IT and email systems or to greater changes such as setting up a new commercial organization or streamlining

production. Often in the first phase after the deal, only the most superficial and explicit changes can be made.

However, the pain of change does not end there. In a second, long-term phase covering several years after the deal, the acquired company gradually learns its ways in the new company, gradually affiliating itself with the new company identity. Also, more important changes, e.g. with regard to streamlining production or investments will take place once the initial excitement of post-deal aftermath is over. Respecting the long duration of integration change is required if companies want to ensure that units that they comprise of are to some extent in line with the organization's way of working, culture and identity. Otherwise, the company might consist of different units with different backgrounds and work habits, thus providing a multi-faceted and distorted face toward the customer, instead of a unified one. The case studies showed how it takes several years before any unit or company forgets its former company identification and is ready to take on the new company's identity. The same holds for change in organizational behavior and culture. This is exemplified by a Finnish manager's comment from an acquisition of a company with approx. 130 staff.

> "Whilst we initiated changes in the acquired company's organizational culture immediately after the deal, still now, four years on, these changes remain underway and are by no means over." (Finnish manager – buying firm)

Holism by Understanding Differing Change Requirements

A third example of holism in mergers and acquisitions is provided next. We seek to understand how the participating organizations differ with regard to the extent of change endured by both parties in the post-deal era. Only by understanding the differences and similarities between the merging parties will the potential areas of synergies and conflicts be foreseen. In doing this exercise, it seems important to focus also on the more intangible areas of similarities and differences between the firms, including their organizational histories, cultures and national affiliations instead of only looking at organizational structures and strategies. Moreover, it seemed appropriate to consider also unit-level differences instead of assuming the whole organization to look alike globally. This seems especially crucial in today's organizations, consisting of units that have either been set up or acquired at different periods in time and thus might have fundamentally different *modus operandi*.

In Teerikangas and Laamanen (2002), we found that the extent of post-deal change will depend on the post-acquisition strategy, approach or regime chosen by the buying firm (i.e. the target state of post-acquisition change) *as well as* the extent of organizational differences between the two firms at the time of the deal. The most significant variable to dictate the degree of post-merger change is the post-acquisition strategy chosen (Olie 1994). In other words, will the acquired unit continue on an independent basis, or will it be fully merged into the existing operations of the buying firm? Based on three examples of acquisitions, we found that the extent of organizational differences and the post-merger strategy chosen will together dictate the *"integrative challenge"* in the merger or acquisition (Teerikangas and Laamanen, 2002). It seemed relevant to consider the need for post-deal change at both the level of the acquired firm as well as at the level of acquired units, as units might boast different backgrounds and organizations than the owning firm itself. Thus, differences between the buying and target firms were identified with regard to unit structures and cultures, organizational structures and cultures as well as national cultures. The aim in the integration in the studied cases was to have the new units functioning in line with the organizational structure and culture of the buying firm.

The analysis of the integration phase showed that areas where the acquired unit and the buying firm shared similarities were easy to integrate or even became factors speeding the integration work, whereas areas of difference provided the arena for post-acquisition change and thus areas of potential threat for the success of integration. Often, only the explicit differences, i.e. strategic and structural differences were identified by the buying firm early on. Differences in both organizational and national cultures took between months to years to recognize. In the meanwhile, the selected integration management approach might not have corresponded to the needs of each of the units. To take an example, this ultimately resulted in the acquired British unit's longer integration time, as the means of integrating the unit followed a Finnish logic and did not match the managerial needs of the unit. It took years after the integration for the Finnish buying firm to recognize how different the management style required for the British unit was and to adapt its approach accordingly.

We thus argue for the need to take a holistic view to identifying differences and similarities between buying and acquired firms and / or units. This means going beyond the tangible areas such as strategy and structure to also include the more intangible areas of differences between the firms, including organizational and national cultures. By so doing, the buying firm is more able to adapt its approach to the particular needs of the acquired firm / unit and avoid getting into years of misunderstandings stemming from its cultural myopia.

To conclude, we note how the examples we have looked at within our first theme in Systems Intelligence, namely holism, have aimed at illuminating different types of systemic behavior embedded in mergers and acquisitions. The examples we presented concerned:

1. Seeing mergers and acquisitions as a process from evaluation to integration;

2. In doing so, realizing that also the organizations' histories and pre-deal relationships are likely to influence the ease of cooperation and integration efforts, and how the implementation of change in mergers and acquisitions is ultimately a continuous process and not a once-off change that can then be forgotten,

3. Each deal will differ owing to the degree of change required and the extent of differences and similarities between the merging organizations, there is no "once-off" rulebook as to how to succeed in all cases.

Without taking a holistic and systemic perspective to the phenomenon, the buying firm is likely to fall into one of the above traps and miss out on the opportunity to create long-lasting positive change.

The Importance of Minor Changes and Acts

... at times success can be dependent on respectful behavior, e.g. shaking hands with shop floor staff ...

After looking at holism, achieving major breakthroughs through initially small-scale changes is the second key feature of Systems Intelligence that we focus on in this paper. In this and the next three chapters, we will elaborate on this particular feature in the context of mergers and acquisitions. In so doing, we will focus on two aspects of change. First, we will explore how small acts and the smallest behaviors can have large-scale impacts on the successful progress of mergers and acquisitions. We will show how at times success can be dependent on respectful behavior, e.g. shaking hands with shop floor staff. In a second stage, we

will question the reasons why so-called "break-through" changes rarely occur in mergers and acquisitions, and seek to provide answers to the lack of "excitement", "innovation" and "novel avenues" in the merging of organizations in today's corporate environment.

The example of mergers and acquisitions is an exquisite one, as total success in merging organizations requires a variety of skills. Besides the traditional business and technical skills, also human touch is needed in understanding the feelings of the acquired company before and after the deal, in understanding the background and culture of the acquired company, and in understanding how the buying firm's behavior impacts the way the merger is experienced in the acquired firm. Thus, we argue that in addition to requiring a holistic perspective for success, also the theme of small actions having a large-scale and long-term impact on organizations' well-being, performance and integration seems a particularly pertinent one to illustrate the dynamics of mergers and acquisitions.

Minor Changes and Acts - Managing the Employees' Mental State Prior to the Deal

A first example that we will look at in greater detail is the way small actions taken by the buying firm before the deal will impact the perceptions of staff in the acquired firm. A significant, and hidden dynamic inherent to the evaluation phase is the attitude that the acquired firm takes toward the deal and toward the buying firm. Earlier research has shown that this depends on the strength of the acquired firm's own culture as well as the perceived attractiveness of the buyer (Nahavandi and Malekzadeh 1988). The findings of this research further deepened these constructs. There seemed to be both an element of fear toward the deal as well as an element of attractiveness toward the buyer.

In terms of fear, firms that had already been acquired, and thus had experience with mergers and acquisitions generally reacted with less fear than firms that were acquired for the first time. Also, firms that clearly understood the reason why they were being sold, e.g. their owner retiring, took the news more calmly than in the case of a suddenly announced hostile takeover.

The attractiveness of the buyer was found to greatly depend on the way representatives of the buying firm behaved during the evaluation phase.

The attractiveness of the buyer is the perception made by staff in the acquired firm of the buying firm. This attractiveness can depend e.g. on the buying firm's national background. Thus for example European firms preferred European owners to e.g. American owners, who were not seen as the best possible buyer owing to their bad reputation as long-term owners. It can further depend on how well the buying firm is doing financially and how good a reputation it has in the industry. In this sense, Nokia would probably be the ideal owner choice for many firms in the industry as compared to smaller players that are not doing as well.

The attractiveness of the buyer was also found to depend on the way representatives of the buying firm behaved during the evaluation phase. Importantly, sound inter-personal relationships formed at the management level at this stage resulted in the integration phase in a good cooperation between the firms and an easier integration start. Whilst staff rarely gets the chance to meet the buying firm's representatives at this stage, they will use whatever information available to them to form their "informed" opinion on the potential buying firms and then begin rumoring about and debating the alternative buyers. Thus, the behavior and moves of the buying firm's due diligence and negotiations representatives will be under close scrutiny. The same will happen to

any official statements made by the buying firm. This is understandable human behavior given the uncertainty that the prospect of being bought by another firm represents. In the pre-deal months, employees dwell in feelings of anxiety and fear of the unknown, as the following quotes illustrate:

> *"You don't understand the dynamics in mergers well until you yourself have once lived through the agony of being acquired." (Finnish senior interviewee with M&A experience)*

> "But this new thing from Finland, who are they, what do they want, what will they do to us? There was worry about the future. The bottom line was that an alien takes our learning from over 100 years away and will shut everything down and shift operations to Finland. In fact, in reality the reverse has happened." (American interviewee describing feelings prior to the deal)

As a consequence, the buying firm can begin acting in a responsible way from its early relationships toward the target firm onward. Indeed, by realizing that every move it makes is a step forward in developing a lasting relationship based on trust and respect with its prospective future employees, the buying firm can begin winning over the hearts and minds of staff in the acquired unit. The first quote below exemplifies this type of behavior in a Finnish buying firm that took an approach based on warmth, empathy, caring and respect for the acquired firm's past and experience. As the same touch continued after the deal, we need not emphasize that the merger was a success thereafter as well. A more negative example is provided by the second quote below.

> *"Their focus in evaluation interviews was on understanding the people – how we behave, what are the staff's competencies, including their social competence - and on getting to know one another. We reached a good level of mutual understanding at this stage already." (Acquired firm's manager in Germany)*

> *"Our previous American owners seemed distant when coming to visit us. They didn't greet and shake hands with all employees they met when touring the site (as the tradition goes in France). We felt insulted. It seems that they didn't respect us." (French interviewee on feelings toward the previous American owner)*

The reactions of the acquired firm's staff toward the deal and the buyer can be summed up in terms of the mental state in which the acquired firm enters the deal. The greater their level of fear toward the deal and dislike toward the owner, the more cumbersome the early phases of integration will be from the perspective of staff satisfaction. Whilst mergers and acquisitions always induce an element of fear or uncertainty, the smaller this uncertainty is, the easier the start of the integration. In this sense, the buying firm begins its integration activities already in the evaluation stage through the impressions they make on the acquired firm's management. These impressions often cascade throughout the organization through rumors or management confidence and trust toward the deal.

Minor Changes and Acts - Managing the Employees' Mental State after the Deal

The same types of rules apply when we look at staff reactions to changes and integration activities in the post-deal implementation period. Figure 1 shows the uncertainty curve (as drawn by interviewees) for a factory that was acquired by a Finnish firm. After recovering from the

uncertainties regarding the deal itself, the site plunged a few times toward great uncertainty as it was hit with negative news related to closing of machines and layoffs.

The studied cases showed nicely how the staff's mental well-being and attitude toward the merger followed an uncertainty / motivation curve in times of change. Prior to the deal, there was a wealth of anxiety and worry. This decreased quite soon after the deal, as the new direction was set and post-merger change efforts were initiated. The greater the staff's confidence in the new future, the sooner their uncertainties wore off. The same trend continued in the years following the deal. All positive news regarding investments and growth signaled an increase in commitment and motivation, whereas negative news regarding layoffs, machine closures etc. marked periods of rising uncertainty.

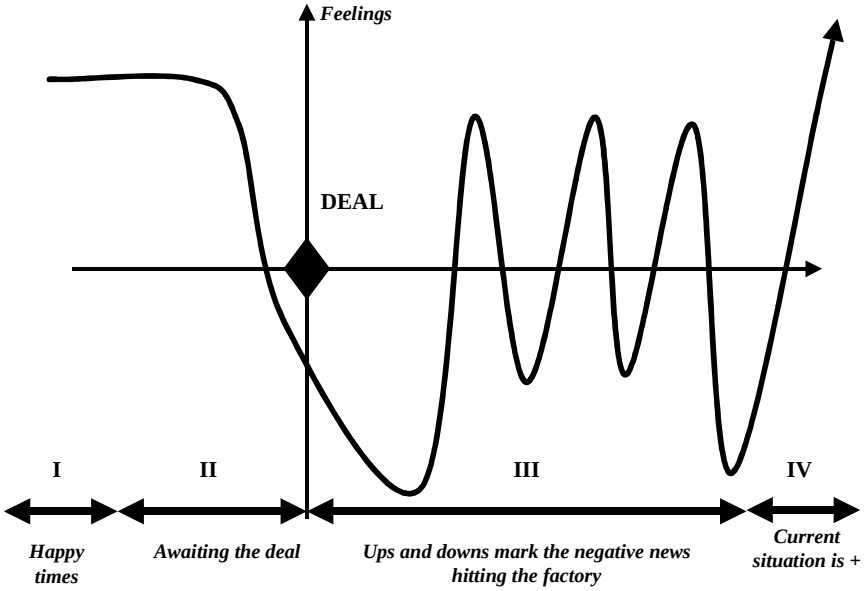

Figure 1. Example of the uncertainty / motivation curve at one of the studied factories. This is a summary of the curves as drawn by the local interviewees in 2003 when visiting the site.

The interest in looking at the level of uncertainty in the acquired or merged firms is that the level of uncertainty generally represents a good approximation of the mental well-being in the firm. The better the staff feels, the more likely they are to be motivated to work for the firm and focus on contributing to its development. However, high levels of anxiety and uncertainty are likely to drop down the atmosphere and take the staff's focus away from work to worrying about their personal future and even to gossiping about the new owner. Taking this approach, we can argue that the primary task of integration management becomes not only the successful implementation of post-merger changes but in so doing ensuring the well-being of staff in the years following the deal.

...good integration management was characterized by Systems Intelligence.

In determining the outcome of a merger or acquisition, the triangle formed by the staff's well-being, the way post-merger change is managed and the extent of post-merger change required (or the integrative challenge) will prove significant, in that one does not succeed without the other. Examples studied in the research project show that successful examples succeed owing to particular attention to the post-merger phase. Whilst this sounds like a cliché, deep down it is not. Integration management means that the integration phase is well taken care of. Successful acquirers were aware of the basic elements of successful integration management.

Taking quick action after the deal instead of waiting for months, if not a year, prior to taking action is a means of ensuring that the acquired unit does not dwell in rising uncertainty. Moreover, acquired units and firms that were granted a clear vision for their future seemed more satisfied than ones that were left unaware of their future. Likewise, good integration management is seen in communicating the changes taking place toward staff of the acquired company, instead of leaving them to come up with rumors regarding their future by themselves.

Ultimately, good integration management was characterized by components of Systems Intelligence. The analysis of one successful case enabled to show that the implicit integration philosophy taken by the buying firm consisted of values such as openness, respect for the other, trusting and caring, changing together, keeping feet on the ground by reminding staff that integration is not hype but normal work. On the contrary, a haughty, disrespectful approach is not likely to get the sympathies of the acquired firm's staff. This is where it gets interesting. Few firms deliberately want to be nasty to the acquired firm. However, as the acquired firm often is a firm against which one has competed for years, if not decades, it does happen that at least the ego of some top or senior managers cannot help "showing off" in the integration phase. This can be seen e.g. through a strong not-invented-here syndrome disabling the usage of the acquired firm's technology to ensure improved solutions, given that "our solutions have always been better". Also, the acquired firm might not be allowed to use its former brand, as the buying firm wants thus to show how it has "vanquished the competitor for good". Whilst these might appear to be small things, to the acquired firm these are continuous signs of disrespect. In other words, all action by the buying firm is constantly monitored by the acquired firm's representatives. Thus, in a merger or acquisition, disrespectful, "superior-like" behavior is not tolerated and it will not enable ensuring the motivation of staff. Moreover, these human acts can lead to a decrease in sales and thus a decrease in the potential for value creation through the merger or acquisition. This all becomes all the more difficult in cross-border situations, where the buying firm meets a firm from another country, where the same rules of management might not apply. The need for a respectful approach becomes all the more significant.

Minor Changes and Acts – Achieving Cultural Change

In our third example of small actions leading to larger-scale change, we will look at how change in organizational cultures is achieved. In the studied cases, changes induced to the acquired units concerned at least "superficial changes" such as its office layout, visual identity, reporting style, but also more "in-depth changes" concerning production efficiency, sales internationalization, the strengthening of sales support functions such as marketing and technical product service, new approaches used in research and development and changes in expected management style and behavior. Such changes are paralleled by a greater presence of the buying firm's management as well as by contacts between the two firms at different levels of hierarchy. In addition, the acquired firm might want to communicate its organizational values through a set campaign.

We found that any change and any contact with the buying firm represented not only an operational or technical change or contact, but a *cultural* change, and as such helped to bring forward a gradual change in mentalities. The studied cases showed that all of the above-identified changes gradually molded and changed the acquired firm's way of operating, and thus changed each unit's organizational culture. In other words, cultural change does not take place through the sole medium of "organizational culture" programs, but through the integrality of all changes induced, each of which communicates its bit of the expected organizational behavior and culture.

Whilst the operational integration measures provide changes to the way each function is used to working, the change of leadership as well as exchanges with the buying firm help to promote and understand a different management style and prevailing organizational behavior. Thus, departments or units that are most in touch with either the integration leader or the buying firm's representatives in general are seen to change faster than those where the majority of staff is not in contact with the outside world. In any case, this does not mean a one-month or a one-year change, but rather a continuous process fuelled by change, interaction and a set direction. The studied cases showed how cultural change does not only take place through organizational culture or value programs per se but also through the practical changes that are made throughout the organization, from office layout changes to changes in manufacturing.

Cultural change that has been implemented in a way that is felt sensitive in the acquired firm seems to gradually result in a stronger identification and thus motivation toward working for the buying firm. Thus, whilst it seems optimistic and unrealistic to expect a total shift in organizational behavior given the imprints that time has left in each member's mind, the gradual changes will over time move the acquired firm toward a new organizational culture and a new organizational identity. The integrative challenge becomes one of successfully changing the mental mindset of the acquired firm. Again, we do not mean a once-off brutal change, but a natural, long-term change of mindset that naturally accompanies post-acquisition efforts, where the integration strategy involves post-deal changes.

Cultural change does not take place through the sole medium of "organizational culture" programs, but through the integrality of all changes induced, each of which communicates its bit of the expected organizational behavior and culture.

On the long-run, in the absence of a conscious building of organizational culture or identity (i.e. if there are no incentives for units to work toward a shared goal in a similar manner), the existence of different organizational cultures and different identities within a company can lead to conflicts between these units. In this sense, some degree of cultural change is positive as it avoids a longer-term problem of having a global organization with dispersed cultures and identities. We note that it is normal for each unit to have its own culture and an identification to the unit as well as to the parent. However, when the importance of this feeling grows and becomes a negative force within the whole company, difficulties are likely to ensue, as the organization does not work in one, but many directions.

Breakthroughs – Illusion or Reality in Mergers and Acquisitions?

In a fourth phase, before leaving the theme of change, we will pause to wonder where is *excitement* in mergers and acquisitions? Why is it lacking and why would most mergers and acquisitions not be characterized as platforms for breakthroughs. If we acknowledge that mergers and acquisitions represent complex systems that require to be treated as such, we get very close to understanding the keys to successful implementation of post-merger change. However, this is not enough to explain the logic of breakthroughs.

What is telling about the lacking of explosive change is the fact that even when judging the success of mergers and acquisitions, most executives and researchers are content with the phrase "well, they're doing ok." It seems that seeing the merger as an opportunity for renewal, exploration into new business areas and mutual learning is not there. It is enough, if the acquired

firm begins reporting good results and even better if after some years its staff behaves more or less like one is supposed to in this firm. Thus, the exploration of exciting new avenues as offered by the prospect of a merger is not even considered. It is outside our frame of mind, outside the mental models of buying firms.

Another characteristic lacking from the merger rhetoric is the notion of mutual learning. Whilst it sounds like a nice word, it is rarely used by executives involved in mergers and acquisitions. The quote below illustrates well a typical rejection mode as to the possibility of mutual learning – the buying firm simply feels itself "superior" to the acquired firm. The following quote further elaborates this theme by providing the example of a firm that suffered from a superiority complex through a "not invented here" syndrome. Whilst these behaviors are human and understandable, the business consequences are less so. Interviewees mentioned failed business opportunities, dissatisfied customers, missed product launches, only to mention a few.

> *"The guiding logic behind owning their technology was a defensive one. We buy out a competitor to keep out new ones. We didn't see a huge combination potential for our technologies. In fact, most of our engineers considered our products to be superior to theirs. So we have to admit that we haven't use their solutions in our new product development, instead, we have tried to offer their former customers our solutions." (Finnish interviewee – buying firm)*

> *"There is such a strong not-invented-here culture in our company. Basically, anything that is not created by our main research department is not considered for development." (Finnish interviewee – buying firm)*

To conclude, we find that today's mergers and acquisitions seem at best to reach as far as holistic thinking and thus ensuring the successful outcome of the merger. However, whilst the concept of learning from one another remains distant to most buying firms, we will still need quite a shift of mind until organizations would be ready to view mergers and acquisitions as something even more – as an opportunity for corporate renewal and radical business change. In the world of today's mergers and acquisitions, this indeed seems like an utopist idea, a dream. However, the idea does seem plausible when reading through the tenet of Systems Intelligence. This would seem to suggest that our daily lives, ways of doing and ways of seeing still have a road to go toward being Systems Intelligent. The next chapter will attempt to provide further clarification and more pointers as to how to explain this phenomenon. We will explore how our mental models impact the way we act, e.g. when faced with mergers and acquisitions.

On Mental Models

The existence of mental models guiding our ways of thinking and doing, and the ability to be able to see and possibly to reframe them are the next features of Systems Intelligence that we will touch upon in this paper. Indeed, until we have become aware of the models guiding our behavior, we remain prisoners of the systems we live in. Typical of such behavior is the way people categorize their lives according to societal expectations, e.g. "I need to study, then I work, then I get married, then I work more, then I get retired, …." Whilst there is nothing wrong with this kind of thinking in itself, what often frustrates people is the feeling that they lack opportunities to strike out of the model and be innovative, be it only

An organization's culture creates its own System Dictatorship, in that it becomes the implicit way of doing, the implicit mental model one is supposed to confine to in this organization.

with regard to small aspects. Systems Intelligence advocates for this type of change optimism, for the ability of stepping outside comfort zones typical to us, of seeing situations differently (reframing), and in so doing, creating opportunities for personal, organizational or societal change, renewal and improvement.

In the following chapters, we will approach the notion of mental models in mergers and acquisitions as follows. We will begin by looking at what types of mental models exist in organizations and what causes them. Thereon, we move on to showing the implicit ways in which mental models affect organizational behavior. In a third phase, we start seeing how in some sense, these models are System Prisons the organizations are locked into, models that limit their view of the world, and stagnate rather than advance their development. We further show how an organization's mental model guides it when it enters a merger. Instead of seeing the deal as an opportunity of moving out of its own prison, companies ensure that the acquired firm enters their own existing prison. This takes time, however, and in the meanwhile the organization exhibits a jungle of mental models that are rarely acknowledged or recognized officially. Given the wealth of implicit action taking place under the tip of the iceberg, we begin to get a glimpse at the powerful undercurrents in mergers and acquisitions. This is the focus of the fourth chapter on mental models, where we look at their stagnating impact on organizational change.

The ghosts of each unit's old ways live on and a myriad of mental models dance their way in the organizational jungle.

Unless organizations are able to see through their mental models and those of the companies they buy, they might lose out on many cues and thus end up taking the wrong approach toward the acquired firm. We claim that some degree of reframing is an essential feature of successful mergers and acquisitions. Reframing will be looked at once we have gone through the theme of mental models.

What Mental Models in Organizations?

In the domain of organizational life, mental models enter the picture to characterize our lives. Indeed, organizations typically become systems of thinking of their own, through the historical paths that they have undertaken, the types of traditions they have become used to, the types of owners and leaders they have grown under. Thus, organizations exhibit different cultures and mentalities. However, they are rarely totally aware of the models that they are carriers of. Whilst the trend today is to expose and advertise the values an organization aspires to publicly, the "real culture" of the organization is often something different. Thus, each firm has a culture, a spirit. However, this described culture or spirit differs from the explicit values the organization claims and aspires to. It seemed that understanding the "real" organizational culture of the firms participating in the studied mergers and acquisitions was more important than understanding their aspired values, or their "official organizational culture". This real culture included phenomena like "not invented here" – syndromes, i.e. both positive and negative characteristics about the organizations. There was often a distance between the stated and the actual values of the studied organizations.

Moreover, we should not consider organizational cultures as unitary elements, i.e. there is not one organizational culture in a company, but each unit has an organizational culture of its own. This is especially manifest in the case of companies that have grown through acquisitions. Each unit's and firm's organizational culture seemed to depend on its history, the business it has been in, the size of the company, the type of leader it has had, the ownership of the company, but also the

national cultural environment in which it has developed. Each unit's or firm's organizational culture is reflected in the management style in use, e.g. in terms of openness of communication and expectations of hierarchical behavior, but also in the way the organization has operated in its different functions, e.g. sales and marketing, production, research and development, the style of reporting it uses, the company's visual identity and the office layout.

It is often to counter the negative influence of having conflicting cultures in the organization that an official culture through aspired values is introduced. Despite the advertisement of the new official culture and its values, more often than not, these "unofficial cultures" (mental models of the past) of the firm's different units continue to live their own lives. Whilst the official message is to move toward the new age and the new way, old traditions do not die out instantly. Thus, looking behind the scenes, behaviors of a company's units worldwide will characterize each unit's prior organizational histories and experiences. Whilst one might tend to openness and flexibility, another one might have the tradition of building walls to be safe from attacks and external disturbance. The ghosts of each unit's old ways live on and a myriad of mental models dance their way in the organizational jungle.

If the presence of mental models is not seen or accounted for, they are let free to roam around, causing opportunities unseen and damage uncorrected.

This brief introduction served to show us how mental models guide the lives of organizations through the cultures they have developed and that they either explicitly or implicitly adhere to. In a large merger, the cultural challenge is likely to differ per unit, as each unit boasts its own unique mental model based on its history and traditions and changing the model will require change at both explicit and implicit levels of the organization.

The Danger of Mental Models Lies in Their Implicitness

Now that we have looked at how organizations create their own mental models and consist of many mental models, we begin to understand the continuous implicit impact that mental models have on the behaviors of firms and their employees. The danger with mental models stems from the fact that if (and often so) their presence is not seen or accounted for, they are let free to roam around, causing opportunities unseen and damage uncorrected.

The organization's mental model easily becomes a barrier to change, a force of stagnation, a force of hindrance.

A powerful example is provided by the impact of national cultures on managerial behavior and organizational cultures in global organizations. Indeed, in addition to organizational mental models, another layer of mental modeling is brought by the fact that organizations are not only carriers of their organizational lenses, but also of their respective national cultures (see e.g. Hall 1976, Trompenaars 1993, Lewis 1996, Adler 1997 and Hofstede 2001). As organizations are embedded and grow in national environments, they share to some extent elements of their surrounding national culture. Thus, by impacting organizational culture, national culture indirectly influences managerial behavior and the integration philosophy adopted by the buying firm. These differences become a challenge if they are not recognized.

The studied examples of mergers and acquisitions showed how strongly embedded in the Finnish tradition and culture the managerial styles and organizational cultures of the studied Finnish firms were. When acquiring abroad, the same slogans, management styles and expectations are often

automatically put upon the new foreign counterpart, without realizing that many of these ways and expectations are based on the Finnish mental model, e.g. Finnish buyers would typically try to implement managerial systems based on the notion of responsibility and delegation without follow-up, which is not typical in many other cultures. As long as the buying firm is not aware of the impact of its own background on its mental models, it might not realize that it cannot expect new staff and newly acquired units to immediately transfer to its ways of working. If it does not explain what it expects and why, it is not likely to get the response it wants, and hence the vicious circle of "why don't they work our way" or "they aren't efficient" begins. In a successful acquisition, the integration leader was able to explain his requirements and expectations to the staff, and also explain why change was needed. Once they understood the reasons guiding the new choices, they were more ready to comply.

> "We explained, for example, that during the times of the former owner, no attention to quality was made given that he was not interested in growth. As us, being the current owner, are interested in growth, this requires a mindset focused on improvements, e.g. in terms of quality." (Finnish interviewee)

For another, firms that have grown through acquisitions often tend to base the development of their "official culture" on the management style and culture in use in its earliest fortress, e.g. its first home country plant or office. This is the culture that they develop and begin to advertise to the newly-acquired units, e.g. "transparency and openness", "trusting one another", … However, in parallel to this official saga, we have to realize that not only are the official values target ones, but also that in the meantime the buying firm and its units each through their behavior portray their actual organizational cultures and mental models. Thus, whilst the official slogan might say "trust and transparency", the reality in action might look different.

Whilst the targeted values take years if not decades of mutual interaction to be implemented in the least, in the meantime we assist to the dance of the different units' mental models like unseen ghosts of the past that are actually not supposed to be there, but that are in practice quite difficult to remove or change. And the newly-acquired unit with its mental model only adds another piece to the jigsaw. We now begin to get a grasp at the implicit human and mental challenge in organizational life.

These examples served to show the danger within the implicitness of mental models. Regardless of whether they are seen or not, they have a continuous impact on organizational lives. Organizations can choose whether they opt to see them or not.

Mental Models as System Dictatorships

Having acknowledged the presence and implicit nature of mental models guiding organizational life, we can move on to seeing how in some way, each organization's culture also creates its own System Prison or System Dictatorship, in that it becomes the implicit way of doing, the implicit mental model one is supposed to confine to in this organization. Seen from this perspective, mergers and acquisitions would become opportunities for breaking free of both firms' existing System Prisons or mental models and taking a step toward the new, opportunities for reframing for both organizations. We are not surprised to see that this rarely takes place.

Instead, mergers and acquisitions are often marked with an approach strongly related to the buying firm's typical way of doing, as most of its managers are embedded in that culture or mental model. Whilst individual managers might act with their own flair and style, breaking away from the routine, it seems that the overall luggage that is transferred to the target firm, including

the new flags, the new reporting system, relations to higher bosses, are all marked with the buying firm's culture. In this sense, instead of opening themselves to mutual learning and the opportunity of breakthrough change, firms seem to lull back into the comfort zone of "making them look and act like we do."

Whilst it often is the official aim to ensure the integration of the new unit into the existing structures and ways of operating of the buying firm, it seems that the behavior of both parties is ultimately undermined and determined by their mental models and traditional ways of doing. Not only do both firms and individuals have difficulty breaking out of their own mental models, but also, it is difficult to see the surrounding mental models and their impact on the progress of their cooperation. Let us take a few examples to illustrate this point.

Making one's way in a merger or acquisition becomes like swimming on waters without seeing what lies under the water and understanding the currents that are influencing your way.

For one, it seems that the buying firm's behavior at both the evaluation and integration stages is strongly undermined by the organization's and the individual managers' mental models. In other words, the buying firm's approach and behavior in the evaluation stage says a lot about the prevailing management style in the buying firm. A company focused on financial management will focus on financial issues in the evaluation, whilst a company with a more humane culture will take organizational issues into account already at the evaluation stage. The approach taken will also be felt in the acquired firm. The resentful and haughty evaluation manager will be received differently from the humane and respectful one. Likewise, the acquired firm's cognition will, together with the approach taken by the buying firm, help to explain their reaction to the deal and toward the buyer.

Instead of opening themselves to mutual learning and the opportunity of breakthrough change, firms seem to lull back into the comfort zone of "making them look and act like we do."

Looking at the integration management measures taken by each buying firm, these seemed to represent each firm's "integration philosophy" behind the integration phase, consisting of themes or slogans used in the integration period, such as "both sides need to change", but more often than that, they consisted of the implicit values guiding their actions and behaviors in the integration phase. These could be personified to the integration leader as well as to the actual practiced organizational culture in the buying firms. For example, one buying firm's members explained that their firm's organizational culture was an informal and relaxed one with a non-hierarchical management style. Not surprisingly, the integration phase was characterized by these same themes, which were as such visible in the integration approach taken as well as the integration leader's management style.

We see that as firms are so embedded in their mental models, these become automatically and unconsciously transferred into their behaviors, as seen throughout the evaluation and integration processes in mergers and acquisitions. Thus, mergers and acquisitions become mirrors reflecting the mental models and behaviors of the participating organizations. If this is so, is there any place for mutual learning and breakthrough thinking or are we more concerned with the ongoing nurturing of the present model?

Mental Models Resist Change

Mental models in organizations also tend to have a slow-down impact in situations of novelty and change, e.g. during mergers and acquisitions. The impact of old ways of doing, old habits and the old organizational culture is seen in the natural resistance against change that takes place throughout the acquired organization. Thus, the existing mental model easily becomes a barrier to change toward the new one. It becomes a force of stagnation, a force of hindrance. In operations, this is seen in the resistance of the acquired organization's old ways of doing, e.g. in production or research and development. In changes related to expected behavior, resistance seems to stem from a mix of the target's organizational culture as well as its national culture. Thus, the ease of converting a German unit toward a more open and responsibilizing management style is a change both to the unit's culture but also to the traditional Germanic management style.

Until the change has been achieved, the mental model of the acquired firm continues to haunt and live on. The degree to which the resistance and impact of the old habits will be seen throughout post-acquisition times seems to depend on the approach and philosophy for integration adopted by the buying firm as well as the amount of contact with the buying firm. The greater the amount of contact, the faster the unit changes, and the faster also cultural resistance is countered. Also, the more respectful the integration philosophy, the less room will be provided for resistance. A disrespectful approach is likely to encounter greater and longer-term cultural resistance than a more respectful one.

To take an example, in one of the studied cases, the buying firm adopted a management style quite typical to Finnish companies, characterized by responsibilizing management, but also typical to its own organizational culture, characterized by a sensitive, relaxed and humane approach to work. Despite the changes that needed to be made in the acquired firm, cultural resistance did not take the lead given the sensitive integration philosophy and approach undertaken by the buying firm.

The significance of old mental models resisting and haunting is seen in companies that have made acquisitions over the years. Prior to the 1990s, the integration strategy followed by companies was one granting the acquired units independence of operations. In terms of organizational culture and company identification this means that a multinational that today boasts an official culture with values and slogans can in practice consist of a multitude of local identifications. For example, units that have for long been used to independence will not easily let go of it. In the meanwhile, the company might have launched a new organizational culture program. These new behaviors and values will not be accepted in a large organization overnight. The actual behavior in the company will be dictated by the habits that the formerly independent units are used to in their inter-unit cooperation. If a unit's culture means bullying others, so they will do, even to a recently acquired new unit. This happened in one of the cases, where the acquired company consisted of two previously merged local companies. This earlier merger had left both sides with a wealth of anger toward one another, so the new acquisition brought the opportunity for both sides to revenge against one another. It took the acquiring company some years until it saw the interpersonal dynamics taking place behind the scenes and until difficult persons were taken aside. This resulted in five difficult years for especially those factories that had been at the forefront of the fighting.

> *"There are many different cultures in our company. One way to look at them is to divide them along a timeline, as our company consists of companies acquired during different periods. Thus today, each of these companies is at a different stage in their integration work." (Finnish manager – buying firm)*

To conclude on mental models, it seems that instead of seeing mergers and acquisitions as opportunities for reframing and renewal, organizations end up shifting their own mental models onto the newly-acquired organization, and basically enlarging their System Prison to also the acquired firm's operations and employees. The System Prison is enlarged both in terms of the new organizational culture, but also in terms of the implicit national orientation guiding the organizational culture. In encountering the new model, the acquired firm's existing model puts up silent resistant for years, unless they are well taken care of. The danger in mental models stems from their implicit nature and the way they are embedded in our ways of doing and being, without us even realizing it. The challenge thus becomes one of being able to identify one's mental models and then being able to reframe them to the situation at hand. This is the topic of the next chapter.

The Ability to Reframe

Having recognized the power of mental models in undermining our actions, we can begin seeing the importance of the ability to reframe and to be able to see things from the other party's perspective. We will next proceed to providing examples to illustrate our point.

A first example relates to the fact that organizations often seemed at loss at how they will ultimately ensure the cultural integration of the acquired firms into their operations and organizational culture. Thus, whilst they were good at the explicit managerial actions, such as ensuring a production plant runs at the right speed, they were quite at loss at understanding how to manage the hidden organizational undercurrents. In other words, they had difficulties in seeing the mental models involved and understanding how to ensure that these would be able to live in harmony in the same organization. For this, they would have needed the ability to see both their own and the other party's mental models, and this in turn would have required the reframing of their own mental model and adapting their managerial approach to the situation at hand.

A second example concerns the need to take different national cultural orientations into account when buying a company abroad. Often the acquired firm's national environment and national culture force some degree of reframing and adapting to the new situation.

Third, reframing is particularly useful in the research and development function, where intercultural encounters are numerous if engineers are involved in cross-border project work. Where differences in mental models are not accounted for, misunderstandings and project delays might ensue. In one example, the integration phase of a research unit in the UK proved difficult until the buying firm realized it could not operate in the UK with the same management style as in Finland. The British engineers expected follow-up from the bosses, and were not receiving it. They were puzzled. In another example, two units tried for years to work on a joint project, laden historically with treason and jealousy. In difficult project meetings both parties tried to put the blame on cultural differences, whilst it was really in the already history-laden relationship between the two units. Cultural differences were an additional source of problems. These examples from the research function show that whilst cultural differences are present, they can be either a core source of problem or made to look like the core problem whilst the real issue is elsewhere.

Buying firms tend to engage acquired firms into their own "Systemic Prisons".

Fourth, reframing is also needed when going into foreign markets. Whilst this seems straightforward, in reality it is not often so. A good example is provided by cases of small firms being acquired for the purposes of internationalizing their sales presence. Such firms have to

change from being a domestic to an international player. This requires a shift of mindset, as the rules played on the home market do not apply abroad. The company has to evolve to understand other markets instead of treating them as "deviations from the norm" or treating their own sales force as "unable to sell in the local way abroad, not being good enough".

Finally, these difficulties, to a different degree, exist also at the level of larger sized firms, who at times had difficulties understanding the true dynamics and nature of foreign markets and what it requires to sell successfully there. For example, American industrial customers want to be visited, and thus a large sales force is needed. Also, the American sales force is motivated by a flexible salary as compared to a set salary in Europe. Both of these are deviations from the Finnish perspective and provided examples of where using an approach typical in your country on a global scale might not lead to optimal results. As a result, the firm will not enjoy its potential sales volumes if it is not able to adapt its approach to the markets served. This is an example of a "hidden cost" caused by a lack of understanding a foreign environment and the mental model guiding it.

To conclude, we note how the ability to reframe is essential to success in mergers and acquisitions and organizational life in general. We saw how reframing related to both identifying one's own mental models and then understanding the target firm's and the host environment's mental models before being able to adapt one's approach to the situation at hand. Going in with one's existing mental model without changing it can prove either fatal or cause lost profits and sales revenues.

This debate, whilst strongly drawing from Senge's (1990) notion of mental models, is also mirrored in literature on intercultural management (see e.g. Adler 1997, Schneider and Barsoux 1997, Marx 1999 and Kim 2001), whose main thrust lies in individuals' and organizations' ability to identify one's own cultural background, the host environment's background and then being able to adapt one's approach to the situation at hand. This is illustrated in Figure 2, which compares the behavior of a monocultural and an intercultural manager, when faced with a puzzling situation. Instead of seeing the possibility of cultural differences and differing backgrounds and perspectives, the monocultural manager regresses back to one's traditional way of doing and seeing. The challenge is to accept the anxiety and address the novel situation by taking an approach suitable to that situation.

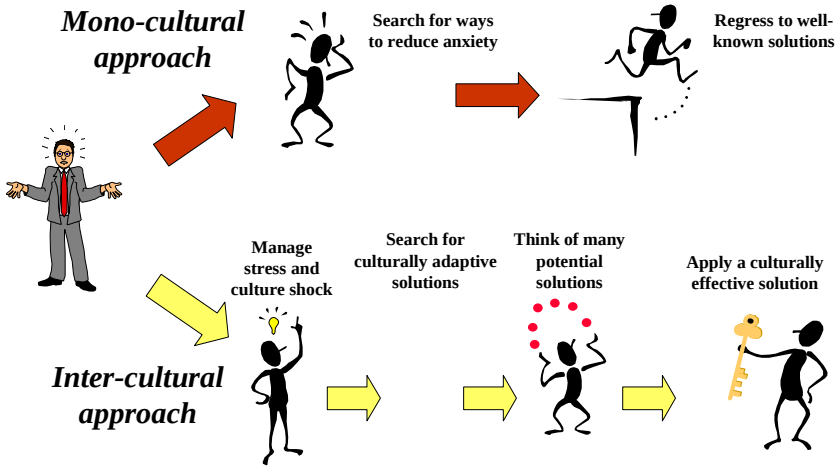

Figure 2. Reactions of a mono-cultural and inter-cultural manager when faced with a cultural difference they do not understand. The figure is adapted from the ideas presented in Marx (1999).

As compared to literature on intercultural management, Systems Intelligence takes a broader perspective by not confining mental models to the domain of national cultures only, as literature in intercultural management does. Instead, Systems Intelligence provides the freedom to see mental models in many ways, whether they stem from national or organizational traditions, societal traditions, professional traditions or individuals' personalities. In this sense, Systems Intelligence helps to broaden our perspective and widen our view as to the significance of mental models in our everyday lives.

Systems Intelligence at the Level of Individual Managers

The example of mergers and acquisitions points to the dual challenge of Systems Intelligence in organizational life. At best, it would be hopeful if Systems Intelligence occurred at both individual and organizational levels. In practice, this means that whilst an individual manager in charge of the acquisition might prove to exhibit highly Systems Intelligent behavior, the success of the merger as well as the reactions of the acquired firm's employees might suffer and drag on if the buying firm's organizational environment into which they are welcomed is otherwise hostile and prison-like. Thus, it seems that organizations cannot get away by resting the responsibility of Systems Intelligent behavior on integration managers. They also need to think of how their organization's blindness and the way that organization's mental framework discourages newcomers from innovation and an exciting organizational ride. We have come back full circle to the System Prison mentioned in a previous chapter. Organizations lacking Systems Intelligent behavior are likely to kill off the initiatives and opportunities existing in the minds of the newly-acquired firm's employees minds by forcing them gradually into the mental model they have, by engaging them in their existing organizational prison.

If we begin by looking at Systems Intelligence as exhibited at the individual level, we find that successful mergers and acquisitions are characterized by integration leaders exhibiting Systems Intelligent behavior. In other words, they see the merger as a holistic system, where a minor action or word will have consequences on the success of the deal. Moreover, they see the mental models involved, and are able to adapt their personal approach in the merger to fit the mental model of the acquired firm. Indeed, a large part of success can generally be personalized to the integration leader in charge of the change period. This is especially the case of small to medium-sized firms, where the role is a visible one. The role of the integration leader is crucial as he will be most in contact with the acquired firm's staff and he will also come to represent the new owner to the new staff, as the following quotes exemplify.

> *"The presence of an integration manager showed that the buying firm really cared for us. Someone was in charge of us and was a living example of the change that we were going through." (Acquired firm's manager)*

> *"His presence helped, it showed security. He was like a big teddy bear. He was a good communicator to people in the company. It was a good thing to send someone over instead of having remote control from Helsinki." (Acquired firm's manager)*

Systems Intelligence in Organizations = Systems Intelligent Mergers and Acquisitions?

Besides the individual managers, ultimately Systems Intelligence is also needed at the level of organizations. Though individual managers involved in M&A might exhibit Systems Intelligent behavior, the organization that the acquired firm enters most often does not.

Instead, organizations are often trapped in the power of their traditions that have made them either bureaucratic or slow, blinding them to new ideas and opportunities. Once these traditions become engrained in the organization's structures and ways of operating, they become forces of stagnation and imprisonment. This is how System Dictatorship is created. Looking at the examples provided in this paper, we see that a lot of organizations are in this very trap. They do not conceive of new opportunities as radical ones. Once they enter a new situation, they shift their existing mental models onto it instead of reframing for that situation. Thus, buying firms tend to engage acquired firms into their own "Systemic Prisons", instead of utilizing the opportunity offered by the deal to enter a new and refreshing era cornered by mutual learning, respect and a sincere willingness to see the deal as an opportunity to create unique potential for both the well-being and market value of the enlarged firm. Albeit mergers and acquisitions have become today's mania, listening to stories from staff and friends having undergone a series of them, respect, learning and excitement seem to be quite far from the daily experience.

It seems that we begin to understand the lack of excitement in mergers and acquisitions. Are they all running "at the 0,64 rate" or even less?

We here come back full circle to the question raised in the introductory chapter in this paper: where is excitement and the potential for individual and organizational enhancement in mergers and acquisitions? Our review of typical examples of mergers and acquisitions has shown that whilst these examples have been more or less successful, they have not fulfilled the underlying potential inherent in combining two organizations, and we can rightfully ask, does this ever happen? Using the example of explosive possibilities of cooperation provided in Saarinen et al. (2004b, p. 16), we see that only too often, as firms enter mergers and acquisitions, instead of becoming stronger and more powerful together in all meanings of the word, they might at worst become less than they were as standalone organizations. In other words, the actual combinatory potential of the firms as two organizations becomes 0,8 * 0,8 = 0,64, instead of 1,2 * 1,2 = 1,44. As both organizations consist of tens, hundreds or thousands of employees (i.e. 1,2 * 1,2 * 1,2 * 1,2 …… or 0,8 * 0,8 * 0,8 * 0,8 * …..), we see how the difference between the minimum and maximum figures of 0,64 and 1,44 is likely to grow even wider, if we account for the individual contributions of all organizational members in a situation of either stagnancy or elevation. Taking the example of two organizations merging, both consisting of 11 members, the difference is already impressive, comparing 0,085 ($=0{,}6^{11}$) to 7,43 ($=1{,}2^{11}$). It seems that we begin to understand the lack of excitement in mergers and acquisitions. Are they all running "at the 0,64 rate" or even less?

For an organization to become Systems Intelligent, it needs to create conditions for Systems Intelligent behavior to flourish.

We acknowledge that mergers and acquisitions are a challenge and many companies today are doing fine, but how much better could they do, and why do they engage in mergers and acquisitions if they aren't ready to seriously affront the potential inherent in the deal? It seems

that ultimately successful mergers and acquisitions should utilize a Systems Intelligent approach at the level of both individuals and organizations. What would this mean in practice?

For one, organizations seem trapped in the mental prison of quarterly results and stock market returns, and thus in a way understandably, need to focus on the bottom-line more than anything else. Being focused on the bottom-line, there seems to be a mental prison in place that sees financial results as stemming from logical steps and financial maneuvers only, e.g. focusing on plant efficiency, ensuring the same IT system globally to get the same figures. In parallel, the hidden potential for elevation or resistance provided by the organizations' human minds is at worst not considered, or not given serious enough a consideration. Doing so, ghosts of old organizational traditions are let to roam around creating forces of resistance, whilst they could also become positive forces. The new organization is trapped in various collective as well as local mental prisons that inhibit its movement toward a better life for employees and in turn increased returns. As long as the only outcome measurement of mergers and acquisitions remains a financial one (hoping for soaring corporate profit in the post-deal years), the unique potential inherent in combining two previously distinct organizations remains underutilized.

Moreover, as long as the mentality in bringing together two organizations remains a non-Systems Intelligent one, the new firm will only be included in the Systemic Prison of the buying firm instead of being involved in building a future together with the buying firm. Ultimately, for an organization to become Systems Intelligent, it needs to create conditions for Systems Intelligent behavior to flourish. We refer here to conditions enabling a positive cycle of mutual learning, reframing and respect instead of forcing people down the spiral of resistance, bureaucracy and syndromes such as "not-invented-here". A clear vision that is explained and made available to staff is one way of ensuring that all know the direction and are ready to go for it. Also, ensuring that the organization's structures are conducive to cooperation instead of islet thinking, e.g. through incentives, or through organization structures that support cooperation and engagement instead of supporting turf-like thinking and sub-optimization. At the level of culture and behavior, behaving in a Systems Intelligent way, instead of forcing down values that staff have difficulty swallowing. Indeed, we may wonder whether Systems Intelligent behavior as such, without further guidelines, would lead to the development of right behaviors for our organizations? The quote below explains more.

> *"Though our organization doesn't have values that it has written in stone, in the post-deal implementation period we argued for the use of common basic values, ones that are part of every child's upbringing, e.g. being honest, communicating openly, mutual respect. We were not aiming at painting a beautiful and rosy future, rather we told the real situation with its positive and negative consequences. People need information; it is the lack of information that is hardest to bear. So we were direct, we said how things are in order to have our new employees trust us as people. If we are decent people, we believed that things would go smoother." (Finnish interviewee)*

We also note that whilst all persons can create change in their environment by behaving in a Systems Intelligent way, as one impacts the culture in one's surrounding, we need to recognize that one's position in the system influences the potential impact that one can have on the system. Thus, e.g. a CEO or a large project's manager as in Fischer (2004), are positioned so that their Systems Intelligence or lack of it, has organization-wide consequences on the success of the project. However, if we remain waiting for those in positions to make changes, we remain trapped in a prison. Hence the call for us all to engage in thinking and acting Systems Intelligently at the level of individuals and organizations in order to make both our personal as

well as our organizational and societal lives better. The articles in this book as well as in Hämäläinen and Saarinen (2004a, b) will provide insightful reading for this purpose.

Concluding Remarks

This article has explored Systems Intelligence in the context of mergers and acquisitions. We began the article by raising the question of where are breakthrough change efforts, radical change and explosive innovative potential in mergers and acquisitions? It seemed that these were lacking from most of our daily experiences when involved in mergers or acquisitions. In this sense, it seemed that today's organizations have a lot to learn on the road to becoming more exciting, explorative and inspiring environments, i.e. in becoming more Systems Intelligent. Only by doing so could organizations consider novel situations they enter, such as mergers and acquisitions, as opportunities for renewal, change or growth.

We then realized that a lot of successful mergers and acquisitions do exhibit behaviors that are Systems Intelligent. We identified five aspects of Systems Intelligent behavior that seemed particularly pertinent in illustrating the typical challenges and success factors in mergers and acquisitions.

In a first stage, we argued for the need to take a systemic and holistic approach to understand the merger and acquisition challenge. Indeed any one approach, be it financial, human or managerial is likely to provide a disparate view of the change dynamics in mergers and acquisitions. A holistic view consisted e.g. in seeing the interrelations between the evaluation and implementation phases in mergers and acquisitions, in understanding the historical and long-term future perspectives to mergers and acquisitions and in realizing that deals differ as to the challenge of change inflicted on the participating firms.

.. a key cause for non-Systems Intelligent behavior stemmed from the mental model guiding today's corporations, a mental model focused on financial performance and quarterly results only.

In a second part, we moved on to understanding how small acts, changes and behaviors can have significant impacts on the success of mergers and acquisitions. Examples related to the importance of small acts and behavior before and after the deal in influencing the staff's mental well-being. Another example related to the myriad of ways in which cultural change is achieved. We further initiated a debate as to where are major organizational breakthroughs in mergers and acquisitions? It seems that this view was so far from today's organizational reality that it was not embedded in the rhetoric used nor the ways mergers and acquisitions are seen. In other words, they are regarded as "deals", not as "opportunities for an exciting future".

In a third part, we looked at how organizations' mental models guided them in their action. We saw how organizations consisted of a myriad of mental models in contrast to the view of organizations having "an official value base". Unless they are recognized, these mental models are let to roam around, disturbing the organization's life, e.g. in times of mergers and acquisitions. Therein lies their very danger. They are implicit and difficult to identify without some effort.

We argued that organizations' mental models also become their System Dictatorships, forces of resistance and resilience toward the new, the different and toward change. We found how buying firms rarely enter deals with an approach conducive to mutual learning, instead they often aim to

thrust their luggage onto the newcomer and thus invite them to join their mental models, engaging them in their System Dictatorships. In so doing, their System Dictatorship grows in size and importance. Through the implicit ways in which System Dictatorships we are engaged in influence our lives, we are guided by forces we are unaware of, instead of breaking free from them, identifying their existence and their influencing role upon our behavior.

We showed how mental models acting as ghosts of the past also had the impact of slowing down and resisting change efforts. Thus, if left unidentified, the acquired firm's mental models often set up silent resistance in the years following a merger or acquisition. This is a further explanation as to why we should care about them. Can organizations afford having implicit forces of resistance roaming around and disturbing the present without even recognizing their existence?

In a fourth stage, we looked at the importance of reframing in new situations. The inability to adapt one's approach to the situation at hand is often at the root of many later difficulties or missed opportunities in mergers and acquisitions. It is often the lack of reframing that is conducive to the lack of exploiting new opportunities.

Finally, we argued for the need for Systems Intelligence at the level of individuals and organizations for mergers and acquisitions to succeed. We noticed how successful mergers and acquisitions were characterized by the presence of an integration manager endowed with Systems Intelligence. However, whilst an individual might make miracles in a merger or acquisition, the excitement is likely to fall off as the new employees encounter and are forced to join the prevailing stagnant System Dictatorship that doesn't encourage change or innovation.

Looking at Systems Intelligence at the level of organizations, we hit a key point. It seemed that as long as organizations are not acting in a Systems Intelligent way, we keep witnessing mergers and acquisitions that create unhappy employees and a systematic lack of potential for elevation as advocated by Systems Intelligence (whilst their financial results might look satisfactory). We argued that as they are not "quantifiable" nor "measurable", they remain dismissed. Yet, such e.g. human, organizational and cultural forces continue to counter-influence corporations worldwide, regardless of whether they are measurable or not. The question then becomes, how long can we afford living in this denial mode?

We concluded by arguing that ultimately, successful mergers and acquisitions would be characterized by Systems Intelligent behavior and provided examples of how to achieve this. In doing so, we came back full circle to the individual's capability in achieving change and to answering the initial question of this paper – where is excitement and elevation in today's mergers and acquisitions? Whilst persons in positions of power might be better positioned to achieve change, ultimately, the opportunity and responsibility for change rests in each one of us. Thus, whilst Systems Intelligent Mergers and Acquisitions might be more of a myth than reality in today's organizational settings, each one of us has the seeds to make a difference in the future.

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Chapter 8

Internet Security and Systems Intelligence

Camillo Särs

Systems intelligence is pragmatic, active, and has a very personal emphasis. Its focus is on executing change through points of exceptional leverage. When we look at Internet security from the perspective of systems intelligence, we can learn a lot about the power of systems intelligence in action. To really understand its power, we must also look at the boundaries of what systems intelligence can achieve. Without an understanding of these boundaries our efforts at changing our systems may fail simply because we tried to change what cannot easily change, instead of starting anew, abandoning that which no longer is of use to us.

Introduction

Systems intelligence seems to be very powerful at its best. In this essay, I will try to describe what I see as some boundaries on the power of systems intelligence. My aim is not to downplay the potential impact of systems intelligence, but rather to illuminate the concept further by making you aware of some possible limitations. I hope that by being aware of the boundaries we can further enhance our capability to act in a systems intelligent manner.

I will approach the subject from an angle that I am personally very familiar with, please indulge me. I am working from the oft-repeated question "Why is the Internet so insecure?" – I am regularly asked this question, or questions that in essence mean the same thing. The question actually means very little taken out of context.

For this discussion, let us assume that the Internet simply is insecure, with blatant disregard of what that actually may or may not mean. Instead, I will attempt to take a closer look at what really amounts to fundamental systematic reasons for security problems on the Internet. To do this, I will have to

There are roads, which must not be followed,
armies, which must not be attacked
towns, which must not be besieged,
positions, which must not be contested,
commands of the sovereign, which must not be obeyed.

Sun Tzu on the Art of War

take a detour into the concept of a "system". This is, as it turns out, no trivial issue.

This essay may be of interest to two very different audiences – computer security specialists and researchers into systems intelligence. As far as I know the intersection of the audiences is very small, so I will necessarily have to state some "obvious" facts about both, while also leaving out a lot of relevant detail. Bear with me, and try to not be distracted by this.

Systems Thinking and Systems Intelligence

According to Peter Senge (1990),

> *The essence of the discipline of systems thinking lies in a shift of mind:*
>
> – *Seeing interrelationships rather than linear cause-effect chains, and*
>
> – *Seeing processes of change rather than snapshots.*

Saarinen and Hämäläinen (2004) describe their effort to define systems intelligence as follows:

> Systems Intelligence follows Systems Thinking in setting out from the primacy of the whole, from acknowledging interconnectivity, interdependence and systemic feedback as the key parameters.
>
> *Like Systems Thinking, Systems Intelligence wants to account for change.*
>
> *Unlike Systems Thinking, Systems Intelligence is primarily outcome-oriented and not a descriptive effort; it is intelligence-in-action on its way to create successful systemic change.*
>
> *Systems Intelligence reaches beyond Systems Thinking in its pragmatic and active, personal and existential emphasis.*

They also point out that systems thinking is an expert discipline – making large parts of it useless to the non-expert in his daily life. So what is then the essence of systems intelligence? Currently, if I were to attempt a short definition, I would expand on Senge's definition of systems thinking.

The essence of systems intelligence lies in a change of ways:

– Seeing interrelationships rather than linear cause-effect chains,

– Seeing processes of change rather than snapshots, and

– Executing change through points of exceptional leverage.

The emphasis of systems intelligence is on the capability to actually execute change, to not just see and describe systems. For systems intelligence to be useful, this capability cannot rely on an expert discipline, but on pragmatic and tangible knowledge.

Changes in a System

Recently I read one of Richard Dawkin's books on the theory of evolution, this one titled "The Blind Watchmaker" (1986). While reading a chapter called "accumulating small change", I was struck by the apparent similarity to how computer software tends to change. This similarity actually applies to quite a few processes of change, as it is a fundamental component of cumulative selection. To avoid overextending the similarity beyond what could reasonably be justified, I will not go into any details of natural selection. However, the process of cumulative change or cumulative selection remains immensely powerful.

As I gather, for cumulative selection to be possible, at least the following things must exist. A number of different possible changes – variations – must exist, some element of selection must choose a suitable solution for a particular situation, and there must be a sequence of repeated change. If we think of any system that is undergoing a series of independent changes, we are essentially witnessing a process of cumulative selection. There is a very distinct difference, however, between cumulative selection as an evolutionary process and cumulative selection in a man-made system. In a man-made system, the choice of "suitable" can be made with hindsight and foresight.

There is another aspect of cumulative change that cannot be overlooked. Once a number of changes have been made, it is very difficult to "go back". Even if we are only talking about an engineering project, reverting to "start" is very costly, and in reality the "start" is illusionary at best. The surrounding system has changed regardless of the project, and it has changed beyond our scope of control. What this means is that once a choice is made, be it however small, you are committed to it.

The essence of systems intelligence lies in a change of ways:

Seeing interrelationships rather than linear cause-effect chains,

Seeing processes of change rather than snapshots, and

Executing change through points of exceptional leverage.

Regardless of the "finality" of choices, the power of goal-driven cumulative choice must not be underestimated. In evolution, no goal exists – every change is "only" submitted to natural selection. In contrast, at any given time, with hindsight and foresight we can make a change that aims towards long-term benefits instead of immediate gain. However, the definition of "long-term benefits" depends very much upon who is doing the choosing.

If we lack the vision of long-term benefits, all choices will essentially be made only for their immediate benefits. In this case the finality of the choices we make can become a strictly limiting factor. As I noted earlier, undoing previous choices can be very difficult.

The role of cumulative selection is important to Internet security, because most of the computer systems connected to the Internet have actually been developed through a gradual process. This means that they carry a large legacy of previous choices, and those choices have most probably not made with the current Internet in mind.

Computer "Systems"

In information technology the term "system" is so heavily overloaded that it is virtually useless as a general-purpose term. For instance, a computer is often referred to as a "computer system" or

just “system” for short. While technically often correct, this usage is completely obscure to the non-expert and a common source of confusion even amongst experts.

Traditionally computer security has been seen as something very “linear”. In essence, you could describe a computer system, how it is to be built[1], and how it can interact with its environment. This description would include a number of “bad” things that could happen and ways to make the bad things disappear. With this approach it is thought that it would be easy to compare different systems and tell which one is best suited for any particular purpose. The underlying assumption is that nothing really significant will change, and that everything will behave as predicted. As we know, real life does not want to play by these rules. Things can, and do, change – sometimes very rapidly. To add insult to injury, not only does the environment change, but also the computer system itself will have many changes made to it. As a result, the “systems” described rarely ever make it out the door before their descriptions are already outdated.

The traditional view of computer security never claimed to solve every security problem. Rather it focused on describing the general security principles of the system – properties that were expected to stay fairly constant even under changing circumstances. Actually using the system requires constant attention to changing conditions – proper administration. This fairly straightforward way of thinking still has much impact on how computer security is built today. Unfortunately, much of the computers in use today have not even had the benefit of this during their design.

So, assuming we have a “securely built” computer, how do we administer it properly? There is a set of well-known best practices in this field as well. All it takes is a few highly trained specialists that can define and run an effective information security management process. Additionally, all users of the computer system must also know their part in using it securely. If this sounds complicated, it is because it is complicated. Designing, constructing, maintaining, operating, and administering a secure computer system is something that requires a considerable effort. The actual “computer system” is only a small part of the overall system at work here.

The important thing to understand about secure computer systems is that they do not really play a major role in the security of the Internet.

The important thing to understand about secure computer systems is that they do not really play a major role in the security of the Internet. There are much larger “systems” at work, and to understand those systems, we need to take a look at ways of working with such systems.

Systematic Implications of Networking

Essentially, the Internet is a large number of intelligent devices connected by a complex but stupid network. This view of the Internet, however, is not really interesting when I try to explain what many see as the insecurity of the Internet.

Another view of the Internet is that of a network that allows a very high degree of interconnectivity between different systems and processes. By “systems” I do not mean computer systems, but instead the “systems” of systems thinking. As soon as a connection to the Internet is

[1] “How it is to be built” does not only imply the specification of the system, but also the development process itself – “how the building is to be undertaken”.

added to a system, the potential connectivity of that system increases exponentially. This is a fundamental change – if this explosive increase in connectivity is not managed properly, we can quickly lose the ability to understand and control the system.

The fundamental issue is that we may no longer know what our system is. This is actually what often lies behind the original question "Why is the Internet so insecure?" There are a number of ways that an Internet connection can change a system; here is a list of examples.

- Huge number of possible contacts – users.
- Contacts are suddenly international.
- Contacts are suddenly global – time zones cause delays and confusion.
- Interactions can happen at any time, any day.
- Interaction can be almost instantaneous.
- "Metcalfe's law of networking" causes exponential growth. (Increasing returns)
- Computer security – attacks are suddenly not only possible, but also probable.

The list could go on, but I hope you get my point. The impact of being networked is easily underestimated – this is also one direct consequence of Metcalfe's law. Understanding this is fundamental to understanding the systematic effects.

Metcalfe's Law is expressed in two general ways:

The number of possible cross-connections in a network grows as the square of the number of computers in the network increases.

The community value of a network grows as the square of the number of its users increase.

The original statement from Robert M. Metcalfe, inventor of Ethernet, was apparently (hard to confirm):

> The power of the network increases exponentially by the number of computers connected to it. Therefore, every computer added to the network both uses it as a resource while adding resources in a spiral of increasing value and choice.

The Internet does not only affect the interrelationships between systems[2]. The processes of change can also benefit from Metcalfe's law. This means that self-reinforcing loops can reach avalanche proportions very rapidly, but also that the different forces that oppose change can have incredible magnitude.

[2] You can see them as interrelationships between systems, or a radical expansion of the system you are considering. I am sure that there are significant differences in how you think depending on which view you choose. I choose to ignore this distinction.

Dawn of Internet Security

Most computers in use today on the Internet were originally designed for an environment that was not networked. Competition between both hardware manufacturers and operating system designers was fierce, and this in turn led to an arms race in which the list of features was crucial to the success of a product. At the same time, customers were not willing to sacrifice old investments when upgrading their systems – backwards compatibility became a key success factor. Today, personal computers are still able to run most software that was produced twenty years ago, despite an incredible advance both in computing power and capabilities.

To me, the process of change that PCs have undergone seems to be incredibly close to cumulative selection. Both consumers and producers of PCs have committed to an ever-increasing amount of features, locked in a self-enforcing arms race. The consumer wants a PC that can perform the task at hand as well as possible, as cheaply as possible. The producer wants to outsmart its competition by shipping the feature faster than anyone else. Until recently, neither has seen security as a major concern.

Enter Metcalfe's law. Once enough PCs were networked, the system started to change rapidly, and beyond the control of either consumers or producers. You may think that this should not be a problem – after all, are not the remaining producers the ones that were able to outsmart all the others in the race for ever more features. Why should they have a problem coping with the effects of networking?

Challenges to Internet Security

Understanding the current challenges to Internet security, or "Why the Internet is so insecure" requires that you look at the motives of the different actors.

Consumers want multi-purpose PCs that perform a number of tasks well, and at a competitive price. They are not willing to limit the capabilities of their PCs too much, except under a clear and present threat that would compromise their capability to use their PCs as desired.

Producers want to sell as many units as possible, with as little customization as possible. That is, every copy sold is the same, reducing costs and increasing profits. Ideally the same product would fit every conceivable customer need.

Attackers may have a number of motives, but essentially they want to misuse the PCs of others for purposes they were not intended for. The more features a PC has, the more likely an attacker is to succeed.

What is very interesting is that an increase in the number of features seems to be in the apparent interest of all parties.

The brief analysis above would serve as a good starting point for a systems analysis of Internet security, using the methods of systems thinking. I would rather highlight the fact that all three parties may very well already behave in a systems intelligent manner from their own perspective. What is very interesting is that an increase in the number of features seems to be in the apparent interest of all three parties. This is a very strong driving factor.

The immediate reaction might be that a systems intelligent person would work to change the rules of the game so that adding more features no longer would be so important. Though alluring, I believe this conclusion to be wrong. While it may be warranted to question some, or even many,

new features, the need for new features seems to be a fundamental property of the entire system. The growth in features also benefits from Metcalfe's law, which means that with increased connectivity we can expect ever more ingenious applications.

Conclusions

It seems that the answer to why the Internet is so insecure is very fundamental. The Internet has "evolved" through a process of cumulative selection in which security has played a very minor part. Changing this will be very time-consuming, because of the properties of cumulative selection. Furthermore, what is "secure" to one person is not secure to another, as the very concept depends very much on what is desired. The unpredictable nature of highly networked systems also means that new security problems can be expected to appear in the most surprising places. This tendency for surprises is amplified by the basic desire for ever more features.

The pragmatic nature of systems intelligence limits the amount of systems thinking that can go into any given situation. This means that the systems intelligent person needs to have an intuitive capability to avoid trying to change that, which does not easily change. There are many aspects of a system that can limit the changes that can easily be made.

A systems intelligent security engineer would probably not go about trying to make the Internet secure. Instead he would seek to make the insecurity of the Internet mostly irrelevant to the security of his own systems. This would entail avoiding legacy components, reducing the effects of networking, and controlling what features are included into his system.

I have identified three potential limiting factors – cumulative change, the unpredictability of networked systems, and fundamental systematic properties. These are just arbitrary choices drawn from my area of experience, but they serve to illustrate some boundaries of systems intelligence.

- *Cumulative change* puts a boundary on what changes can easily be made to a system.
- The *unpredictability* of networked systems puts a boundary on how well you can understand a system.
- Some *properties* of a system seem to be fundamental, which puts a boundary on what change can be reasonably expected.

Knowing that such boundaries may exist is critical to the ability to act systems intelligently.

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Chapter 9

Systems Intelligence in Preventing Organizational Crises

Isto Nuorkivi

This paper introduces certain aspects of Systems Intelligence as means to avoid organizational crises. The Tenerife air disaster of 1977 is referred to as an example of an organizational crisis, and its causes are examined in the light of Systems Intelligent applications. These applications are then considered in devising suggestions of how to avoid such accidents in the future.

Introduction

The Tenerife air disaster of 1977 is to this day one of the most tragic aviation accidents of all times. Besides that, it is also an example of an organizational crisis. When the causes of the accident are examined, one thought emerges above all others: the striking notion that even a slight adjustment to even a seemingly trivial detail might have prevented the crisis from happening altogether. What could have been done, then, to make the critical adjustments and avoid the crises? I believe that certain applications of Systems Intelligence could have made the difference between tragedy and success in this particular case and, what is more, would make the difference in numerous other cases in the future.

This paper is intended to shed light to different aspects of Systems Intelligence and how they could in a fruitful way be used in real-life situations. It should be noted that not all aspects of Systems Intelligence are considered, and even the ones that are, are considered from a somewhat subjective point of view. The paper is designed as follows: First, the Tenerife air disaster is briefly summarized and its causes are discussed, as they have been discovered by scholars Karl Weick and Paul Shrivastava. Second, there is the consideration of some Systems Intelligent applications that I believe could have prevented the crisis. Third, there is the discussion of how the findings of this particular case at Tenerife can be stretched to cover other organizational fields.

In this paper I argue that, in order to avoid another Tenerife air disaster or any comparable crisis, the following aspects of Systems Intelligence should be drawn upon: 'Perspective observing', inquiry-mode, defining the system's objectives and boundaries according to the *principle of carefulness*, and realising one's own impact on the system, along with some others. I believe that

these aspects could be beneficial in two ways: By leading to more Systems Intelligent individuals as well as to systems that themselves generate Systems Intelligence. I realize that my suggestions are neither profoundly innovative nor novel; instead, I wish to point out the effectiveness of the concept of Systems Intelligence as a framework for considering different approaches to organizational activities. Should this paper succeed in nothing else, I wish it would at least demonstrate the dire need for Systems Intelligent applications in today's organizational world.

The Tenerife Air Disaster

On March 27, 1977, two 747 airplanes collided on a takeoff runway at Tenerife's Los Rodeos airport. 583 passengers and crewmembers lost their lives, and sixty-one people survived the collision. The events preceding the crash are briefly summarized as follows: Due to a bomb explosion at the Las Palmas airport, KLM flight 4805 and Pan Am flight 1736 were diverted to a smaller Los Rodeos airport at Tenerife. KLM landed first at 1:38 PM, whereas the Pan Am flight landed at 2:15.

At around 5 PM the Las Palmas airport had reopened and the two planes were ready for takeoff. At this point they started to receive somewhat incoherent instructions from the control tower concerning their departure. Ultimately the KLM crew were instructed to taxi down a takeoff runway, make a 180-degree turn at the end, and wait for further instructions. The Pan Am crew understood that they were to follow the KLM aircraft on the same runway (C-1) and position themselves behind the KLM plane, although they were actually instructed to take the parallel runway (C-3) to the waiting point behind the KLM. The misunderstandings were mainly caused by the flight-controllers' somewhat inadequate English skills.

While the KLM plane was already at the other end of the runway and the Pan Am was only starting to get moving, a dense cloud drifted between the two planes preventing their crews from seeing the opposing aircraft. What followed next was a series of misunderstandings in a conversation among the control tower, the KLM captain ant the KLM co-pilot: While the control tower understood that the KLM plane remained waiting for further instructions, the KLM captain thought he had been given clearance for a takeoff, and immediately began accelerating the aircraft down the runway. A few seconds later at 5:06, the KLM jet fatally collided with the Pan Am that was still taxiing down the runway in the opposite direction. (Weick 1990)

The organizational psychologists Karl Weick (1990) has observed four major causes for the Tenerife air disaster: the combinations of interruptions of important routines among interdependent systems, tightening interdependencies, a loss of cognitive efficiency due to autonomic arousal, and a loss of communication accuracy due to increased hierarchical distortion. The four causes are more carefully examined in the paragraphs that now follow.

1. *The combinations of interruptions of important routines among interdependent systems:* The first interruption of an important routine in the Tenerife case was the sudden changing of the destination of the two airplanes from Las Palmas to a smaller airport at Tenerife. The occurrence led to interruptions in the routines of the flight crews and the air-traffic controllers. These interruptions were partially the reason why the Pan Am did not take the runway it was supposed to, and followed instead the KLM's route. Another major interruption was the cloud that hung between the two airplanes severely decreasing visibility and adding to the uniqueness and unpredictability of the situation.

2. *Tightening interdependencies:* During the course of the events, the system grew tighter and more complex. For instance, the controllers had to work without the aid of ground

radar, and the runway had no functional centreline lights to guide the pilots. Also, the longer the planes stayed at Tenerife, the greater the chances for other air traffic delays at the Las Palmas end and for the KLM crew's duty time to expire while they were still in transit (the crew had been on duty for 11 hours and approaching their limit). There was even a growing concern that the Los Rodeos airport might fall under a terrorist attack such as the one at the Las Palmas airport. These aspects with numerous others increased dependencies among the elements in the system and/or increased the number of events that were unnoticed, uncontrolled, and unpredictable, making the system and the situation increasingly vulnerable to failure.

3. *Loss of cognitive efficiency due to autonomic arousal:* The interruptions of important routines discussed above caused the flight crews and the controllers to become stressed. Ongoing stress leads to autonomic arousal, which leads on to a loss of cognitive efficiency: a person's attention is drawn to the interrupting event, and the person's capacity to process information is consumed. At Tenerife, people's attention was drawn to such things as inclement weather and distorted flight schedule, when in fact it should have been drawn to more essential things such as radio transmissions. In short, the stressful interruptions caused the people at Tenerife to pay attention to seemingly trivial factors, which reduced their ability to focus on difficult and crucial flight manoeuvres. Another noteworthy point is that stress causes people to fall back on first learned responses. The KLM captain had worked as an instructor for a long time prior to the fatal flight. Simulated flights are very common in flight instruction, and in flight simulators the training pilot issues himself the takeoff clearances; there are no simulated radio transmissions with the control tower. Therefore the KLM captain may have learnt the practice of issuing his own takeoff clearance so thoroughly that, as the pressure intensified, he may have fallen back on it as a first learned response.

4. *Loss of communication accuracy due to increased hierarchical distortion:* In the Tenerife case, the increased hierarchical distortion refers mainly to the KLM cockpit. As is mentioned above, the KLM captain had been working as an instructor for a long time prior to the flight. The plane's first officer had, in fact, at some point acted under the captain's instruction, so there appeared to be a distinctive hierarchy in the KLM cockpit. It may have, at least, been partially the reason why the first officer only twice tried to influence the captain's decisions, while the plane was at the end of the runway. On both occasions he tried to stifle the captain's eagerness to take off, and on both occasions he seemed to have assumed by the captain's reaction that the captain was fully on top of the situation. This would make sense, since in stressful situations the salience of hierarchies tends to increase, and the person lower in the hierarchy tries to shape his or her messages in a form that pleases the receiver. Also, in a stressful situation, the people involved will have a high expectancy of what is being said; hence the captain, the first officer, and the controllers may have thought they heard something that was never really said, and because of the increased hierarchical distortion, did not dare or bother to confirm the messages.

Whereas Weick (1990) accounts much of the crisis' roots to operational errors and technological failures, professor of management Paul Shrivastava (1994) finds that crises are rooted in systemic human, organizational, and technological contradictions. Although he has not written specifically about the Tenerife case, his work on industrial and environmental crises can quite easily be stretched to cover the Tenerife air disaster, as well. In the following paragraphs, Shrivastava's (1994) findings on crises and their causes are applied to the crisis at Tenerife.

1. *Systemic technological contradictions:* The most applicable of Shrivastava's (1994) findings in this case are the contradictory demands of efficiency and flexibility in designing technological systems. Here, the two 747 jets can be considered as technological systems. The planes were designed to be as effective as possible, which made their characteristics not as flexible, as would have been preferable. After all, the captain of the Pan Am refrained from using the parallel runway (C-3) partly because the aircraft could not be manoeuvred through the steep curves on the way (Weick 1990). Shrivastava (1994) also suggests that, high efficiency in design leads to tightly coupled systems. This would make sense when compared to Weick's (1990) argumentation on tightly coupled events, since the aircraft's inflexibility to turn in steep curves lead to tightening interdependencies and eventually to the crash.

2. *Systemic organizational and personal contradictions:* As Shrivastava (1994) has found, the most prominent contradiction in organizations are the contradictory demands of their multiple stakeholders. At Tenerife, there were numerous stakeholders' demands at play: The flight crews were eager to get airborne, because they were approaching their duty time limits; the crews were also aware of the damage a great delay might have on the company's image; the passengers wanted to get airborne, because they had connection flights, room reservations and appointments awaiting; the flight controllers had to balance between safety regulations and keeping the traffic flowing; and so on. Since many of the demands were conflicting, some of them prevailed at the expense of others – for example, the demands of getting the airplanes to Las Palmas may have exceeded the demands imposed by safety regulations and protocol. Hence it is quite possible that, the accident was partly caused by contradictions between productivity and safety objectives – another prominent contradiction studied by Shrivastava (1994). Finally, there are the contradictory effects of work experience on operator vigilance: As one's work experience increases, one becomes more skilled at one's work but simultaneously starts willingly to take unnecessary and progressively increasing risks (Shrivastava 1994). This appears to have had an effect in the KLM cockpit: The captain was a very experienced pilot, and may have thought indifferently about the potential risks in the situation. The first officer, on the other hand, was rather inexperienced and may have felt (unnecessarily) compelled to rely on the captain's expertise and judgement.

Both Weick (1990) and Shrivastava (1994) conclude that, crises are most often ignited after a long chain of unfortunate and accumulating events. From this can be derived that there are two ways of preventing a crisis: First, one may recognize that a disastrous chain of events is underway and interrupt it. To succeed at this, one must be familiar with the optimal state of the system, so that, when the system is in a declining state, one can pinpoint the aspects that are off of the optimal state, and act on them. Second, one may prevent such harmful chains of events from occurring altogether. In order to do that, one has to design the system in such a fashion that contradictory demands, relationships or effects can have no deteriorating impact on the state of the system.

Applications of Systems Intelligence that could have prevented the crisis

As was pointed out in the previous paragraph, in order to steer clear from crisis, one has to have a sound grasp of the optimal state as well as the current state of the system, of which one is a part. To avoid crises, this alone does not suffice: One must also be able to carry out manoeuvres that will return the system to its preferred state and/or, that will keep the system from going astray. To succeed at this, one must put one's Systems Intelligence into play. In this section, different

applications of Systems Intelligence are considered in view of preventing crises similar to the Tenerife air disaster.

When Weick's (1990) and Shrivastava's (1994) findings are combined, six major causes for the Tenerife air disaster can be derived:

- Combinations of interruptions of important routines among interdependent systems
- Tightening interdependencies
- Loss of cognitive efficiency due to autonomic arousal
- Loss of communication accuracy due to increased hierarchical distortion
- Systemic technological contradictions
- Systemic organizational and human contradictions

Each one of these factors represents a lack of Systems Intelligence, and each one of these factors could be remedied by Systems Intelligent behaviour. Let us now examine these arguments more thoroughly.

Systems Intelligence and interruptions of routines and tightening interdependencies

As was noted previously, the Tenerife air disaster came about after a series of interruptions of important routines. Simultaneously, the interdependence among various factors and events grew tighter, resulting in tightly coupled events and aspects. The tragedy was not so much the accumulation of these events and aspects, but rather the fact that the tightening interdependencies and critical interruptions went unnoticed by the people involved with the system. Had the flight crews acknowledged, for example, that the conditions for a takeoff were significantly poorer than in a normal situation; that the flight controllers did not have a sound grasp of the situation and; that the general atmosphere had been intensifying ever since the aircrafts had landed on Los Rodeos, they might have acted more carefully and thoughtfully throughout the situation. Hence the partakers lacked a crucial element of Systems Intelligence: The ability to lift one's self above the system, and observe the system and its parts from different perspectives. It is my personal belief that this aspect of Systems Intelligence (like numerous other aspects, as well) cannot be profoundly obtained without intense and vast practicing. Therefore the question arises: To what extent is this kind of 'perspective observing' taught and practiced in training new crewmembers? It is my assumption that the training revolves mainly around more specific aspects of flying (the controls of the plane, taking off, landing, etc), and not so much around personal skills such as 'perspective observing'.

The partakers lacked a crucial element of Systems Intelligence: The ability to lift one's self above the system, and observe the system and its parts from different perspectives.

Systems Intelligence and loss of cognitive abilities

There was yet one factor that diminished the crewmembers' chances of realizing the ongoing interruptions and interdependencies: As Weick (1990) concluded, autonomic arousal leads to declining cognitive abilities. The presence of a great pressure caused everybody to become stressed, and stress decreased everyone's ability to think clearly and observe the situation from various perspectives. Therefore, 'perspective observing' is insufficient in terms of avoiding

operational and other kinds of errors in difficult circumstances. One also has to be mentally prepared for these kinds of circumstances, so that one does not experience the situation too stressful when it occurs. To accomplish such mental preparedness, two aspects of Systems Intelligence should be integrated into the training of crewmembers:

1. Crewmembers should be familiar with as many kinds of circumstances as possible. This, I imagine, could be achieved by adjusting the conditions of the simulation flights. The result would not be more Systems Intelligent individuals, but systems that generate Systems Intelligence: As the system changes in a way that its partakers do not experience difficult conditions too stressful anymore, the system will provide better chances for the partakers to act Systems Intelligently. Hence, the system will transform into a system that generates Systems Intelligence.

As the system changes in a way that its partakers do not experience difficult conditions too stressful anymore, the system will provide better chances for the partakers to act Systems Intelligently.

2. Crewmembers should be made crystal clear about the primary and secondary objectives of the system. At Tenerife, the primary objective of the crewmembers seemed to be getting airborne as soon as possible. This would imply that the system was perverted: The primary objective should have been the safety of the people onboard, whereas getting airborne should only have been a secondary objective. Had the primary objective been overall safety, the crewmembers would probably have paid closer attention to interruptions and interdependencies that threatened their own and their passengers' safety.

To establish more safety-oriented crews, the crew training objectives probably require restructuring. When a safety-first training programme is successfully carried out, two fruitful outputs can be expected to proliferate:

1. More Systems Intelligent crewmembers that would have a clearer grasp of the system's preferred direction and state ('safety at all times' instead of 'getting there on time'). This would enable them to produce more favourable outputs on the system's behalf.

2. Systems that generate Systems Intelligence, since crews would be trained to follow more Systems Intelligent outlines. In other words, by doing merely what they are told, the crewmembers' actions would be Systems Intelligent by nature.

Systems Intelligence and loss of communicational accuracy

Another dramatic and exceptionally worrisome factor that made the Tenerife air disaster possible was the loss of communicational accuracy due to increased hierarchical distortion. There are at least three aspects of Systems Intelligence that have the potential of preventing such perverted situations from occurring ever again.

First, one could design the cockpit behaviour to be more open and informal, which would hinder the chances of unwanted hierarchies developing as tension rises. Steps have already been taken to this direction: Finnair, for example, has allegedly fashioned an 'open cockpit' policy that refers to the open communication among crewmembers. However, not all flight companies (and definitely not all pilots) are fans of such policies, as Weick (1990) suggests. An 'open cockpit' would yet again pave way for systems that generate Systems Intelligence: If there were no barriers for open

discussion about decisions and circumstances, justified disagreements would more probably be voiced, and the system would potentially be directed to a desirable direction. In other words, by allowing the crewmembers to communicate more freely and informally, the system would create opportunities for Systems Intelligent behaviour.

Second, the crewmembers' personal skills could be developed. One crucial component leading to the accident was the KLM captain's strong advocate-mode[1] – the inability to listen openly to suggestions and even instructions. It is quite evident that crewmembers and flight controllers should possess a high-level inquiry-mode[2] so that all the information and communication could be properly registered and processed. On the other side, lower-ranking crewmembers should also possess the courage of voicing their opinions even if it meant jeopardizing their status in the eyes of the outranking officers. Inquiry-mode and having the guts to voice one's own opinion are qualities that, I believe, cannot be obtained without an immense effort and practice – as is the case with other personal skills concerning Systems Intelligence, such as 'perspective observing'.

The third aspect concerns once more the values and approaches that are taught to crewmember candidates: While working as a critical player of a system, it is vital that a person has a clear comprehension of what the system actually is. For instance, the system at Tenerife did not only include the KLM cockpit or two flight crews and a control tower – there were hundreds of passengers involved, as well. Had the crewmembers kept this in mind, they might have been less eager to take even minor risks. This concerns defining the system's boundaries. In high-responsibility jobs it would be advisable to follow the principle of carefulness[3], and to do so, the system needs to be defined as vulnerable and fragile rather than not.

Systems Intelligence and systemic technological contradictions

Systems Intelligence is equally helpful in dealing with systemic technological contradictions. When there exist contradictory demands of efficiency and flexibility in design, unified standards are highly welcomed. For instance, all the airports that potentially might host large airplanes should have the capacity and facilities to do so successfully. Similarly, large airplanes should be adaptable enough to be manoeuvred even at the smallest airports that may ever serve as a backup-airport. To design and establish such standards is Systems Intelligent, since the benefits that systems like airports or even individual flights might experience are evident.

It is quite possible that these kinds of standards already exist, and airplanes and airports are being designed according to them. Should this be the case, the Tenerife incident can be seen as evidence for such a system's inadequacy. Hence it should be noted that, in order to have a functioning system and functioning standards, professional operational crews are needed. It would seem that the standards, the training of crews, or both of these aspects require further attention in the world of aviation.

[1] Advocate-mode refers to the tendency to debate forcefully and influence others (Senge 1993).

[2] Inquiry-mode refers to the ability to "tap insights" and learn from other people (Senge 1993).

[3] The principle of carefulness states that, if there is a risk of severe or irremediable damage, actions should be taken to prevent that damage even if the consequences are not scientifically certain.

Systems Intelligence and systemic organizational and human contradictions

Finally, Systems Intelligence can be applied to systemic organizational and human contradictions. One plausible way of dealing with the contradictory demands of the multiple stakeholders of an organization would be to analyse the demands and rate them according to the principle of carefulness. Hence, any given demand could be ignored or highlighted based on its potential to ignite hazardous behaviour. A Systems Intelligent solution would be to create a set of references that could and should be called upon in any susceptible situation. This might yet again lead to systems that generate Systems Intelligence, since the set of references would lead the crewmembers and flight controllers to behave Systems Intelligently.

Crews should also be gathered with the notion of the contradictory effects that work experience has on operator vigilance: By paring optimally experienced individuals, Systems Intelligent behaviour is more likely to occur. The individuals themselves should also be made aware of the effects experience has on their behaviour. Then, these individuals would become more able to comprehend their own impact on the system, which is a cornerstone of Systems Intelligence.

Applications to parallel fields

Admittedly, exploring the possibilities of Systems Intelligence in an individual case of immense rarity, the task and its outcomes seem somewhat trivial. One could argue, however, that the unique case of Tenerife was not so unique, after all. On the contrary, the crisis at Tenerife contained certain features that are shared by numerous other crises, as well. There is, for instance, the *Exxon Valdez* oil spill of 1989 that had devastating effects on the waters and shores of Alaska. It, too, came about after misjudgements by operational crew, failures in communication equipment, and lack of attention to safety issues among many other factors (Shrivastava 1994). Since many systemic contradictions, tightening interdependencies and crucial interruptions were present, the respective findings of Systems Intelligence are also applicable. Weick (1994) argues that his findings on causes of crises are applicable to most of organizational crisis, not just the Tenerife air disaster. In his groundbreaking work *Emotional Intelligence* (Goleman 1995) happens to even state that an aeroplane cockpit is like any organisation in a smaller size. Therefore, it would seem, the Systems Intelligence approach considered here can be taken in a vast number of different organizations.

Since most organizations do not have the rigid communicational rules of an airplane cockpit, I shall emphasize yet another aspect of Systems Intelligence. Most commonly, I would imagine, organizational crises originate in communications. For instance, groupthink[4] is an example of communication situations gone wrong, and groupthink itself can have tragic consequences such as the Bay of Pigs incident (Fincham and Rhodes 1999). To bring Systems Intelligence into organisations' communication, some of the already suggested ideas ('perspective observing', inquiry-mode etc) could be drawn upon. But, in addition, a brilliant set of instructions has been devised by Professor of Organizational Behaviour Debra Meyerson (2001) to change the direction of a derailing conversation: One can

1. Interrupt an encounter to change its momentum. (For instance, suggest a new solution, before a decision on a solution is made.)

[4] Goupthing refers to faulty decision-making in a group. Groups experiencing groupthink do not consider all alternatives and they desire unanimity at the expense of quality decisions. (Fincham & Rhodes 1999)

2. Name an encounter to make its nature and consequences more transparent. (For instance, state that a decision is acceptable although it violates your personal values.)
3. Correct an encounter to provide an explanation for what is taking place and to rectify understandings and assumptions. (For instance, point out that someone's ideas are not listened to.)
4. Divert an encounter to take the interaction in a different direction. (For instance, point out that there is a general tendency of people not listening to others' ideas.)
5. Use humour to release the tension in a situation.
6. Delay to find a better time or place to address the issue.

This set of instructions presents heavy weaponry for changing the course of a derailing interaction situation. However, to use these means effectively requires a good comprehension of the system and its needs – a cornerstone of Systems Intelligence that has already been discussed in previous sections.

Conclusion

In this article I have sought to ignite discussion on applications of Systems Intelligence that might be helpful in preventing organisational crises such as the Tenerife air disaster. I have discussed the causes of the Tenerife accident, as they have been discovered by organisational scientists Karl Weick and Paul Shrivastava. Referring to these causes, I have made some suggestions of how Systems Intelligent approach can be taken to avoid such crises in the future. I have found that, certain aspects of Systems Intelligence have the ability to produce more Systems Intelligent individuals and/or systems that generate Systems Intelligent behaviour. Some of these aspects are 'perspective observing', inquiry-mode, realising one's own impact on a system, and relying on standards when designing systems and their features. A common factor to most of these aspects is the need for intense and vast practising. Furthermore, practising on these aspects means practising on one's personal skills, which I believe to be generally overlooked in today's organisational world.

Systems Intelligence could and should be applied in the hard-value-driven organizational world.

A potential flaw of this article is that it portrays an aviation accident as an example of an organisational crisis. This might be problematical in the sense that aviation crises already occur quite rarely, and achieving a zero-rate in flight accidents is virtually impossible. Therefore I must emphasize that I do not suggest the Systems Intelligent applications considered here are a solution to the risks of flight traffic. I have merely sought to point out that Systems Intelligence seems worth exploring in the organizational world when it is viewed in light of previous organisational crises such as the Tenerife air disaster.

This chapter differs slightly from most of the others, since it considers Systems Intelligence as a means to maintain a preferred state of a system instead of a means to escalate its current state to a higher level. However, although not discussed further in this article, I intuitively sense that the course of applying Systems Intelligence in order to avoid crises is quite often the course of automatically escalating the state of the system to a higher level. Many of the Systems Intelligent applications considered in this article, in my view, potentially enhance the atmosphere, the parameters and the productivity of a system, thus potentially enhancing its prevailing state.

I shall once more point out that my interpretations of Systems Intelligence are subjective, limited, and merely suggestive. With this paper I have sought to express my rather intuitive idea that Systems Intelligence could and should be applied in the hard-value-driven organizational world. I especially sense that Systems Intelligence could be extremely useful in the matter of an utmost importance: the prevention of organizational crises.

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Chapter 10

Theory of Constraints Revisited – Leveraging Teamwork by Systems Intelligence

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This article presents the Theory of Constraints in the context of teamwork with strategic enhancements through Systems Intelligence. The Theory of Constraints is introduced and put into practice on a theoretical level from the point of view of teamwork. With the Theory of Constraints providing the analytical roadmap to elevate teamwork, Systems Intelligence offers the complementing systemic behavioral approach, the final touch, which enables the realization of significant teamwork leverage.

Introduction

> *"I came through the gate this morning at 7:30 and I can see it from across the lot: the crimson Mercedes. It's parked beside the plant, next to the offices. And it's in my space. Who else would do that except Bill Peach? Never mind that the whole lot is practically empty at that hour. Never mind that there are spaces marked 'Visitor'. No, Bill's got to park in the space with my title on it. Bill likes to make subtle statements. So, okay, he's the division vice-president, and I'm just a mere plant manager. I guess he can park his damn Mercedes wherever he wants."* (Goldratt 1992, p. 1)

These are the opening words of Eliyahu Goldratt's groundbreaking business novel The Goal: A Process of Ongoing Improvement (1992). In The Goal Goldratt introduces the business audience to the Theory of Constraints – a multi-faceted systemic methodology and management theory to overcome the barriers of change, improvement and success.

Conceived originally in the 1970s as a scheduling algorithm, the Theory of Constraints – also referred to with the acronym TOC – has during the last decades been developed primarily by Dr. Goldratt into a strong and versatile management theory. As it exists today, TOC comprises a suite of management related theoretical frames, methodologies, techniques and tools (Mabin and Balderstone 2003, pp. 569-570). In the words of Mabin and Balderstone (2003, p. 570), TOC is "…a systemic problem-structuring and problem-solving methodology which can be used to develop solutions with both intuitive power and analytical rigour in any environment". Goldratt

himself refers to TOC as a generic management theory for running an entire organization (Goldratt 1988, p. 453).

The management concept delivered by the Theory of Constraints may be summarized by means of the following two fundamental principles (Rahman 1998, p. 337).

- Every system is equipped with at least one constraint.
- The systemic constraints represent opportunities for improvement.

Systems Intelligence is introduced by Saarinen and Hämäläinen (2004) in their Systems Intelligence: Connecting Engineering Thinking with Human Sensitivity, where Systems Intelligence is proposed as a key form of behavioral intelligence. However, readers should note that the ideas and concepts of Systems Intelligence that I will discuss herein are based on the working draft by Saarinen et al. (2003), Systems Intelligence: A Programmatic Outline[1]. In this programmatic outline Saarinen et al. (2003) define Systems Intelligence as intelligent behavior that incorporates a holistic view of the complex system one belongs to. Refer to Saarinen et al. (2003) for the complete outline and see Saarinen and Hämäläinen (2004) for the updated version.

The primary objective of this article is to present the Theory of Constraints and its analytical roadmap in the context of teamwork, and to seek further teamwork leverage through Systems Intelligence.

> *"The bottom line of systems thinking is leverage – seeing where actions and changes in structures can lead to significant, enduring improvements."* (Senge 1990, p. 114)

Theory of Constraints Revisited

Goldratt (1997, p. 84) presents the Theory of Constraints as a new management philosophy. In this sense, TOC is comparable to such eminent management concepts as Total Quality Management (TQM), Just-In-Time (JIT) and the Learning Organization. But notwithstanding the fact that Goldratt (1997, p. 85) considers these philosophies to be complementary rather than contradictory, there is still an imperative distinction between them as far as their theoretical foundations are concerned. Both TQM and JIT are firmly rooted in the notion that any improvement realized anywhere in the organization produces a global improvement in the organization (Umble and Spoede 1991, p. 27). As shall be discussed in the subsequent paragraph, TOC represents a dramatic departure from this concept. Still, the aspect of complementariness is well illuminated by Ronen and Pass (1994, p. 10) as they state that TOC may enable managers to implement TQM in a more effective manner. Being able to determine the loci where organizational performance is impeded the most using TOC tools automatically results in a significantly improved implementation record of TQM.

In order to clarify the characteristics of TOC, Goldratt (1997, pp. 88-89) defines two fundamental frames of reference, the "cost world" and the "throughput world". The essence of this approach lies in the fact that controlling cost and protecting throughput imply different modes of management, rendering any proposed compromise between the two frames unacceptable. In accordance with the managerial theory of the cost world, any local improvement automatically

[1] http://www.sal.hut.fi/Publications/pdf-files/msaa.pdf

results in an improvement of the organization. In light of this statement, achieving global organizational improvement calls for inducing many local improvements (Goldratt 1997, p. 88). The managerial mode of the throughput world, on the other hand, proclaims the opposite – most local improvements do not automatically translate into a global improvement (Goldratt 1997, p. 90). This is due to the fact that not only the entities subject to the local improvements influence the total throughput but also their linkages. To elucidate this scenario more explicitly, Goldratt (1997, p. 89) parallels the performance of a company to the strength of a physical chain. The analogy convincingly demonstrates that the performance is not only determined by the links in the chain but also by the interaction between them, i.e. all linkages. Elaborating on this equivalence, it is also evident that ultimately the weakest link of the chain determines the overall strength (Goldratt 1997, p. 89).

> "*Companies are so immersed in the mentality of saving money that they forget that the whole intention of a project is not to save money but to make money*." (Goldratt, 1997)

To distinguish the managerial approach of protecting throughput from controlling costs even further, Goldratt (1997, pp. 91-92) clarifies the applicability of the Pareto principle - that is, the concept of focusing - in both cases. According to Goldratt statistical rules prove that focusing on solving twenty percent of the relevant problem issues yields an eighty percent realization of the potential benefits. However, this theory is only applicable to systems involving independent variables. In consequence, the 20% - 80% rule can be successfully employed only in situations where the entities or links are managed on an individual basis as in the case of controlling costs. As for the throughput world the influential linkages result in the Pareto principle being inapplicable.

The Five Steps of TOC

This section outlines a workable procedure for TOC by presenting the process of focusing in five highly intuitive steps. In fact, Goldratt (1990, pp. 3-4) vigorously accentuates the importance and the potential of human intuition. But in order to realize to intrinsic innovative power of the human intuition, one must put strong emphasis on continuously verbalizing the intuition in a convincing and depictive manner. "If we don't bother to verbalize our intuition, we ourselves will do the opposite of what we believe in." (Goldratt 1990, p. 3)

Before unveiling the TOC working model, two axioms need to be introduced. First, every system is built for a particular purpose (Goldratt 1990, p. 4). Thus, the mere existence of a system does not automatically translate into self-justification. In accordance with this purpose driven or pragmatic systems approach Goldratt (1990, p. 4) states that any action taken by any organ in the organization is to be judged by its overall impact with respect to the global objective. This, on the other hand, implies that targeting the global objective of a system is prerequisite to being able to carry out improvements or successful change strategies in for example any section of an organization. Second, in reality any system is influenced by very few constraints and, complementarily, any system must be influenced by at least one constraint (Goldratt 1990, p. 4). This postulate is discussed and proved in detail by means of the Boy-Scout analogy in Goldratt's The Goal (1992). As the name Theory of Constraints suggests, the TOC management philosophy recognizes a system's constraints as the key elements in seeking ways to leverage the system. Goldratt (1990, p. 4) defines a constraint of a system as follows - once again stressing his faith in the exertive power of intuitive behavior and perception.

> *"A system's constraint is nothing more than what we feel to be expressed by these words: anything that limits a system from achieving higher performance versus its goal."* (Goldratt 1988, p. 453, 1990, p. 4)

Having brought forward the foundation of TOC in the previous paragraph, it is now appropriate to introduce the five steps of focusing. The five steps of focusing as presented by Goldratt (1990, pp. 5-6) are depicted in Figure 1. The circular motion used to illustrate this workable procedure is intended to accentuate the correlation between the five steps of focusing and the process of ongoing improvement – the process of continuous improvement is discussed in the next section.

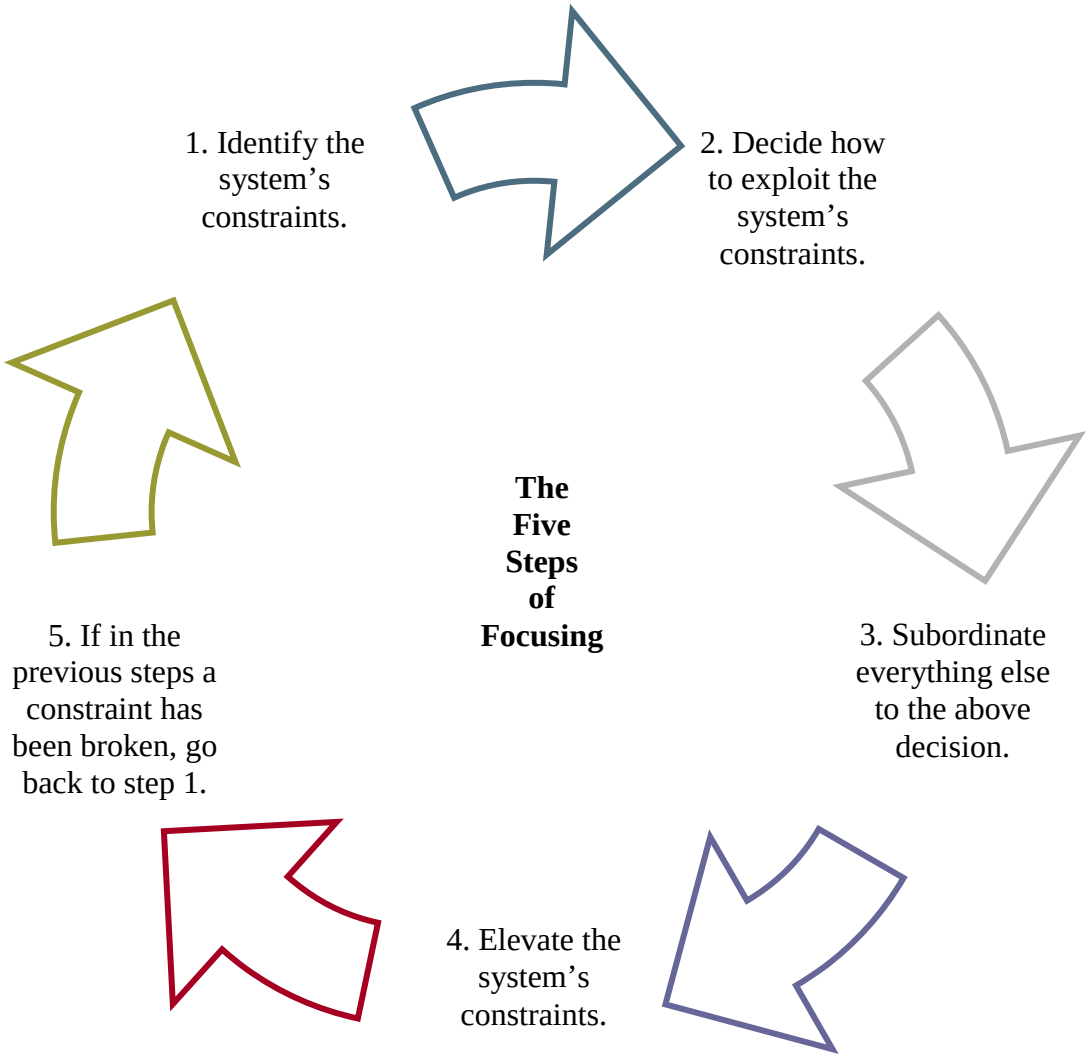

Figure 1. The Five Steps of Focusing – The Process of Ongoing Improvement

Obviously, identifying the system's constraints implies the process of locating the limiting factors of the system. In addition, identifying the constraints implicitly proposes that the constraints be prioritized according to their individual impacts on the global objective (Goldratt 1990, p. 5). In this step two different cases of constraints may be encountered (Goldratt 1997, pp. 92-93). The first and more intuitive one is the case concerning a physical constraint, e.g. a bottleneck or, yet in other words, a lack of some critical resource or a shortcoming in capacity. The second case concerns encountering an erroneous policy.

In light of the two cases depicted above the decision regarding the exploitation of the system's constraints may likewise face two scenarios (Goldratt 1997, pp. 92-93). As for the scenario involving a physical constraint the proper measure would be strengthening the weakest link, i.e. improving the efficiency or capacity of the bottleneck. An erroneous policy, on the other hand, requires replacing the policy as opposed to strengthening.

Recalling the integral linkages of the throughput world, it is self-evident that any decision made as part of the second step is likely to have ramifications reaching beyond the particular link initially targeted. Analyzing the situation from the holistic perspective of protecting throughput, Goldratt (1990, p. 5) concludes that the exploitation of all unconstrained resources should be adjusted to the maximum level of performance of the weakest link. This stems from the fact that the overall performance of the system is sealed as dictated by the constraints. By subordinating all other operations to the solution agreed upon in step two, the possibility of redundant or futile effort is eliminated.

The fourth step, elevating the system's constraints, simply addresses the issue of reducing the limiting impact of the identified constraints even further (Goldratt 1990, p. 5). The desired result being enhanced global throughput, targeted measures have to be taken in order to ensure the leverage of the inhibiting factors.

Continuously elevating a constraint will inevitably at some point cause the constraint to break, that is, become noncritical. Thus, to avoid inertia in the system being empowered, one must at this point return to step one and successively repeat all actions of the process (Goldratt 1997, p. 94). Goldratt accentuates the importance of regularly reviewing the rules that have been derived from the existence of constraints. Not paying sufficient attention to questioning the validity of instituted policies may result in policy constraints being the greatest limiting factors of the system. To sum up, due emphasis must be placed on not allowing inertia to bring about a system constraint.

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The Process of Ongoing Improvement

The workable procedure consisting of the five steps of focusing laid out in the previous also corresponds to the process of ongoing improvement (Goldratt 1997, p. 95). The process of ongoing improvement essentially means being able to achieve continuing success without experiencing the loss of momentum following even a dramatic growth. The consequent stagnation combined with misguided management policies may in a worst case scenario cause the demise of the business (Sheridan 1991, p. 44). In point of fact, a major problem with companies pursuing ongoing improvement is the lack of an adequate definition of the concept. Sheridan (1991, p. 46) quotes Eliyahu Goldratt for a meticulous definition: 'Anything that improves the bottom line is an improvement. Anything else is an ego trip.' By nature, a successful implementation of the process of ongoing improvement requires a leap to the throughput world (Sheridan 1991, p. 46). However, making the leap partially as far as the organizational functions and levels are concerned does not suffice. Without a comprehensive across-the-enterprise transformation the improvement chain will ultimately be blocked.

The Team Viewed as a System

Since the introduction of TOC in the The Goal (1992), Eliyahu Goldratt has successfully applied the theory in a number of different contexts. In It's Not Luck (Goldratt 1994) TOC is put into operation for sales and marketing, whereas in Critical Chain (Goldratt 1997) the power of TOC is harnessed in the environment of project management. Indeed, according to Umble and Spoede (1991, p. 27) TOC is a generic management philosophy for all levels, departments and functional areas in the business organization. Taking this argument one step further, Umble and Spoede (1991, p. 27) propose that TOC as an overall management philosophy can be viewed as an umbrella for reinforcing the effectiveness of other management methodologies. In what follows, with reference to its generic nature, TOC is analyzed from the point of view of teamwork and Systems Intelligence. Being inherently sensitive to systemic interventions, teamwork qualifies as an ample candidate for systems intelligent TOC leverage.

For the purpose of this article the team concept is defined as any group of individuals faced with an arbitrary task characterized by encompassing a desired state or output. Intuitively it is apparent that a team represents a human system. However, vis-à-vis the system concept portrayed by Saarinen et al. (2003) in their programmatic outline of Systems Intelligence the team concept defined above possesses an intriguing dissimilarity. Before advancing on this subject the five key features distinguished by Saarinen et al. (2003) to delineate a system are summarized in the following enumeration.

1. A system is defined by the following variables: elements, interconnections and reciprocities.

2. A system amounts to more than the mathematical sum of its entities. Saarinen et al. (2003) refer to this quality of the system as emergent.

3. Minor changes imposed on the system may have significant consequences.

4. A system must be defined in accordance with the chosen perspective of analysis.

5. As far as the input and decision variables are concerned, the control of a system is by nature imperfect.

The characteristics outlined by Saarinen et al. (2003) do not take the possible output or state of the system into account. However, the authors do reflect upon the subject as they turn their attention to the link between systems and game theory. In that context the output of a system is defined as the variables that can be observed directly. The state in turn comprises the state variables constituting the elements of a system. Also the concepts of controlling as well as observing a system are put forth.

I believe that the state or output of the system is an essential factor worth considering in detail as an additional feature defining a system. By state I mean the level of operation, i.e. the current operational status, of the system. Output, on the other hand, pertains to the yield or productive result of the system. In either case, the logic is applicable to any scenario involving a system as defined by Saarinen et al. (2003). Therefore, a system may for instance maintain peace of mind or produce happiness as well as quality footwear and forklifts. As implied by the fourth statement of Saarinen et al. (2003), a system needs to be defined with respect to the observer's point of view. As for the system state or output, I would employ the same reasoning and recommend that the state or output be defined specifically in accordance with the perspective of analysis.

In light of the foregone discussion a team may represent any of the following human systems: a board of directors, a project team, an orchestra, a family, a football team, etc. Hence, the arguments presented herein are not to be taken solely from a business perspective, albeit they have far-reaching managerial implications.

TOC and Systems Intelligence

Successfully employing TOC in the context of teamwork requires adopting the approach of protecting throughput in contrast to controlling costs. In essence, protecting throughput translates into managing and understanding the team holistically, accentuating the team performance as the core measure of achievement– not the individual performances of the team members. As for this holistic approach towards problem solving, TOC has a close relationship with Systems Intelligence. Saarinen et al. (2003) de facto elaborate on the notion of wholeness and holism and present several conforming ideas constituting the foundation of Systems Intelligence. To begin with, the authors assert that the whole is more important than the constituents. Moreover, it is proposed that in many cases people would change their behavior if they were given the chance to objectively comprehend the system settings imposing or dictating that behavior. It is also argued that most subjects taking part in a system do not understand the cumulative overall effects their individual reactions may have on the system. The key ideas stressed by Saarinen et al. (2003) are also reflected upon in Checkland's Systems Thinking, Systems Practice (1999). Checkland (1999, p. 3) describes the central characteristics of the system as the properties of the whole – not properties of the component parts. Checkland (1999, p. 5) continues to define the "systems approach" as a means of approaching a problem utilizing a broad view, i.e. attempting to take all aspects into account and concentrating on interactions between the constituents of the problem. In conclusion, it all comes down to Systems Thinking – defined in the following words by Peter Senge (1990).

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> *"Systems thinking is a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static 'snapshots'. … And systems thinking is sensibility – for the subtle interconnectedness that gives living systems their unique character."* (Senge 1990, pp. 68-69)

Systems Thinking has been studied and applied as a means of problem solving by numerous authors (e.g. Churchman 1979, Flood 1999, Gharajedaghi 1999). The relationship between TOC and Systems Thinking and, consequently, Systems Intelligence is interestingly put into perspective by Mabin and Balderstone (2003).

> *"The TOC approach epitomises systems thinking: a philosophy that recognises that the whole is much more than the sum of its parts, and that a complex web of interrelationships exist within the system."* (Mabin and Balderstone 2003, p. 570)

As pointed out in the course of the discussion relating to the elements characterizing a system, the concept of system state or output is not referred to by Saarinen et al. (2003) as a fundamental systemic feature. However, as for the systems intelligent adoption of TOC in the case of teamwork I suggest that this characteristic be addressed properly. Saarinen et al. (2003) do

contend that structure produces behavior, but the possible state or output of the system is not targeted with the exception of the game theory topic. In order to be able to efficiently implement TOC in teamwork, I insist that the main operative focus be placed on the throughput of the system as a whole. Furthermore, I propose the emphasis on throughput also be included as a fundamental element in Systems Intelligence. I believe that a system is metaphysically defined, at least partially, by its outcome or state in the sense that a system without exception either produces or maintains a result or a status, respectively. Since systems intelligent behavior according to my perception leans towards a certain level of pragmatism I would consider the embodiment of throughput in Systems Intelligence a powerful complementary asset. As a matter of fact, Saarinen et al. (2003) provide an illustrative example of the emergent potential of a system in their programmatic outline. Using an example of a project team, the authors describe the substantial possibilities of system leverage as a result of positively reinforcing human interaction. Additionally, the subject is touched upon as the authors make an effort to clearly distinguish Systems Intelligence from Systems Thinking.

> *"Systems Intelligence reaches beyond Systems Thinking in its pragmatic and active, personal and existential emphasis."* (Saarinen et al. 2003)

The following section initiates an attempt to present suggestions for harnessing that emergent potential in a human system, and more specifically in teamwork.

Leveraging Teamwork with Systems Intelligent TOC

This section addresses the issue of applying the five steps of TOC in the context of teamwork.

As discussed earlier, the first step of the process is to identify the system's constraints. In the generic case two scenarios were introduced, the physical constraint and the erroneous policy. As argued in the previous section, the systems intelligent TOC approach is based on the concept of overall team performance. In The Fifth Discipline, the landmark contribution to the concept of the Learning Organization, Peter Senge (1990) explains the poor performance of a team in terms of alignment and wasted energy.

> *"The fundamental characteristic of the relatively unaligned team is wasted energy."* (Senge 1990, p. 234)

According to Senge (1990) the kernel of this statement lies in that fact that the potentially extraordinary hard work of the team members does not translate into a united or common effort, i.e. a team effort. By contrast, Senge associates the aligned team with a commonality of direction and harmonization of the individuals' energies. Senge parallels this phenomenon to the development of resonance or synergy as well as the coherent light of a laser. I believe that this proposal by Senge lays the foundation for the identification of a team's constraints – that is, the unalignment of a team could generally be considered the primary constraint in teamwork.

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Contemplate the following scenario. A team is formed by a group of experts to be responsible for an operation of paramount importance. The outcome of the operation is directly proportional to the overall performance of the team, i.e. the combined performance of the team members including synergy as well as rivalry. Acting blindly in accordance with the cost world introduced by Goldratt (1997) results in each team member striving to optimize his or her performance

without paying any attention to the interactions inside the team affecting overall performance. Using project management terminology, the team members attempt to create local optima instead of a global optimum. In my experience a major driver for this single-minded quest for localized optimization may be the misconception among team members that individual excellence is more appreciated or valued than the total accomplishments of the team. That having been said, one must stress that this quest is often well-founded due to poor or misleading management – or total lack thereof – which in some cases even enforces localized optimization. The major reasons and solutions for unalignment will be addressed in more detail as part of the second step of the TOC routine. All the same, it should be clear from this example that the unalignment of a team may in a worst case scenario be substantial and, thus, a serious constraint of the system.

The second step suggests that the system's constraints be analyzed for exploitation. In the case of teamwork this refers to replacing an erroneous policy. There are several feasible reasons for a possible distortion towards unalignment in teamwork. In my opinion, especially the following underlying causes are worth putting forward for consideration.

- A weak commonality of purpose.
- Distorted measurement of success.
- Team pessimism.

Within the scope of this article only the first aspect, a weak commonality of purpose, will be examined thoroughly. Nevertheless, the other two allegedly major causes of unalignment – distorted measurement of success and team pessimism – represent interesting targets for future research and should under no circumstances be undervalued. For example, the aforementioned misconception regarding the question about individual performance versus team performance is without doubt strongly associated with distorted measurement systems. By these I mean team performance indicators which do not optimally enhance overall team performance. In fact, I believe that distorted measurement systems may in the least favorable case even weaken overall team performance. In other cases they just strengthen each team member's effort to optimize his or her individual performance, frequently leaving much room for improvement with regard to the global accomplishments of the team. In developing team performance measurement frameworks it is imperative not to lose focus of something I am inclined to call the *teamwork axiom*: the team is superior to any single team member due to the fact that one team member's weakness can be compensated for through the strengths of others (Rushmer 1997). Rushmer (1996) also refers to this powerful trait as "harnessed diversity". The importance of measuring team success in a constructive manner is emphasized in teamwork culture guides as well. In building highly effective teams even a team member with an excellent personal record of performance should be valued less than the team member capable of achieving results with others[2].

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By team pessimism I mean a general pessimistic attitude among team members which spreads and grows inside the team as an epidemic outbreak, preventing the team from performing to the best of its ability and potential. In his revolutionary guide to learned optimism, Martin Seligman

[2] http://humanresources.about.com/library/weekly/aa122001a.htm

(1998, p. 156) presents the following predictions for athletes and team sports. First – assuming that all other factors affecting performance are equal – the athlete with a more optimistic attitude will succeed or win because he will try harder especially under pressure, e.g. after a frustrating defeat. Second, in conformity with the optimistic athlete – again assuming equal talent – a team with a higher level of optimism will win. And following as a result from the two previous predictions, Seligman hypothesizes that once an athlete changes his attitude from pessimism to optimism, he should in fact succeed better or win more, again particularly under pressure. Thus, the optimistic and pessimistic attitude of the whole team may produce either victory or defeat, respectively. Seligman goes on to explain the role of optimism in an organization or organizational team. According to Seligman talent is not always enough – especially in 'high-defeat', 'high-stress' occupations requiring persistence and initiative, dynamic optimism is a real virtue (1998, p. 256). Seligman asserts that an optimistic employee produces more, and that even an extraordinary talent may amount to nothing unless a firm belief in one's chances to succeed is present. However, Seligman is convinced that optimism can be taught – on a personal as well as a team level (1998, pp. 258-280). In conclusion, team pessimism may be a severe inhibitor of team alignment. In order for the team to be ready to recuperate as a united whole when adversity strikes, team pessimism is to be addressed properly and a change of attitude towards what Seligman calls the "optimistic organization" should be fulfilled.

Team Learning

A weak commonality of purpose indicates that the team members do not have a clear vision of their consolidated goal. That being the case, the team ineluctably suffers from reduced determination, motivation, passion, resolution, etc. and in the wake of these undermined productivity, efficiency and stamina. According to Senge (1990, pp. 234-235) a commonality of purpose is equivalent to the notion of having a shared team vision as well as understanding how to complement other team members' efforts. As stated in Senge's The Fifth Discipline, the means to confront a weak commonality of purpose is found in team learning.

> *"Team learning is the process of aligning and developing the capacity of a team to create the results its members truly desire."* (Senge 1990, p. 236)

Senge presents some interesting dimensions of team learning, the most important of which are discussed in this context. First, Senge (1990, p. 236) proposes the need to think insightfully about complex issues. By this statement Senge refers to the ability to take advantage of the synergy in the team, i.e. the cooperative interaction which allows for a combined effect to be greater than the sum of the individual effects. This idea was also discussed briefly in the previous section, where the team synergy was referred to as the emergent potential of a system. Saarinen et al. (2003) propose three different reasons for the absence of team synergy. First, people view themselves as individual agents affected and, above all, limited by others and the interaction patterns of the environment. This translates into internal team competition as opposed to cooperation. As a second argument the authors suggest skepticism towards the possibilities of remarkable positive change in the other people as well as the system. And third, skepticism towards a remarkable positive change in oneself is proposed. These possible inhibitors of team synergy are presented as contrasts to the virtues of Systems Intelligence. Indeed, Saarinen et al. (2003) assert that Systems Intelligence is based upon the assumption that human interaction intrinsically is a system exhibiting a massive potential of leverage.

The second dimension of team learning is the need for innovative and coordinated action, i.e. action that is spontaneous yet structured and systematic (Senge 1990, p. 236). Senge introduces

the concept of 'operational trust' – a form of enhanced relationship utilized effectively in outstanding organizational teams. Senge describes the operational trust as a way of interaction, where each team member is actively conscious of other team members and, thus, acts in a manner that complements the actions of the others. The concept of operational trust is strongly linked to the ideas that Saarinen et al. (2003) bring forward as part of their discussion regarding a person's perspective inside a system. The authors convey that the perspective or behavior of a person demonstrating systems intelligent qualities is characterized in the following two ways.

- The person perceives himself as part of a system environment and adopts a holistic perspective as opposed to a limited self-centered perspective.

- The person perceives himself and his environment from the perspective of the system and is consequently able to act intelligently – that is, in harmony – with the system.

Saarinen et al. (2003) refer to these characteristics with the general concept "seeing oneself as part of a system", the perhaps most important consequence of which is the ability to influence systemic interactions. In the same context the authors contend that in particular self-centeredness is a personal trait that Systems Intelligence attempts to challenge. Saarinen et al. (2003) insist that "self-centeredness is a prominent feature of the human apparatus and of our mode of thinking". To manifest a clear distinction between this limited perspective and the holistic perspective that Systems Intelligence offers, I trust an additional note on this issue is in order. Systems Intelligence convincingly displays the power of extending one's perspective to cover, on the one hand, the system one is part of, and, on the second hand, the interactions the system entails. Extending one's perspective implies moving from a limited vision to an enlightened vision, disclosing a frame of reference previously unknown to the person experiencing this revelation.

Saarinen et al. (2003) mention several aspects connected to the aforementioned ability to see oneself as an actor inside a system. The most fascinating aspect in the context of team learning is expressed as follows.

> *"The impact of one's behaviours and possible changes in interaction patterns upon the behaviours and possible interaction patterns of other agents in the system."* (Saarinen et al. 2003)

The concept of operational trust and the ability to see oneself as part of system both have crucial implications as far as the interactions inside a system are concerned. Especially from the point of view of Systems Intelligence the capability to affect or manipulate those interactions consciously is of paramount importance. In the case of human systems such as teams this type of skill is also discussed in Howard Gardner's Frames of Mind, the groundbreaking contribution to cognitive psychology introducing the theory of multiple intelligences (see also Gardner 1993b and Gardner 1999). Gardner (1993a, p. 238-278) examines the interaction in human systems through the presentation of personal intelligences and particularly the interpersonal intelligence. The essence of interpersonal intelligence is captured in the following sentences.

> *"[Interpersonal intelligence] turns outward, to other individuals. The core capacity here is the ability to notice and make distinctions among other individuals and, in particular, among their moods, temperaments, motivations, and intentions."* (Gardner 1993a, p. 240)

Elaborating on the systemic interactions and the possibility of elevating them for some purpose, Gardner concludes as follows.

> *"In an advanced form, interpersonal knowledge permits a skilled adult to read the intentions and desires – even when these have been hidden – of many other individuals and, potentially, to act upon this knowledge – for example, by influencing a group of disparate individuals to behave along desired lines."* (Gardner 1993a, p. 240)

The third and final dimension of team learning I intend to discuss within this scope is dialogue. As stated by Senge (1990, p. 237), mastering practices of dialogue and discussion – the two ways teams converse – is vital in team learning. Dialogue is characterized by free and creative exploration of both subtle and multi-faceted issues, deep 'listening' to other team members as well as suspension of the single team member's own views (Senge 1990, p. 237). Discussion, on the other hand, is the process of presenting different views on subject in a search to discover the best candidate for the situation prevailing (Senge 1990, p. 237). In this sense I get the impression that a discussion bears resemblance to a debate, whereas a dialogue is more similar to an instance of brainstorming. Senge continues to assert that these two forms of communication are potentially complementary – that is, if they are properly harnessed. Equally important is the ability to deal creatively with the forces hindering dialogue and discussion (Senge 1990, p. 237). Senge explains these destructive forces as habitual ways of interacting, the purposes of which are to reduce the risk of embarrassment and mistrust (see also Senge 1999). In the wake of this weakened dialogue team learning is obviously diminished. Dialogue is also mentioned by Saarinen et al. (2003) – with references to Bohm (1996) and Isaacs (1999) – as one of the pillars of Systems Intelligence. The true engagement in dialogue is described by Slotte (2004) as a full engagement of oneself in that relation in all particular situations, the last part of which I interpret as something being done with respect to all surrounding aspects. Slotte (2004) continues to state that in order for a dialogue to come true, a "trustful turning towards to other" is needed. I propose that this way of approaching dialogue is imperative in teamwork as well as team learning, and, thus, an important asset as for the inhibitors of dialogue brought forward by Senge.

The Final Steps

In this final section covering the application of the TOC working model in teamwork only the third step serves a purpose of being discussed in detail. The fourth and fifth step – elevate the system's constraints and go back to step one to avoid inertia, respectively – are to be considered standard TOC procedures, the functions of which are to complete the logical circle in the process of focusing. However, the essence of these routines should not be forgotten: they ensure the successful implementation of the process of ongoing improvement.

I believe that an appallingly large portion of a team's efforts, in particular related to business situations, is futile, rendering the efforts merely ends in themselves.

The third step of the TOC working model suggests that all other components of the system be subordinated in accordance with the decision made to exploit the system's constraint. In the context of teamwork this generically translates into a need to adjust all unnecessary team functions to support the maximum efficiency of the identified constraint. According to Lockamy and Cox (1994) nonconstraint resources contain either productive capacity, which can be used to support the constraint throughput, or idle capacity, which is intended as protection against system disruptions. Using the same terminology one may conclude that nonconstraint resources utilized beyond their productive capacity do not improve throughput but only increase inventory (Rahman 1998, p. 338). As for teamwork this usually means wasting critical resources.

My hypothesis in reference to the third step suggesting subordination of nonconstrained resources is as follows. I believe that an appallingly large portion of a team's efforts, in particular related to business scenarios, is futile, rendering the efforts merely ends in themselves. This hypothesis stems from the assumption that a great number of team routines are governed by images that limit us to familiar and learned manners of thinking and acting. Senge (1990, p. 174) refers to these images as "mental models", deeply held internal models or images of how the world works. According to Senge our mental models are severe development barriers in the sense that they prevent new insights from being put into practice. In fact, even the best systemic insights may be overwhelmed by the inertia of deeply entrenched mental models (Senge 1990, p. 177). Senge views the discipline of managing mental models as a promise of a significant breakthrough for building learning organizations. Interestingly, Saarinen et al. (2003) also devote a section to the relationship between mental models and Systems Intelligence. Saarinen et al. (2003) suggest that especially mental models associated with beliefs are to be given due attention with regard to Systems Intelligence. This statement is backed up by the suggestion that the possibility of change in a person's beliefs in turn represents a major window of opportunity of change. As Systems Intelligence may be viewed as skillfulness in complex system environments, it arises as a great asset to the ability to analyze and change deeply rooted mental models.

In the following list I have gathered some possible scenarios of futile team or team management efforts.

- Pushing the team to the limit out of principle.
- Removing team critical benefits or privileges in order to decrease noncritical costs.
- Abusing deadlines; forcing the team to meet deadlines which are not strategically vital with respect to the team's overall performance.
- Exaggerated and unmotivated bureaucracy.
- Team feedback and reporting sessions marked by restrained dialogue.

The challenge presented in this section is highlighted by the intrinsic organizational resistance to change. Mabin et al. (2001, referring to Kanter 1985) provide a comprehensive list of factors that actually cause resistance to change. It is not my intention to analyze them in this context, but just to mention the most interesting ones.

- Fear of the unknown.
- Loss of control.
- Loss of face; feeling embarrassed by the fact that you might have done something wrong.
- Need for security.
- Force of habit; fear of loosing the comfortable familiar routines.

Saarinen et al. (2003) present Systems Intelligence as a philosophy of change. One of the cornerstones in the Systems Intelligence theory is the belief that a system itself can change as a result of even a relatively small intervention. Due to this inherent susceptibility a system comprises an enormous potential of leverage (Saarinen et al. 2003). Moreover, Saarinen et al.

(2003) propose Systems Intelligence as a tool to achieve higher-order change, or second-order change as Watzlawick et al. (1974) describes it. From the point of view of TOC the dynamic perception and action-driven attitude advocated by Systems Intelligence serves as a forcible asset.

Identifying Constraints through Systems Intelligence

The ability to identify the constraints in an intricate system is pivotal as one seeks to successfully implement TOC in order to obtain second-order change. According to the TOC principles identifying constraints essentially translates into locating the most acute and pressing bottlenecks of the system. However, since TOC represents a highly generic management tool a generalization of the concept of system constraints might serve as a gateway to a more intuitive understanding of TOC examined in an arbitrary context. The first principle of TOC – presented in the introduction of this paper – states that every system is accompanied with at least one constraint. My hypothesis is that the part or function of a system acting as the prime obstruction of momentous progression and enrichment does not necessarily correspond to a constraint but rather to a catalyst, or more accurately, an inactive or unexploited catalyst. I believe that in many systems and systemic scenarios the most profound changes and improvements can be realized not by attacking and desperately striving to resolve the ostensibly apparent problem, but by acknowledging the underlying interactive structure of the system and, thus, identifying the *trigger point* of the system. I wish to define the trigger point as the most effective source of or channel for systemic leverage – that is, the constraint or catalyst that acts as the most crucial inhibitor or most potential activator, respectively, of enhancement.

In describing the laws of the fifth discipline Peter Senge (1990, pp. 63-65) conveys a similar pattern of thought as the one presented above.

> *"Small changes can produce big results – but the areas of highest leverage are often the least obvious."* (Senge 1990, p. 63)

Senge (1990, p. 63) argues that the most apparent solution indeed not only fails to resolve the problem but also might worsen the situation in the long run. According to Senge (1990, pp. 63-64) remarkable, enduring improvements may be achieved through relatively small but well-focused actions provided they are implemented in the correct loci, i.e. at the identified trigger points. And in equivalence with the challenge of establishing the system constraints in the application of TOC, Senge (1990, p. 64) accentuates the paramountcy of being able to pinpoint where the high leverage of the system resides.

Turning his attention to rules or procedures for identifying high-leverage changes, Senge (1990, p. 65) suggests that the ability to see underlying 'structures' instead of 'events' represents an effective starting point. However, this ability also constitutes one of core ideas of Systems Intelligence. As stated in the final paragraph of the previous section, Saarinen et al. (2003) present Systems Intelligence as a dynamic tool to accomplish higher-order change. In addition, Saarinen et al. (2003) put forth that a higher-order change requires a change of perspective as to the way a problem is viewed. This in turn induces a shift of thinking enabling the potential realization of higher-order change. The relationship between Systems Intelligence and the quest for higher-order change is summarized in the following words.

> *"Systems Intelligence is about getting out of the reactive loop and onto the tracks of higher-order possibilities. A systems intelligent person acknowledges the fact that her perception of the system in which she operates might be distorted, one-sided or*

> *mistaken. She is constantly on the look-out for possible redefinition of her very perception of the system – for possibilities of a higher order."* (Saarinen et al. 2003)

Taking the problem-solving and change-seeking potential of Systems Intelligence one step further, it is my intention to launch Systems Intelligence as a viable vehicle for intuitively identifying the trigger points of a system. I believe that the systems intelligent person has a high-level capability to grasp and marshal the complex processes and interactions that ultimately dictate the systemic environment, and, consequently, to accurately establish the constraints as well as the catalysts of the system. In fact, I wish to hypothesize that a systems intelligent person automatically perceives a system as a field of opportunities – that is, an environment with certain trigger points the leverage potential of which he seeks to unleash.

Conclusions

During the course of writing this article I have become convinced of the competitive edge that Systems Intelligence is able to offer the Theory of Constraints, especially in the context of teamwork. Not only do Systems Intelligence and the Theory of Constraints complement each other, but they also mutually reinforce each other, creating an abundant source of synergy. The Theory of Constraints represents a powerful problem-structuring and problem-solving methodology, presenting management with an intuitive yet highly capable tool to address shortcomings in efficiency. Systems Intelligence, on the other hand, represents the new wave of thinking in all realms of life – intelligent systemic behavior actively interpreting interactions and enabling the individual to succeed through an enhanced holistic frame of reference.

Obviously there is still much research to be done. As I pointed out regarding the causes of team unalignment, distorted measurement of success and team pessimism both constitute interesting areas of analysis. However, the commonality of purpose or lack thereof combined with team learning is too vast a subject to be covered within the scope of this article. Nevertheless, it is my hope that this article will raise some interesting questions concerning both Systems Intelligence and the Theory of Constraints and that the connection between Systems Intelligence and the Theory of Constraints will grow stronger in the future. In light of this article I am definitely also looking forward to a teamwork case study realizing the inspiring and innovative power implicit in the combination of these two principles. And finally, I would like to refer to the updated version of Systems Intelligence: A Programmatic Outline by Saarinen et al. (2003), renamed Systems Intelligence: Connecting Engineering Thinking with Human Sensitivity (Saarinen and Hämäläinen 2004). This paper provides an even deeper understanding of the concept as well as the potential of Systems Intelligence. Also from the point of view of the Theory of Constraints the ideas developed by Saarinen and Hämäläinen (2004) serve as an interesting area of future research.

The teamwork benefits of the Theory of Constraints approach leveraged by Systems Intelligence are, I believe, without limit.

> *"Without changing our pattern of thought, we will not be able to solve the problems we created with our current pattern of thought."* (Albert Einstein)

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Systems Intelligence in Public Policy

Chapter 11

From Conflict Management to Systems Intelligence in Forest Conservation Decision Making

Paula Siitonen and Raimo P. Hämäläinen

We present a new systems intelligent forest conservation process, which shifts the focus from conflicts into defining a common goal and innovative ways to reach it. The process aims to create self encouraged co-operation and positive trust among the participants' by recognizing and avoiding the systemic responses originating from reactive and conflict driven thinking and interactions. The idea is to create a shared vision of the desired future to embed different values and interests in the alternative strategies to reach it. The systems intelligent forest conservation process is seen as a step towards a culture of innovative collaboration, which can produce sustainable decisions.

Introduction

In this article we outline and discuss ways to introduce a new framework and perspective to forest conservation planning. It is called the systems intelligent participation process. The starting point of Systems Intelligence (SI) (Saarinen and Hämäläinen 2004) is the acknowledgement of the fact that every decision making process is systemic. The stakeholders and participants react to the ways the process is carried out. The understanding of these reactions and feedback phenomena can be the most important driving forces steering the process. Thus, one is likely to reach a successful result only if one takes these into account i.e. acts in a systems intelligent manner. For example, if the situation is initially portrayed as a conflict then the participants are likely to react by choosing an adverse and advocate mode of behaviour.

The conservation and management of forest resources interest people for different and often conflicting reasons. Public interest in forest conservation and other natural resource management problems has resulted in the development of new participatory planning techniques (Renn 1999, Wondolleck and Yaffee 2000). Interactive participatory decision analysis provides a systematic approach to understand and structure resource management problems, and to generate and evaluate policy alternatives (see e.g. Marttunen and Hämäläinen 1995, McDaniels and Roessler 1997, Hobbs and Meier 2000, Hämäläinen et al. 2001, Hämäläinen 2004).

Conflict management is based on the idea of regulating conflicts. In resource management reasons for conflicts include lack of knowledge, differences in the interests and values of the stakeholders, structures of the processes and interrelationships (see e.g. Priscoli 1997, Hellström 2001). Walker and Daniels (1997) proposed that conflicts can be addressed through the three dimensions of any conflicts: substance, procedure and relationships. Niemelä et al. (2004) used this approach to understand how biodiversity related conflicts arise in forestry.

Recent resource management literature acknowledges the need to shift the initial focus from individual goals and priorities to developing a shared common goal (Wondolleck and Yaffee 2000, Gregory et al. 2001). It is essential to develop the process away from conflicts towards a positive and collaborative generation of creative solutions to a common problem (Watkins and Mohr 2001). This as well as many of the processes and principles already described in the literature does include systems intelligent elements. However, we feel that the introduction of this new concept of systems intelligent participation process will allow seeing the situation from a new perspective and change the whole process of conservation decision making. It should no more be seen in the frame of conflict analysis (see e.g. Hellström 2001, Niemelä et al. 2004). Rather it should be considered as a challenge for the acting parties to produce sustainable improvement in the maintenance of the biodiversity and other conservation values in forest systems.

We first provide the framework and the characteristics of a new systems intelligent participation process. After that we examine the challenges for systems intelligent forest conservation and discuss ways to introduce systems intelligence into forest conservation decision processes. After that we explore how systems intelligence already appears in the conservation practices and how it could be enhanced in new situations.

The conservation process will be seen as a challenge for the acting parties to improve the conservation values in forest systems.

A Systems Intelligent Participation Process

Systems Intelligence refers to intelligent and active behaviour of an individual in the contexts of systems with interactions and feedbacks (Bäckström et al. 2003, Saarinen and Hämäläinen 2004). Systems Intelligence is related to systems thinking (Churchman 1968, Ackoff 1994, Flood 1999), which emphasizes the seeing and understanding of the system as whole with interactions and feedbacks.

A person can behave in a systems intelligent manner, but a decision making process can be systems intelligent as well. In the systems intelligent approach, participants are directed to work together so that they understand their own impact on the system and the reactions of other people and actors in the system. This insight is particularly important, because participants always have inner feelings even if these are not considered explicitly. This behaviour strengthens the prevailing structure of the system e.g. the framing of a forest conservation process as a conflict. Hence, a systems intelligent process encourages the participants to look for new perspectives and modes of actions, instead of letting the structures of the system to frame their thinking. The identification of key moments and issues to change the whole system is a crucial part of systems intelligent behaviour (Saarinen and Hämäläinen 2004).

A systems intelligent facilitator creates a systems intelligent participation process. We propose that it would include the following steps. During the process these can also be repeated.

(1) See the situation as a system with feedbacks and interactions between the decision makers, and interrelationships of this human system with the dynamic forest ecosystem.

(2) Understand how visible and invisible structures of a decision making process can create behaviour. Invisible factors, as fear, may lead the participants to behave in a defensive and adverse way, which blocks creative problem solving. On the other hand, positive trust may release the participants' innovative capacity and encourage them to work together. This includes the initial framing of the situation not as a conflict but as a process of seeking a common better.

(3) Bring the parties involved into a dialogical encounter. This gives people a voice and builds trust between them. Consider the participants as participants, not as representatives of different interest groups. Start working in a dialogue, towards a shared vision of a common goal. This consists of all the benefits related to forest conservation. Acknowledge and evaluate the participants' different experiences in forest conservation: what kind of values, interests and strategies these stories reflect. Create and share new visions of the common future. Focus on the participants' behaviour, relationships and interactions in addition to the goals, needs and alternatives to achieve them. Treat participants fairly throughout the whole process.

(4) Create, evaluate and select practices, which support the achievement of the common goal. These practices may include changes in the visible structures such as timing of harvesting and invisible structures such as the ways the participants meet each others. Seek new innovative alternatives beyond the set of immediate alternatives. Small actions may change the whole system.

(5) Monitor and evaluate the process in terms of visible and invisible results. This means the achievement of goals and changes in the invisible structures such as the participants' relationships. For example, the participants may end up in the feeling that they share a same decision-making system, which encourages them to work together and makes the results sustainable. Consider also what is not achieved or created.

What is not created may tell more about the process than what is created.

Public Participation in a Systems Intelligence Perspective

Public participation in environmental decision making can have different objectives (Renn et al. 1995, Renn 1999, Susskind et al. 2000, Wondolleck and Yaffee 2000, Hämäläinen et al. 2001, Kangas et al. 2001, Mumpower 2001). It is a way for people to have a voice in issues affecting their lives. It increases the participants' understanding of the problem and its alternative solutions. The consideration of different views means that decision makers are better informed and can make more sustainable choices. Participatory planning gives people a possibility to influence and a feeling that their opinions are listened. This encourages them to commit to the decisions and supports the implementation of the decisions. Public participation increases the communication between people. This improves the ways to find innovative solutions to common problems. Participatory planning is an element in systems intelligence. It wider the perspectives of the decision making and increases the shared understanding of the problems. This may facilitate finding of new innovative strategies also in other planning situations.

In current policy processes it easily happens that participation will be implemented in a conflict orientated way (Chess and Purcell 1990). The way the situation is for the first time approached is crucial. The approach, such as conflict management or collaboration, largely defines the outcomes of the process. Extreme care should be taken when the process starts by the

identification of the values, interests, interest groups and the alternatives (see e.g. Keeney 1992, Folger et al. 2001). This may sometimes polarize the positions of the participants by focusing on the disagreements and conflicts between the individual perspectives.

We believe that the next necessary and natural step is the development of the systems intelligent participation process. In the process, participants are lead to work together towards a common goal without restricting their thinking by the pre-specified views of interest groups or individual goals.

The facilitator, often a neutral outsider, has the crucial role in developing the participation process towards systems intelligence. A facilitator needs to ensure that all different types of ideas have the possibilities to be represented. This makes the participants feel that they have a voice and allows them to see the process acceptable. This ensures that some visions are not omitted in advance. The challenge for a facilitator is to help the participants to step out from their individual views and use their creativity and ideas to define a common goal together and finally, to work towards it.

Challenges in Systems Intelligent Participation

A systems intelligent participation process acknowledges that decisions are typically made with incomplete information, but still trying to understand the whole system beyond the details. We see that it is essential to first understand the conservation situation through the actors' interrelationships in order to build positive trust between the participants and to define together a conservation goal.

The question of the definition of a common goal is an important challenge in a forest conservation process. Without an idea of what is wanted it is impossible to create strategies to reach it. The ecological, aesthetic, economic and social goals in forest conservation, as well as the needs for competing uses of forest resources changes over time reflecting the changing values of the societies. The populations of species, their habitats and forest landscapes change dynamically over space and time. Moreover, the legislation, networks of conservation areas and other conservation practices are likely to be continuously updated. A forest conservation process needs to reflect the changing needs of natural and social systems. Therefore, the common goal could be the new sustainable forest conservation process itself and thus it must include both the social organizational and the biological components.

Work together towards a common goal.

Systems intelligent approach is useful, for example, in a setting, where there is asymmetric information between the landowners and governmental agency in the conservation of forests on private lands (Michael 2003). The conservation value of a certain forest is different for every landowner depending on his personal values. The landowner knows his personal values, but the governmental agency does not know these. It is not known if a landowner is willing to protect his forests without any compensation or at what price. A systems intelligent approach addressing this situation is to create positive incentive mechanisms, which alter the landowners' behaviour to voluntarily conserve the forests with high conservation value (see e.g. Parkhurst et al. 2002).

A systems intelligent process focuses on seeking a common goal and working towards it together beyond the individual values, interests, believes and assumptions. Values are reflected in our ideal goals, foundations of needs and interests. So far the public debate on forest conservation in Finland has been strongly polarized into nature position and forestry position. The outcomes of

decision alternatives are seen to be more extreme than what they really are (Rantala and Primmer 2003). The discussion on forest conservation typically focuses on the differences of the priorities and interests of the stakeholders, and on believes on how well alternative strategies fulfill their needs. Value focused thinking (Keeney 2002) emphasizes the definition of the values before comparison and generation of the decision alternatives. A systems intelligent approach uses these ideas to develop a common goal through dialogical interaction between the parties but without separating different perspectives, which may polarize the attitudes.

A systems intelligent participation process addresses in particular the participants' interrelationships and behaviour. Studies on environmental decision making have indicated that improvement in the participants' communication and expression, assurance, positive thinking and openness to new ideas aids participants to understand different views and collaborate (see e.g. Wondolleck and Yaffee 2000, Folger et al. 2001, Hämäläinen et al. 2001). Participants should be lead to meet and appreciate each other as contributors and colleagues (Gregory and Keeney 1994, Slotte and Hämäläinen 2004).

Structures Create Behaviour

Systems intelligence appears in (1) understanding that both the visible and the invisible structures guide the participants' behaviour, and (2) in using this observation to create processes, which produce systems intelligent thinking and behaviour.

Participants are not only guided by the visible structures of the existing systems. Invisible structures of the ways the individuals think shape their behaviour even more powerfully than visible structures, and are much more difficult to identify and address. Hence, existing visible systems creates structures, which generates behaviour, which in turn affects the individuals' vision on how the world works. A system creates behaviour. For example, fear of expropriation may result in clear-cuts, whereas positive trust generated from voluntary approach and incentives may produce conservation without compensation.

For example, separate local decisions about the conservation or management of each single forest patch may result in a reserve network consisting of several small and isolated conservation areas. This can be both ecologically and economically inefficient strategy (Saunders et al. 1991). Large habitat units close together maintain species more likely than several isolated and small patches of same total area (Hanski 1999). Microclimate and species composition change near forest edges. Therefore large and regularly shaped reserves contain more original habitat than small ones (Saunders et al. 1991, Siitonen et al. 2005). Several small reserves are also often expensive to maintain (Margules and Pressy 2000). Systems intelligence appears in the understanding that sustainable conservation decisions require the conservation planning structures, which allows consideration of the whole biological and social system. This includes the dynamics of species and landscape patters in the different spatial and temporal scales, as well as changes in people's social, economic and conservation interests and values (Margules and Pressey 2000).

In the tradition of forest conservation planning, years of mistrust and conflicts between the participants and a focus on the differences between the parties' interests have generated a system, where every planning situation is seen as a conflict (Watkins and Mohr 2001, Niemelä et al. 2004). This is an example of the interrelationship between structures and behaviour. In general, approaching a planning or negotiation as a conflict makes the participants behave in a conflict management manner (Cooperrider and Srivastva 1987, Thompson 2001). A conflict management approach may create a conflict even in situations, where the underlying interests are not conflicting. Shifting the focus from what is disagreed to what is agreed – from unwanted to the

desired – aids to develop a process out of arguing towards positive and collaborative generation of creative solutions to the common problem. Different outcomes can be achieved from a process depending on whether participants are invited to talk about a conflict or to build a shared vision of forest conservation process together. For example, Thompson (2001) noted that negotiators who focused on mutual interests resolved the problems better than those focusing on rights and power.

The problems in forest conservation decisions can be understood also from the perspective of game theory. Individuals, each of them behaving rationally from their own individual perspectives, can end up in a stable equilibrium, which can represent a collectively inefficient poor solution. In the general context of resource management this is called The Tragedy of Commons (Hardin 1968) and it appears e.g. in the overgrazing of pastures and pollution of air and waters.

Mental Models

Mental models guide our thinking and behaviour in the context of learning organizations. "Mental models" refers to the individual's perspective taken when approaching a problem. Mental models control our thinking, but also how we act and interpret ideas presented by other people. For example, our response to a certain idea often depends on who has expressed it, e.g. an environmental group or a forest company. Moreover, we talk to people differently on the basis of which kind of values we think that they have. Hence, in a forest conservation process, behaviour of the participants depends on what they think that other people think that they think that the other people think…

In environmental decision making, individuals may lack holistic view of situations and how alternatives satisfy their values and needs. Moreover, individuals do not always have well formulated perspectives with clearly defined values and objectives. Therefore, peoples' opinions – their personal interpretations of the issues – and activities are sometimes even contradictory to the values and objectives what they say and think that they have.

Behavioural decision research describes how people make choices in different situations. Simon (1957) noticed that people generally try to simplify decisions to manageable levels for example by using a satisfying principle instead of optimization. Gigerenzer et al. (1999) discussed the use of simple heuristics and rules of thumb. For example, people may select a single criterion they find most important and make their decisions according to it or use strategies they have applied earlier in similar kind of situations (Gregory et al. 1997). One strategy is to reduce problems to small and more manageable parts. These strategies aim to increase our feeling of managing our surrounding. An illusion of manageability makes us feel that we are safe. Although this is a good strategy in certain situations, it may limit our way of thinking.

Consequently, mental models are our simplified visions of what it likely has happened, and therefore our reactions reflect rather our mental models than what really has happened. In forest conservation processes, assumptions on what other people think and behaving according to that may generate misunderstandings and lead the process far out of the substance. Therefore, it is essential to understand a conservation process as a dynamic system consisting of interacting visible systems such as comments and events, and invisible systems including the way the participants think. Understanding that mental models guide our thinking is first insight to get out of the negative models and free our mind to meet ideas of other people openly. In a systems intelligent forest conservation process, the positive experiences and success stories are used to

create positive trust – or positive mental models - in the conservation process and between the participants.

Facilitators' Approaches to Systems Intelligent Participation

Research on group decision making and support is extensive. Many of the provided techniques aim to improve communication and understanding among the participants. These methods typically require a neutral outsider facilitator, who does not have personal stake in the issue. Susskind et al. (1999) provide a collection of consensus building techniques. A systems intelligent facilitator uses these techniques to lead participants to act systems intelligently in the group without directly asking this. Decision workshops and conferences have the same goals but are usually based on the explicit elicitation of decision criteria and weights (for reference see e.g. Hämäläinen and Pöyhönen 1996, Salo and Hämäläinen 2001).

Dialogue, role games, brainstorming, scenario building, appreciative inquiry and active listening are considered efficient techniques to aid participants to see the situation from the perspective of other participants, describe and evaluate positive experiences, create shared visions of desired futures and finally find a consensus on preferred strategy (see e.g. Isaacs 1999, Wondolleck and Yaffee 2000, Susskind et al. 1999, Whitney and Trosten-Bloom 2003, Slotte and Hämäläinen 2004).

The basic insight in the systems intelligent participation process is to shift from a defensive and attacking advocate mode into an inquiry mode. Appreciative inquiry is an approach, which suggests that human organizations and change are relational processes of inquiry grounded in affirmation and appreciation (Whitney and Torsten-Bloom 2003). It is based on the assumption that questions and dialogue about success and dreams can themselves produce change in the whole decision making process.

Participants become observers of their own and other participants' thinking.

Systems intelligence in decision making also means a shift from discussion, where the aim is to make one's own view to win, into a dialogue, which goes beyond individual perspectives (Senge 1990, Isaacs 1999, Slotte and Hämäläinen 2004). Senge (1990) defines discussion as communication, where different views are presented and defended in a search for a best view to support a decision that must be made. In dialogue, participants become observers of their own and other participants thinking. People present their ideas and enter into deep listening, where being aware of ones prevailing assumptions and mental models, are holding them up for examination (Senge 1990). Instead of trying to find good arguments to critique other ones ideas, a participant tries really to understand the point of other participants. During dialogical interaction people start to consider the other participants as colleagues - not as enemies – working for deeper insight and clarity for a common insight of the desired future. The systems intelligent participation process includes idea of a dialogic approach. The role of the facilitator in systems intelligent participation process is to take care of that all the participants know the dialogical rules of the group meetings. One of the rules is the focusing on the positive experiences and characteristics of the desired future.

In brainstorming, the aim is to create a congenial environment for creative thinking and generate new alternative solutions to the problem. All ideas are listed and each person is considered to be a good idea generator and is encouraged to contribute. In the "why approach", the idea generator is asked why would the proposed idea lead to a preferred result. For example, why will protection of a certain forest fragment improve the survival of some species? The answer then leads to new

why-questions and answers, while an idea undergoes critical investigation (Belton and Steward 2002).

In social encounters like participatory environmental decision making all participants do not typically contribute equally. For example, people may feel that their opinions are unimportant, that they have neither enough knowledge to support the arguments nor courage or verbal skills to present them. They may be afraid that someone uses their opinions against them or that they are not the right persons to highlight some ideas (Susskind et al. 2000). Janis's (1972) theory of groupthink (see also McCauley 1998) explores how the pressure of the group to find consensus at any cost may prevent an open decision making process and innovation of new alternatives to take the place.

One systems intelligent approach is to use the nominal group techniques, in which the participants' are asked to write down their perspectives and ideas anonymously, after which all these ideas are improved together in the group (Delbecq et al. 1975). This avoids interpersonal systemic problems due to the tendency to reach to the persons rather than ideas. There are not their ideas against my ideas. The participants can also present ideas that do not follow the official view of their organizations without the fear.

The key idea in scenario planning is to consider a variety of possible futures that include many of the important uncertainties of the system instead of a single outcome (Kahn 1962, Wack 1985, Schwartz 1996). For example Peterson et al. (2003) used alternative scenarios to explore the uncertainty of future consequences of forest conservation decisions. Participation in the structuring and interpretation of scenarios appeared to create shared understanding, which facilitated generation of conservation decision accepted by the different parties (see also Prendergast et al. 1999, Schmoldt et al. 2001, Siitonen et al. 2002). In the systems intelligent approach, scenario building may be used to screen the positive experiences and alternatives defined together for the desired future.

Focusing on positive experiences and images instead of failures and differences provides a way towards systems intelligent practice. Positive experiences may be the whole success stories or single characteristics, which were considered positive in some processes. The purpose is to help the participants and policy makers to see the situation from different positive perspectives to understand the characteristics of a successful conservation process. On the basis of these experiences, participants are asked to screen different perspectives towards future: to imagine a desired forest conservation process. The facilitator collects these images and structures them by encouraging participants to do clarifying questions using the inquiry mode. Although participants may disagree on some visions, they are only allowed to tell what they do agree upon and develop the idea further.

In the systems intelligent approach we must appreciate and work with the participants' values and to create an interactive process towards mutual understanding and sharing values. The values of different participants can be clarified by decision analysis interviews, which increase the participants' feelings that they are given a voice (Marttunen and Hämäläinen 1995). One systems intelligent way to work with the value preferences elicited is to embed them into a joint model where individual estimates are replaced by the range of opinions with interval models (Hämäläinen and Pöyhönen 1996, Salo and Hämäläinen 2001). Preference programming provides a decision support process, where all the interests of participants are embedded in the same model (Hämäläinen et al. 1991, Hämäläinen and Pöyhönen 1996, Salo and Hämäläinen 2003). This reflects the idea of systems intelligence. The group can then continue to work with the model in the search of a consensus solution without focusing on the differences in preferences. Systems

intelligent decision support should include value focused thinking (Keeney 1992, see also Keeney 2002), which focuses first on the values and only after that on the alternatives that might achieve them. In both techniques the order is reverse to the traditional alternative focused thinking, where decision makers focus first on alternatives and after that start to think the fundamental objectives. Focusing on alternatives can easily strengthen the anchoring in present solutions and prevent innovative imaging of the desired future beyond the existing alternatives.

Systems intelligence in participation process includes the capability to the work with Senge's third and fourth disciplines: shared vision and team learning (Senge 1990). The basic idea in shared vision is that the participants generate a shared understanding of a common problem and dreamed future alternatives. In forest conservation process, it is an answer to a question "What do we really want?" while personal vision refers to individuals or group of participants personal dreams. It is much easier for participants to accept and commit themselves to visions of future in the innovation of which they have self participated. When a participant feels that the alternative presented supports the fulfillment of his values and interests as well, he is willing to commit himself to the implementation of that vision. The aim of team learning is to achieve alignment in people's thoughts and energies. It means that participants can together generate something more than they would have generated if all of them would have been working individually. Successful team learning may happen when persons can use both dialogue and discussion in the appreciative mode.

During the goal definition process, the participants are encouraged to expand their imagination to generate together new innovative alternative futures. New innovations grow from the persons' different ways of thinking enriched by new perspectives to forest conservation process, but without letting existing strategies to frame thinking and innovation. We emphasize the role of a facilitator, whose task is to help the participants to dream the preferred future far over the limits of the sets of the existing alternatives and status quo (see e.g. Cooperrider and Srivastva 1987). However, in forest conservation, it is not always possible to have it all: environmental or cultural values of certain forest patches may be unique and irreplaceable, e.g. due to one and only occurrence of an endemic species. Therefore, it may be fruitful to start to build a shared vision of preferred future from those issues in which a compromise can be obtained. New images are generated through interactive insights as a result of evaluation of success of existing strategies to satisfy common goals and underlying values of the participants (Hämäläinen et al. 2001).

Towards Systems Intelligence with Different Conservation Strategies

There are a number of forest conservation practices. These include permanent and temporary reserves, restoration and the sustainable management of the commercial forests. Naturally the spatial and temporal arrangement of the reserves on the landscape scale is crucial. Sizes of the protected habitat patches and the distances between them are important for the survival of many species (Saunders et al. 1991). Restoration of the processes of natural forests is used to improve the quality of the reserves. The entire network of reserves can be supported by the sustainable management of the surrounding forests. This includes e.g. protection of the key-biotopes and the timing of the harvesting (see e.g. Esseen et al. 1997).

The systems intelligent approach can be used to innovate and combine the conservation strategies. Voluntary forest conservation practices provide attractive, systems intelligent alternatives where the landowner is offered a role of the protector. Then he takes a reversed new perspective on the problem and can act in a completely different way. In Finland the landowners may offer their forests for conservation for fixed periods and of the price they define themselves

(Tikka 2003). This has generated spontaneous co-operation among landowners and communities to create conservation areas. Some landowners protect forests even without any compensation (Tikka 2003). Voluntary approaches create positive processes for conservation, which together with the positive examples may multiply the immediate consequences of protecting a certain forest area (Wondolleck and Yaffee 2000). These effects show that a new way to approach conservation can change the whole culture of participation towards systems intelligence.

Hence, the voluntary forest conservation practices provide possibilities for the systems intelligent win-win situations where conservation can be achieved at a reasonable cost while at the same time respecting the landowners' rights. However, as Michael (2003) noted, it is unsure how well and at what cost a conservation strategy that only relies on voluntary conservation will succeed in maintaining biological diversity or other conservation goals. Therefore, purchase or even expropriations may be needed if certain areas have unique conservation value or sufficient reserve network can not be reached through voluntary conservation.

Voluntary forest conservation programs provide an attractive, systems intelligent policy alternative.

The purchase of property rights for conservation includes a range of actions from taking over all the rights from the land owners to limiting timber harvest only for a certain time period (Doremus 2003). Conservation acquisitions can occur either on a voluntary basis, through purchase at mutually agreed price or through expropriation, where the government forces the landowner to sell the land at fair market price. Expropriations are used in the situation where sufficient areas are not forthcoming otherwise or owners of the biologically unique sites are not willing to conserve them (see e.g. Doremus 2003). Expropriations are politically sensitive and may create negative self-enforcing systems against conservation. Conservation is therefore more likely carried out through the negotiations with the landowners.

Different incentive mechanisms provide a systems intelligent approach often used. The idea of an incentive plan is to provide new information, which changes the perspective of the participant in such a way that when pursuing one's own goal she, in fact, also pursues a general goal (see e.g. Hämäläinen et al. 1990, Ehtamo and Hämäläinen 1993). Incentives can be positive such as payment for positive conservation action, or negative such as fees for actions that negatively affect biodiversity. Parkhurst et al. (2002) proposed an incentive mechanism for non-cooperative landowners to voluntarily create a contiguous reserve across their common border. The agglomeration bonus mechanism pays extra bonus for every area a landowner protects that borders on any other protected area. The author demonstrated by a gaming experiment that this mechanism alters landowners' behaviour making them voluntarily conserve land to satisfy biological needs for species' conservation. We see that this mechanism represents a policy, which generates behaviour reaching mutual benefits by matching the landowner's interest with the community's. It also addresses environmentalist concern that voluntary conservation easily results in fragmented reserve-network, whereas endangered species for which reserves are designed typically requires contiguous reserves (see e.g. Saunders et al. 1991).

Incentives need not necessarily be monetary and there are many incentive policies available. For example, for some landowners technical guidance on how to restore habitats for endangered species can be a more important incentive than financial support (Wilcove and Lee 2004). Such policies reflect systems intelligence by enriching the communication and understanding between the actors in the conservation process.

The creation of markets for the non-timber products of forests, such as ecotourism, can be a way for the landowners to get income from their forests and at the same time produce ecological benefits. This provides a systems intelligent alternative for the competing uses of forests.

Legislative regulations can range from prohibiting an action to limiting the manner in which the action is carried out (Doremus 2003). Systems intelligence appears in understanding that areas protected by regulations may be flexibly complemented with other conservation strategies. This flexibility allows conservation systems to response to the changing needs of the society. It requires the identification of the right moments and actions for change.

Small Actions at Key Moments can Produce Essential Systemic Changes

The identification of key moments for a changing action is an important part of systems intelligence. Small change in the right moment, such as, how participants meet each other in the first event of a forest conservation process, may radically shift the whole system. One way to practice recognizing of suitable situations and actions for whole systems change intervention (see e.g. Manning and Binzagr 1996) is observing how certain mental models and systems always seems to create similar behaviour. For example, certain arguments may always lead to similar discussion in negotiation. In such a situation, fast identification of the start of a typical system and unexpected reaction to comments may change the system. When a participant suggests that 20 % of old forests should be protected, the other participant may be encouraged to ask clarifying questions instead of immediately arguing that its is too much or too little. Questions like “That is an interesting perspective. What do you mean with old forests? How does this alternative support the achievement of your final goals and what are they?” represent an inquire mode and may change the discussion into a fruitful dialogue.

Systems intelligence is sensitivity to small actions, which can change the whole system.

Discussion

Forest conservation is an environmental decision problem where stakeholders’ different interests meet. The systems intelligent participation process outlined here emphasizes the creation of a positive and innovative decision making culture, which shifts the focus from conflict to collaboration towards constructive ways of interaction and a common goal. A systems intelligent process encourages participants to use their creativity for the innovation of new strategies beyond the limiting structures of the existing visible and invisible structures. Often the prevailing participation structures and organizational practices can be the causes preventing co-operation. In a dialogue and inquire- mode the participants work together. This allows them to flexibly explore, innovate and combine different conservation strategies. In the systems intelligent process we acknowledge the risks caused by negative framing and systemic fears of the participants. Systems intelligence is a new approach. Its practical implementation is to be tested and developed in real life forest conservation situations.

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Chapter 12

Systems Intelligent Awareness and Sun Tzu's The Art of War

Matti Knaapila

We present herein the phenomenological notes on Systems Intelligence introduced by Hämäläinen and Saarinen and revisit Sun Tzu's The Art of War. We extend the common picture of The Art of War from the static to the dynamic and find that Sun Tzu's ideas of realizing opportunities by adequate timing represent Systems Intelligence being crafted by information centricity and unexpected methods. We suggest that this form of Systems Intelligence both realizes and requires early comprehension, 'systems intelligent awareness', borrowing from situation awareness concept but particularly contributing to creative work with personal emphasis. Characteristics of early comprehension in a simple multi-disciplinary team have been discussed as a prototype example.

Introduction

Where holistic systems thinking introduced by Churchman, Senge, and others (Churchman 1968, Senge 1990, Senge et al. 1994, Checkland 1999, Flood 2002) appears a contrast to isolated analytic thinking—Systems Intelligence (SI)[1]—reaches beyond both. SI was formulated for the first time by Saarinen and Hämäläinen (2004b) and Slotte (2004) as intelligent *behaviour* in complex human systems involving interaction and feedback. The first thoughts on SI are described in Bäckström et al. (2003). Word for word, SI links intelligence with the system concept similar to that in the systems thinking referring to the dynamic complex wholeness of human thinking and activity whose emergent properties cannot be explained by regarding the properties of its parts alone. Further, according to Saarinen and Hämäläinen (2004b), SI combines insights from a variety of disciplines and schools of thought having a particular inspiration in the work of Senge (1990) where the concepts of personal mastery, mental models, shared vision, and team learning are formulated, and where systems thinking is understood as the fifth discipline combining the four first disciplines. However, while the method in systems thinking is considered from a distance, SI assumes an observer to be an active part of it. According to Slotte (2003), the

[1] http://www.systemsintelligence.hut.fi/

understanding of the concept requires understanding thinking as a process (see also Bohm 1996). Saarinen and Hämäläinen (2004b) and Slotte (2004) find that SI is a key form of human behavioural intelligence, hitherto not formulated as such. There are several further interpretations and Bäcström (2004), Salonen (2004), and Vilén (2004), for example, emphasise social skills in SI. SI differs clearly from traditional intelligence concepts and adds both to emotional intelligence (Goleman 1995) and multiple intelligence (Gardner 1983).

Competition is an inevitable part of life whether we like it or not. The discussion of general principles in competition has always fascinated scholars and—like the development of SI— been motivated by the necessity of formulating practical advice for human activities. In the vast literature and tradition of strategy and decision making, the oldest text of the kind, Sun Tzu's classic *The Art of War* has been translated and rewritten on several occasions (*e.g.* Sun Tzu 1910[2], 1963, 1988, Sun Tzu and Sun Pin 1996, or Krause 2002). While little is known about the exact birth of the 25 centuries old text, the ideas have since been relatively well-analyzed in literature. Besides the natural interest in military history (*e.g.* Turner and Vandervort 1997), and modern military (*e.g.* Arm-San Kim 2002), *The Art of War* has been discussed in terms of business (*e.g.* McNeilly 1996), or in those of game theory (Niou and Ordeshook 1994), or *e.g.* with the emphasis on Taoism (*cf.* Zhuge Liang 1989, Cleary in Sun Tzu 1998). Analogies to the central tenets have been found in international politics (*e.g.* Barkawi 2004), in strategies of Japanese companies (*e.g.* Benjamin 1993), or even in evolution theory (Gammel and Hardy 2003). It has been used as a source of inspiration at a highly metaphoric level of SI by the present author (Knaapila 2003). Any gross comparison between ancient war and *e.g.* business is, of course, irrelevant. Based on contemporary understanding of strategy, much critique can be presented also when *The Art of War* is read at a metaphoric level (*e.g.* McCormick 2001 and de Man 2002). The text itself evidently contains peculiarities which have little value or cannot be understood outside their historic framework. Nonetheless, it is a marvel that this ancient book can give us what it does.

In this essay, some features of SI of Saarinen and Hämäläinen (2004) which relate to rapid comprehension and intelligent action in competition are approached. We refer loosely to *situation awareness* (SA) (*e.g.* Endsley 1988, 1995) or *situational awareness* (*e.g.* Spick 1988) and team SA (*e.g.* Endsley 1989 and Salas et al. 1995) which are known as being important factors *e.g.* for the military (*e.g.* Kim and Hoffmann 2003, 2004), aircraft pilots (*e.g.* Spick 1988 and Schnell et al. 2004) or aircraft maintenance teams (*e.g.* Endsley and Robertson 2000). However, while SA is usually discussed as a factor to prevent erroneous actions in stressed circumstances that are externally regulated (*e.g.* aviation) or when otherwise a finite number of well-defined options exist, we outline a situation where complexities are faced in *creative* work with infinite initially unknown options. As a working method, the issue is approached by considering this in the terms of *The Art of War*. The competition is broadly understood as a system which occurs when we have something important to seize or when we are in danger. Similarly, the war is thought to reflect loosely a contemporary system which occurs within the minds of those who comprise the constituents of an organisation or within an individual (*cf.* Krause 2002). Where the previous authors considered *e.g.* game theoretic interpretation of *The Art of War*, we aim at a new insight, the first systems intelligent interpretation of *The Art of War*.

We are of course mindful of the cultural evolution that has occurred between the considered texts and therefore our hypothesis is that these sources have totally different character and give

[2] http://classics.mit.edu/Tzu/artwar.html

opposite advice for one in competition. For this reason, the issue of how to best interpret and analyze them in the context of the overwhelming differences is addressed. Furthermore, it is necessary to highlight which, if not all, aspects of *The Art of War* fail, particularly from the systems intelligent point of view.

We suppose that the SI discipline still benefits from seeking out analogies, as long as their original character is kept in mind. We are mindful of the risks and traps of this approach and underline that the same phenomenon may be discussed using different concepts but also the same concept (say the harmonic oscillator in physics) can describe phenomena which have nothing to do with each other. In order to avoid artificial narrow-mindedness, such a technique is used as a source of inspiration in many fields. One may refer for example to far reaching analogies between natural sciences and management in managerial cybernetics of organisation presented by Beer (1995), which are yet distinguished. We discuss *The Art of War* without any strict historic consideration.

Moreover, in this framework, we discuss SI in action and try to get a grip on whether *The Art of War* can contribute here, too, or not. The practitioner's discussion is based on the experience in research work and organisations in multi- and inter-disciplinary natural sciences and technology, in Finland (Helsinki University of Technology and University of Helsinki), in UK (University of Durham), in France (European Synchrotron Radiation Facility), in Germany (Deutsches Eletronen-Synchrotron), and in Hungary (Budapest Neutron Centre) as well as with *e.g.* the University of Wuppertal, University of Groningen, University of Twente, and University of Coimbra, during 1997-2004 having included the work of around 60 co-workers from very different backgrounds and cultures. The individuals and interim organisations reveal the following properties: (i) Traditional intelligence or technical skills do not limit their performance, (ii) An early comprehension is impeded by a serious tendency to be swamped by secondary issues. Their success is determined by how they seize critical information (related to SA) and opportunities (related to SI), (iii) As organisations, they are relatively simple so that we may try to reflect some ideas without the serious expense of generality, important for the general reader and possible future extensions. In the appendix, we present further hypotheses and speculations.

Furthermore, throughout the essay, we exploit freely a few aspects originating from the extensive ideas of the premier lectures[3], *Philosophical Lecturing*, given by Saarinen (Saarinen and Slotte 2003, Le Bon 2004) and a seminar given by Saarinen and Hämäläinen (Bäckström et al. 2003) at the Helsinki University of Technology in 2000-2002. In particular, given the discussed context, we try to absorb something about Saarinen's idea for triggering a breakthrough requiring practical knowledge, openness towards others, and tuning to the (mental) upscale register. Further clarifications are made below.

According to Churchill, "The first duty of a university is to teach wisdom, not a trade, character, not technicalities." (Winston Churchill. House of Commons, September 19, 1950) This sums up what the teaching of Systems Intelligence is much about.

In conclusion, the interpretation of SI made in this paper is much about SA, but SI links SA to a system and long-term work, and applies particularly when creating new, unthinkable options. The facets of *The Art of War*—the formation of opportunities and their use by means of adequate timing—are in agreement with this view of SI, while issues related to moral and relevance are

[3] http://www.esasaarinen.com/luennot/?sivu=tkk&kieli=en

troublesome. We suggest that *The Art of War* supports these actions emphasising unorthodox methods, adaptability, and information centricity. Unlike previous authors, we suggest that *The Art of War* sets an *infinite* number of strategies which all cannot be known equally by everyone or at any stage, which consequently renders a dynamic rather than a static 'game is given' character. Because the cultural and chronological differences between the sources are extreme, we suggest further that the nuance of SI already intuited in *The Art of War* supports the assumption that SI represents a part of fundamental behavioural intelligence, not restricted to the time or place. Furthermore, we suggest that a major practical obstacle of these actions lies in the difficulty in an early comprehension which may occur irrespective of traditional intelligence. Possibilities to overcome this problem by achieving 'systems intelligent awareness' are discussed and proposed borrowing tenets from SA, SI, and dialogue. We finally conclude SI to be a powerful tool in practice and valuable source of inspiration at any level, something which is by no means obvious or available in conventional university teaching.

Systems Intelligence and Situation Awareness

SA represents the detection of the elements in an environment, the understanding of their meaning and the projection of their status in the near future (Endsley 1988). In contrast, SI represents an individual's higher level cognitive capacity. *"By observing one's own interdependence in a feedback intensive environment, one is able to act intelligently"* (Saarinen and Hämäläinen 2004b) [present author's underlining]. Besides concepts familiar from systems thinking, like personal mastery and mental models, or the impact of thinking about thinking (*cf.* Slotte 2003, 2004, Bohm 1996), SI particularly realizes the systems concept where one, first of all, has the ability to see oneself in it, and, most importantly, to change it in an intelligent way with a pragmatic, active and personal emphasis. This is what we look for in *The Art of War* later on. As a framework to this emphasis, we present next selected notes on SI. Several generally essential aspects are avoided.

People's ultimate aim is likely the good life, and their natural interests are likely in their families, friends, and values they believe in, respect and matters of which they dream. People become old, lose opportunities and die, which are good reasons to emphasise the good life here and now. It is plausible that in order to *really* behave intelligently, one must account for this ultimate timing problem. Also, in our understanding, the morals of SI (*cf.* Saarinen and Hämäläinen 2004b) means referring to this issue in one way or another. Key ideas of SI, like perceiving a world through eyes of another person (Churchman 1968, Saarinen and Hämäläinen 2004b) are assumed to facilitate the consideration of moral issues.

At first sight, the competition or *The Art of War* do not fall well into the purview of seeking the good life or the moral of SI. However, the issue is obviously something highly personal and hard to conceptualise or approach, and this (*i.e.* the conceptualisation) cannot be our purpose. Rather, we might contribute to the possibility of living the good life by recalling change optimism (Saarinen and Hämäläinen 2004b), good reputation, fair play, justice, and wisdom – and by encouraging and enriching friends and our beloved ones. We may discuss later how these aspects relate to the title of this paper. As the difficulties and opportunities of life can be extreme and unexpected, we feel that different approaches to these may give tools to unforeseen situations and indirectly help one to achieve or maintain what one really wants, and so avoid what one wants to avoid. SI, as we understand it, is clearly one tool for this purpose and discussion on SI in different unexpected contexts may enrich this tool and, we hope, make it even more personal and existential and thus strengthen one's mental vehicles to answer *how* to achieve what one wants -

rather than give ready-made answers as to *what* one should do to achieve what one wants or what one should want.

Thus, from moral point of view, a starting point of SI is an *undefined* target in the human system. This seems sound. Because SI comprises of an assumption where one is an active part of the system, the 'system thinker's' advice outside reveals a different perspective and may seem useless inside (for someone placed within the system). However, the latter point is not necessarily true and the external view naturally enriches the internal one though the external observer may lack first hand information, which makes his position difficult. Compared to systems thinking, the view of SI seems more challenging: In other words, a Chief Executive Office (CEO) and an analyst have different views on the company and while the work of an analyst is important, it is the work of CEO which is vital. Note that this refers also to the dialogue concepts of Slotte (2003, 2004) where it is described that dialogic systems have no strict target in advance but rather find their targets themselves.

Fundamentals are not directly referred to in Saarinen and Hämäläinen (2004b) where SI is a multi-disciplinary subject and the underlying principles arise from several disciplines. SI seems underpinned on psychology in order to probe human behaviour and mathematics in order to avoid any slippery slopes of reasoning, misunderstandings of statistics or mixing of correlation and causality. SI emphasises personal characteristic in a way which is hard to conceptualise but the address of conceptualisation of what is hard to conceptualise such as 'thinking about thinking' or 'existential view', or claims that cannot be proven either true or false is yet clear and we may recall *e.g.* Russell and 'the questions to which no definite answer can be given is what is called philosophy' (Russell 1959, *p.* 155). Furthermore, SI in art has been discussed by Pakarinen (2004) and Akkanen (2004) elaborating general principles far beyond the ordinary.

In short, it seems clear to us that Saarinen and Hämäläinen (2004b) and Slotte (2004) are not only applying SI on a wide front but they are also building it on the tradition of various sciences and art in a novel way without any artificial axioms or restrictions. Recognizing this, we find it a particular strength of SI and a requirement for widespread applications and understanding. It is plausible that it is the multi-*theoretical* approach that provides new insights for multi-*disciplinary* work. On the other hand, this appears a challenge from the attitudes and communications point of view and therefore skilful execution of SI must be performed. Obstacles in mutual communications may lead to a situation of the blind leading the blind, common in multi-disciplinary work. One may neither feel comfortable with respect to the primary message, if one finds lapses -no matter how secondary- in details related to one's specific field, which in our experience is one of the starting points of vicious circles in attitudes of multi-disciplinary work. However, we believe that these issues are carefully accounted for by Saarinen and Hämäläinen (2004b).

SI is pragmatic and applicable by definition (Saarinen and Hämäläinen 2004b). In applications, SI occurs as a success of the system (Slotte 2003) and the applicability of SI in astonishingly various situations is unquestionably reflected by the present paper collection as well as in Hämäläinen and Saarinen (2004). However, at first sight, this seems to contradict to the generality aspect and directly useful methods are expected to be case sensitive. Again, as discussed above, concepts for use—but no ready-made answers how to use or for which to use them—are dealt with. We assume that this is the fact which renders generality possible. Furthermore, we assume that the lack of those answers is essential for innovation and creative thinking and problem solving.

Situation awareness prevents errors. Systems Intelligence creates opportunities.

Situation awareness serves the system. Systems Intelligence serves an individual.

The application of SI seems to imply that practitioners are able to master their everyday field, broadly understood. We have previously interpreted that in the systemic approach this is actually *always* true, because one may always define the limits of one's 'home ground' where one is the only master (Knaapila 2003). So, SI would not take the place of professional skills, but rather would add to them. Consequently, if one always masters the 'home ground', one can always benefit from SI, no matter what kind of skills one has. Surprisingly, this implicit idea of SI seems to actually relate to the fundamental idea that everyone is able to make significant things in their life (Heidegger 1993).

In competition, SI is assumed to benefit more the weaker party, although the parties are not understood as concrete well-defined objects, and working best when one is *initially* competing against all odds. It is not possible to win without any strength –miracles do not happen– but we assume that there are strengths that may not be observed in too brief or in too narrow-minded consideration. Unsurprisingly, this goes back to both Senge's idea of the least obvious highest leverages (Senge 1990) and Saarinen's idea that everyone is more than outwardly seems.

Given the mentioned phenomenological assumptions, we suggest that SI provides a particular benefit and competitive advantage when considering both long-term general preparation and the problematics of short-term 'thousand-dollar opportunities'. Over a short period, one cannot either get any crucial advantage by training oneself a little more, or there is simply no time to do that. The exploitation of this opportunity might be understood as a higher order change which is illustrated as an awakening by Saarinen and Hämäläinen (2004b). This hypothesis seems paradoxical: The underlying work behind the opportunity is decisive but the opportunity was clear-cut in a very short period only. In other words, we would suppose that one may create 'higher order change', the awakening, without being beforehand aware of either its exact nature or how to elaborate it.

The questions involved have been posed in the lectures of Saarinen (Saarinen and Slotte 2003) who illustrates those metaphorically in ice-hockey, a naked archetype of competition. A player must train himself his entire career but he, at best, has only a few seconds to make a crucial goal to win the Stanley-Cup. The chain of events requires SI revealing the following characteristics: (i) The long-term training is imperative but a player is not aware how to make the decisive goal, (ii) During the seconds for scoring, he must read the game and his relations to this system without any options for further considerations whatsoever *i.e.* he must reveal SA, (iii) According to Saarinen, however, a still third crucial factor is required: A player must trust that he will be able to be win in the very beginning, although he cannot know exactly how to elaborate his career and nothing about how make the very crucial goal. Otherwise, he would never start training. So, in order to be a decisive player when winning the Stanley-Cup, he must have magnificent long-term skills to create himself an *opportunity* to play in final but without the correct *timing* in scoring he still misses out on that.

In order to probe distinction between 'traditional' intelligence and SI in competition 'against all odds', we refer to another prototype of competition: chess against a computer. Although chess contains enormous amount of possible situations, it is –after all– a well-defined 'solvable' system. Chess players face two problems: Again, they may train whole their life but in the game itself they cannot learn any more. Moreover, against the computer's analytic superiority any

analytic intelligence or memory of the human being –no matter how good– has no chance whatsoever. Emotional or any part of multiple intelligences may not help either. The fascinating question is how we could explain the fact that a human being has still been able to play against computers, superior in traditional reasoning, without referring to SI. We cannot give a definite answer but we may refer to Garry Kasparov, who was still able to play against a computer and who is evidently familiar with his 'home ground'. Interestingly, the first sentences reflect the nuance of systems thinking while the last one that of *The Art of War*, our specific topic:

> *"Man will have to accept that using the specific faculties of the human brain is not the only way to solve intellectual problems. … Chess is initially a logical, calculating, mathematical game that makes use of the left side of the brain. But as a player becomes stronger he is using more and more faculties that are located in the right side hemisphere. …Against the computer … I have to rely completely on my experience and intuition, to try to probe for long-term weaknesses rather than to launch aggressive attacks."* [4] (Underlining by the present author)

Within this general phenomenological framework, we set the hypothesis that 'timing' is based on the overwhelming *experience,* but is executed in an *intuitive* or instinct manner. This seems very problematic even in phenomenological discussion. Unsurprisingly, experience is known to support SA (*e.g.* Endsley and Robertson 2000) but the difference between 'professional' and 'SI' experience is obviously blurred. The 'instinct' part in timing is obviously hard to conceptualise and instinct actions are difficult to probe using the tools of SI, like dialogue, either. This also contradicts any higher order cognitive capacity. How does this 'instinctive' timing differ from the strategy of an ambushing crocodile? Crocodiles with narrow genetic programming may not easily elaborate opportunities or new strategies but it may well be that the intuitive timing is anything but a higher order cognitive capacity. Nevertheless, its efficiency in action may not be underestimated recalling that SI occurs as success of the system (Slotte 2003). Secondly, how can our phenomenological view on SI add anything to SA which is so rigorously understood (*e.g.* Endsley 1995) and so minute experimentally verified (*e.g.* Endsley and Robertson 2000)? We might say that the research of SA reaches its best when concerning the prevention of errors and accidents, while SI, in our interpretation, is built on the idea of *creating* opportunities and breakthroughs. Of course, preventing errors is vital and like Nuorkivi (2004), we could exploit SI to this direction as well. From our point of view, situation-aware persons or organisations do what is planned or set in advance but, roughly speaking, nothing else. Whereas, system intelligent persons or organisations do not do just what is planned, but far more than what is thought to be possible. Moreover, SA is implicitly built on the idea to serve the system (*e.g.* aviation companies), while SI serves rather an individual. Further, SA refers to the *near* future, while our interpretation of SI is a continuum where both long and short-term actions are important.

In conclusion, although we cannot get a grip on all the roots of SI here, it is plausible that SI works. SI seems very useful when we, on the one hand, face overwhelming complexities and when we, on the other hand, must react rapidly to them. This requires both SA and intelligence in one form or another. We feel that in competition in diverse creative projects this problem is paramount.

[4] http://www.research.ibm.com/deepblue/meet/html/d.1.6.html

The Art of War

> *"Systems thinking starts when a person looks at the world through the eyes of another person."* (Churchman 1968, *cf.* Saarinen and Hämäläinen 2004b)

> *"Learning to see war thorough our enemies' eyes is a vital first step. But Sun Tzu reminded us that 'knowing thyself' is just as important to victory."* (Basrawi 2004 on the western world, *p.* 26)

The Art of War (*e.g.* Sun Tzu 1910, 1963, 1988) contains thirteen interrelated chapters of planning, competitive actions, competitive strategy, positioning, opportunity and timing (force), control (emptiness and fullness), managing direct conflict, flexibility (variation in tactics), manoeuvring, types of competitive situations (terrain), competitive conditions (nine grounds), destroying of enemy's reputation (attacking by fire), and gathering intelligence. The nuance varies from translator to translator. According to Krause (2002), the essence of the book includes ten principles for competitive success: Learn to fight. Show the *Way*. Do it right. Know the facts. Expect the worst. Seize the day. Burn the bridges. Do it better. Pull together. Keep them guessing. The critical question is whether these ideas and SI have anything in common. If positive, this might loosely support the assumption of SI as a form of fundamental human behavioural intelligence, not restricted to the place, application, or *time*. We may put first a brief attention on the *Way* which seems to represent a 25 centuries old version of the shared vision of systems thinking (*cf.* Senge 1990).

> *"The Way means inducing the people to have the same aim as the leadership, so they will share death and share life, without fear of danger"* (Sun Tzu 1988, *p.* 43)

> *"The Way means humanity and justice."* (Du Mu (803-853) on The *Way* in Sun Tzu 1988, *p.* 43)

> *"If the leaders can be humane and just, sharing both the gains and the troubles of the people, the troops will be loyal and naturally identify with the interests of leadership."* (Jia Lin (Tang Dynasty, 502-556) on The *Way* in Sun Tzu 1988, *p.* 43)

Having recognized a kind of tentative connection between the two, we may give our next attention to the text as a whole. *The Art of War* synthesises the in-depth experience of conflicts, the oriental philosophy of its time, and the assessing relative probabilities of specific outcomes of actions but of course, as a major failure, (or an obvious characteristic) it lacks of any modern science of probability and statistics. The central tenet of *The Art of War* is that the competition is won by an organisation or a person who, first and foremost, has the greatest competitive advantage, and who, secondly, makes the fewest mistakes. This outcome is based on an idea where human resources surpass inhuman ones. Previously, the greatest competitive advantage had been interpreted as systemic and the avoiding mistakes as a precisionist's attitude (Knaapila 2003). This reflects the interpretation of SI vs. SA as well. In other words, with SI you win but if you still lose, with SA you are not in peril.

According to Niou and Ordershook (1994, *p.* 166), Sun Tzu's general intent is to analyze the diversity of inter-dependent choice situations in warfare and to deduce efficient strategies – plans of action that lead to victory, broadly defined.

> *"The best strategy, then, is to use superior positioning. After this, use diplomacy. After that, use military force as a threat. Only after all else has failed, attack your enemy."* (Krause 2002, *p.* 24)

> *"The superior militarist foils enemy plots, next best is to ruin their alliances, next after that is to attack their armed forces, worst is to besiege their cities."* (Cleary in Sun Tzu 1988, *p.* 2)

> *"If I first occupy constricted ground [then] I must block the passes and await the enemy. [But] If the enemy first occupies such ground and blocks the defiles [then] I should not follow him, [But] if he does not block them completely [then] I may do so."* (Sun Tzu 1963, X/V)

> *"If you know others and you know yourself, you will not be imperilled in hundred battles, if you do not know others but you know yourself, you will win one and lose one, if you do not know others and do not know yourself, you will be imperilled in every single battle."* (Sun Tzu 1988, *p.* 82)

Where the normative best is the win without a battle, the second passage represents Sun Tzu's list of options in strategy and the third one, quoted by Niou and Ordeshook (1994, *p.* 166), in tactics, and refers to the solving a sequential game. It is noteworthy that in many ways, *The Art of War* deals with tactics alongside strategy. Note also that in systems intelligent interpretation, strategy and tactics depend on the system limits. The fourth well-known passage sums up the consequences and here the advice is to know yourself *before* you know others (*cf.* Gammer and Hardy 2004). Niou and Ordershook (1994) argue that Sun Tzu intuits the implications of the contemporary theory of conflict, game theory (see *e.g.* Ordeshook 1986), and that *The Art of War* anticipates the concepts of dominant, minmax, and mixed strategies but fails to account the full implications of the notion of equilibrium strategies. These authors further find that *The Art of War* intuits a partial resolution of 'he-thinks-that-I-think' regresses but remains vulnerable to a more complete strategic analysis.

It seems thus plausible that *The Art of War* is surprisingly much about elements of the game theory (Niou and Ordeshook 1994) and less about business (*e.g.* McNeilly 1996, see critical notes of de Man 2002). However, both sources implicitly approximate Sun Tzu's world to be a static game where the number of possible moves is limited, given, and known by everyone. Such being the case, *The Art of War* would give little to SI.

In contrast, according to Cleary (Sun Tzu 1988, Zhuge Liang 1989), this would be a simplification and the thread in *The Art of War* is to understand the text at all its levels. Different nuances appear when reading *The Art of War* in different circumstances and modes and the classic seems to grow wiser as we grow wiser, more useful the more we use it. Evidently, 'terrain', 'territory', 'road', or 'weather' are meant to be taken broadly. Cleary (Sun Tzu 1988, Zhuge Liang 1989) emphasises further that in the ancient Chinese school (*cf.* The philosophy of warfare of Zhuge Liang, 1989) *The Art of War* is meant to be read by putting yourself in everyone's place, an approach having thus a probable phenomenological analogy with systems thinking (Churchman 1963, Saarinen and Hämäläinen 2004b). However, where oversimplification of Sun Tzu's experimental advice forms the first trap of interpretation, mystification forms another. *The Art of War* is about war and experimental human competition and action, rather than about philosophy or mythology.

The Art of War –Systems Intelligent Approach

This paper avoids many intriguing perspectives such as Taoism underlined by Cleary (Sun Tzu 1988, Zhuge Liang 1989) or continuous improvement and continuous change, and the relations to Japanese management styles discussed by Krause (2002). Rather, we try to touch upon a 100-fold improvement of SI discussed by Saarinen and Hämäläinen (2004b) and thus extend the view of *The Art of War*. Alongside the content, we start the systems intelligent interpretation by putting attention on the structure reflecting the 'working methods' behind *The Art of War*, a perspective mostly omitted in previous work on *The Art of War*.

The investigators of SI use fascinating methods, such as Philosophical Lecturing (Saarinen and Slotte 2003) and dialogue (*e.g.* Slotte and Hämäläinen 2003) having simultaneously in-depth view on topics like game theory (*e.g.* Saarinen 1977 or Ruusunen et al. 1991). These authors say that their methodologies have strong impact on SI. Their specific methods are known to be highly successful when triggering off creative initiations and movement of thought and we counsel readers to gain more information on these and thereby deepen their understanding of SI.

We suggest that the structure and nuance of the 'working habits' of *The Art of War* fit well in the purview of SI, perhaps better than many an other. We still continue to underline that *The Art of War* is not to be considered as a historic reference here. Shall we note some phenomenological similarities between methodology of *The Art of War* and SI of its original authors? Obviously, both approach the machinery of human behaviour and thinking in general. Both are presumably based on in-depth personal experience in practice and emphasise a pragmatic touch but not at the cost of generality. Furthermore, Sun Tzu didn't write himself but the book depicts a compilation of discussions. As a consequence, in our opinion, *The Art of War* reveals a 'discussion like' character, especially when presented with the reflections of ancient interpreters representing shifts in interpretation (Sun Tzu 1988). This character, the structure of interrelated mutual chapters (except that of gathering intelligence) and an undefined target (except victory) seem to relate the text to dialogic characteristics of SI (Slotte 2004). Furthermore, it is conspicuous that both SI and *The Art of War* utilise metaphors in thinking, aiming at crystallising the essentials into a few well-developed sentences taking care when using these separately from original context. We interpret that both sources try to generate the audiences' own thinking rather than provide off-the-rack answers.

When considering the Chinese treatise *The Art of War*, it is useful to contrast it with related historic sources of inspiration of thinking as well, especially von Clausewitz's characteristically 'western' classic *On War* (*e.g.* von Clausewitz 1989). The thesis of *On War* is that strategy cannot be reduced to a formula. Detailed planning in human systems fails, due to the inevitable frictions encountered: chance events, imperfections in execution, and the independent will of the opposition. Unsurprisingly, like Sun Tzu, *On War* presents the human elements crucial: leadership, morale, and the *instinctive* savvy. According to *On War,* one cannot expect a plan of operations to survive beyond the first contact with the enemy but think only the broadest of objectives. Von Clausewitz emphasised *seizing of unforeseen opportunities* as they arise and did not understand strategy as a lengthy action plan but as the evolution of a central idea through continually changing circumstances. In our opinion, these are the fundamental outcomes of *On War* that can be discerned in *The Art of War*. However, because of its age, structure, and philosophic nuance, we find *The Art of War* far easier to read at a metaphoric level. Paradoxically, it possesses nevertheless the strong practical grasp and touches on a topic arousing such practitioners' interest which pure oriental philosophies can never attain.

Like *The Art of War, On War* is widely studied in military history and Drake (1999), for example, addresses the social theorisation of war in terms of analysis from attempts to develop a sociology

of war on the basis of the classic theories of von Clausewitz (and others). Outside this, *On War* has been discussed early (see *e.g.* Koenig 1963) and in versatile contexts (*e.g.* the work of Bertram and Sharpe 1996). According to Von Ghyczy et al. (2001, *pp.* 1) a nineteenth-century Prussian general teaches 'everything' to a twenty-first-century executive about business strategy.

Unsurprisingly, there are numerous authors who note that *On War* is not critically understood among bestsellers and that business is never war, even metaphorically speaking. Rogers (2002), in turn, questions the belief that von Clausewitz maintained that 'a genius rises above the rules'. He demonstrates to the contrary that, in von Clausewitz's view, a good theory could and should describe rules of universal explanatory (though not prescriptive) value, while the statement 'a genius rises above the rules' actually denies the utility of theory. So, according to Rogers (2002) successful practitioners violate only the incorrect or oversimplified theories. They succeed because they understand the true rules better than 'blinkered' theorists who – in the context of the military - try to explain the phenomena of war *e.g.* without taking account the impact of moral forces.

Morals and Relevance

Besides the age the weakest link between SI and *The Art of War* is clearly how *The Art of War* meets the morals of SI, closely related to its relevance. In other words, how war, broadly defined, should be addressed. In an excellent analysis on SI, Ollila (2004) underlines the disinterested nuance of SI and Handolin (2004), for example, finds justice an essential component in systems intelligent rewarding. We conclude that the practitioner's high morals represent the key issue of SI. First, we may ask how the moral issue in *The Art of War* is linked to its original forum, if it is still recognized.

Surprisingly, in his modern military interpretation, Arm-San Kim (1994) argues that *The Art of War* is still recognized as a valuable source book by the modern military and its military value lies in the distinction between total and limited war with both limited and unlimited objectives. According to Arm-San Kim (1994), the former is represented by Clausewitz while Sun Tzu's thoughts on military tactics duly emphasise the short duration of war, a characteristic of limited war in modern times, and the statements such as *"To win a war is important, but it is no good for it to be prolonged"* and *"When a war is prolonged, weapons become obsolete and troops dispirited"* can be interpreted as an emphasis on limited conflict in terms of its objectives and duration and avoiding devastation which can be neither justified politically nor accepted morally. Arm-San Kim (1994) argues further that these facts show the value of the thoughts of Sun Tzu applied to a modern limited war system. So, at first sight, Sun Tzu seems to reveal higher morals than his western counterpart. We shall next ask how morals are connected to the generalisation of *The Art of War*.

According to McCormick (2001) (see also de Man 2002) any generalisation of *The Art of War* to the business environment is questionable (as expected). McCormick finds Sun Tzu's way of thinking far too sinister in order to provide metaphors relevant to today's business environment. In particular, two central tenets –warfare and deception– are found to be irrelevant in light of current business practice. McCormick argues that Sun Tzu is far from the problem outlined in the Prisoner's Dilemma (*e.g.* Axelrod 1984) where honesty maximises profit. Of course, business is about the creation of value, whereas war is about destruction or at best zero-sum reorganisation of the existent value. Business is naturally a continuum while war is a one-time transaction. Likewise, according to Fischer (2004), SI in business relies on process thinking. Elsewhere, Niou and Ordeshook (1994) find that the deception meant more to Sun Tzu than one of randomising one's choices. They found this problematic, because the deception –the strategic manipulation of

information– results easily in circular reasoning when each knows that other is trying to deceive. They also find that *The Art of War* does not give a complete explanation to this. Indeed, it is easy to see that Sun Tzu's ideas of strategic assessment include notorious methods, Trojan Horses.

> *"Assess the advantages in taking advice, the structure you force accordingly, to supplement extraordinary tactics. … A military operation involves deception. Even though you are competent, appear to be incompetent. Though effective, appear to be ineffective. … Use humility to make them haughty."* (Sun Tzu 1988, *pp.* 48, 49, and 53).

It is clear that the criticism of McCormick (2001) is correct. Niou and Ordershook (1994), too, show that it is the constant sum game which Sun Tzu understood best. The issue ought not to be oversimplified, however. The idea of knowing while being unknown, a deception of a kind, should be revisited in the light of philosophy of the time (Cleary in Sun Tzu 1988). Also, Niou and Ordeshook (1994) argue that by means of the 'expect the worst' basis Sun Tzu provides selected tools for achieving equilibrium and for taking advantage of an opponent who fails to act accordingly.

We might speculate whether there is a difference between morals and relevance. Companies obviously benefit from increasing markets which helps everyone in the area, a situation which refers to McCormick's 'win-win' transaction. However, they also do their best to increase their market share and seem keen to outsell their competitors, which in turn refers to Sun Tzu's 'win-lose' transaction. We might also ask whether the metaphoric war may be thought to be about the creation of (metaphoric) political value, and thus related to the win transactions at abstract level.

Obviously *The Art of War* seeks the victory –as does the game theory of Ordeshook (1986)– so that it appears morally questionable but how this aspect relates to SI. We obviously recognize that win-win and win-lose transactions are related to the system considered. By redefining the system, we may find somebody who loses or we may consider a group including winners only. When 'playing chess', one may win the game in a traditional sense. However, if one is playing with one's young children, one may want to give them a winning edge, create joy for everyone, and thus have a win in a less narrow-minded context. So, the game can be understood both as a win-lose or win-win transaction by rethinking the limits of system and understanding one's position in it. This is presumably what the systems intelligent interpretation of SI morals in competition is partly about. When considering the practitioner's morals, we may also note that (i) people are not interested in creating value for everyone and (ii) they find high morals where they themselves win.

We conclude that *The Art of War* cannot withstand a close inspection from ethicists and secondly that discussion about any direct relevance to the contemporary would be foolish. *The Art of War* does not meet disinterested morals but does not deserve gross oversimplification either. Rather, its nuances relate to human situations where hostile and competitive aspects cannot be ignored. At best, such attitude may help us to see disinterested ethics elsewhere and thus warns us to avoid challenges of the world. Apart from the moral problem, given the circumstances, *The Art of War* still appears wise. Technically, *The Art of War* touches upon seeing the world thorough the eyes of another person. The nuance of seizing time relates to the central facet of the good life. Its ideas appear less destructive than could be imagined (Arm-San Kim 1994). The ultimate win is what is achieved without a battle and competition for its own sake (without benefiting from it) is described to be stupid, risky and costly. In other words, *"People can get caught in systems which serve nobody's interests."* (Saarinen and Hämäläinen 2004b). It is advised not to push a desperate enemy but to leave a way out – which is obviously also a long-term calculation. One's own

constituents are advised of a threat like one's own family. In a deadly situation, one is advised to tell them they may not survive. While dying men had no value to Sun Tzu's army any more, they still deserved to hear the truth.

Finally, we note that, surprisingly, neither Arm-San Kim (1994) nor McCormick (2001) find *The Art of War* out-of-date because of the huge cultural evolution and difference between the ancient Chinese and the modern Anglo-American culture, matters which could well be their primary criticism.

System Concept

Besides morals and relevance, the second critical question in a systems intelligent interpretation of *The Art of War* concerns the system concept. Obviously, *The Art of War* does not formulate any modern system concept (or use it in thinking) but –based on intuition and experience– we may ask how far it goes. Does the idea of complete estimation (Krause 2002 *p.* 10), for example, relate to assessing systemic features? We propose that *The Art of War* goes some way towards the system concept. Niou and Ordeshook (1994) find that Sun Tzu realized how the complete specification of the strategic structure includes realizing the moves available in nature. He was then aware of the limits of the strategic structure defining the system. Also, it seems plausible that Sun Tzu knew of an idea to test the system and intuited that the wholeness is more than sum of its parts.

> *"I spar with the enemy to determine what he will defend and when he will attack"* (Krause 2002, *pp.* 48)

> *"The troops of those skilled in leadership are like the "Simultaneously Responding" serpent. The "Simultaneously Responding" serpent lives in the mountains of Chang. If its head is threatened, its tail will swiftly attack. If its tail is threatened, its head will attack. If its body is threatened, both head and tail will attack at the same time. In the same way, the goal of leadership is to make soldiers think and fight as one team."* (Krause 2002, *p.* 88)

According to Krause (2002), *The Art of War* includes the idea of the *natural organisations* that, first and foremost, exits to serve a limited purpose thus revealing (systems) limits. Secondly, these are information-centred seeking high quality information. In our opinion, this implicitly refers to the assumption where an observer is located inside the organisational system. Combined to Sun Tzu's central idea of the interplay of assessing and control (by means of initiation and strong and weak points) – this could be interpreted as a situation where one is (i) a part of an evolving system, (ii) able to recognize it, and (iii) able to conduct it to the desired direction.

> *"What does it matter if a competitor has greater resources? If I control the situation, he cannot use them. To get control, seize something your competitor wants or needs. … The less a competitor knows about where you intend to focus your attention, the stronger you are. If he must prepare defences at many points, because of limited resources, your competitor will be weak everywhere."* (Krause 2002, *p.* 116)

Thirdly, a natural organisation is highly flexible and adaptable. Also, a person in this organisation is highly adaptable. This seems to refer further to the dynamic system and its members' ability to change it. Furthermore, Sun Tzu does *not* consider collective decision making that could be mixed with SI (*cf.* Slotte 2003) and also understands that a member of a system cannot control it overwhelmingly. Therefore, we feel that Sun Tzu was not too far from the starting assumptions of SI and we may next try to seek SI of one kind or another in *The Art of War*.

Opportunity and Timing, and How They Are Crafted

It is an intriguing belief of military historians that the interplay of transient opportunities and sudden accidents have dramatically changed history, sometimes arbitrarily but sometimes driven by individuals being in a correct place at a correct time (see *e.g.* Cowley 2001). In terms of Saarinen and Hämäläinen (2004b) or Senge (1990), these events would correspond to the change of the system or the least obvious leverage, respectively. In terms of systems engineers, we might refer to bifurcation, for instance. The way towards this problem was taken already in ancient China.

> *"Hostile armies may face each others for years, striving for the victory which is decided in a single day."* (Sun Tzu 1910, XIII/2)

We suggest that *The Art of War* intuited SI in the terms of opportunity and timing. We find that Sun Tzu's key advice to recognize and create opportunities within time and maximise their value by recognizing most adequate moments to exploit the opportunities and also *acting* at these very moments is systems intelligent. In this interpretation, Sun Tzu approaches the problem of Saarinen's ice-hockey player and Senge (1990)'s highest least obvious leverage. Unsurprisingly, the high level of opportunism and tactical timing has been quoted in an analysis on Honda by Benjamin (1993). Two fundamental advantage situations are observed.

In the first case, one is able to comprehend how the system is evolving but not being able to control it. In this case, however, one is able to act intelligently in terms of adequate timing. This refers to the central facet to win without fighting. This refers to the skilled ancient warriors who were not victorious through infinite wisdom or boundless courage but seized the moment and won when victory was still easy (Sun Tzu 1988, *p.* 2) and did what was great when it was still small. Moreover, by waiting for the enemy's vulnerability, they indeed triumphed (*e.g.* Krause 2002, *p.* 32).

> *"In ancient times, those known as good warriors prevailed when it was easy to prevail"* (Sun Tzu 1988, *p.* 82)

In the second case, one is not only able to comprehend how the system evolves and utilise the appearing opportunities at the correct time but one is also able to change the system and create opportunities to use at the correct time. This refers to the second central facet of achieving control by initiation. This refers to the skilled warriors who moved their opponents and did not allow the opponents to move them (*e.g.* Krause 2002, *p.* 44). See the last citation in previous section. In short:

Plan what is difficult while it is [still] easy. Do what is great while it is [still] small.

> *"For a skilful commander, momentum is like a drawn crossbow and timing is the trigger which will release the bolt with deadly accuracy. So, a great warrior creates momentum, then, at the right moment, he hurls his troops at the enemy like rolling round rocks down the side of mountain."* (Krause 2002, *p.* 38)

In game theoretic chess your opponent does not know your next move.

In situation aware chess he knows your last move and guesses the next one.

In systems intelligent chess he knows how to move pawns only.

As we provocatively propose that the ideas of 25 centuries old text represent SI in action, we are not able to address and overcome the moral and relevance issues, as discussed above, and the hypothesis ought to be criticised from this base. Instead, we are far more interested in how Sun Tzu thought of realizing these ideas in practice recalling that any SI *must* be realizable. In other words, if Sun Tzu does not give adequate tools to a contemporary practitioner, we have not recognized any relevant SI.

As an answer, we put forward that *The Art of War* accounts five main factors which are interrelated to the presented (tentative) systems intelligent actions and facilitate their realisation.

1. Knowing the facts and adequate preparations form the base. Sun Tzu assumes that one is a professional and keen to improve one's skills at all times. This factor is not a tool to execute above systems intelligent actions but their pre-requisite. It is also our previous assumption about SI. *The Art of War* does not suggest how to use a sword but how to use brains. We turn next on Sun Tzu's 'tools' which, in our interpretation, render both the creation and recognition of opportunities possible and facilitate their execution by means of appropriate action at the correct moment.

2. The first tool comprises of foreknowledge. *The Art of War* has an entire chapter dedicated to information and disinformation, and the described actions lie in gathering intelligence and their execution requires as much foreknowledge as possible. The last passage on *p.* 13 introduces the situation of this chapter. Obviously, foreknowledge of a system does not necessarily lead to the creation and utilisation of opportunities and does not realize actions but it renders them possible *and* probable. In gathering intelligence, Sun Tzu shows himself to be an experimentalist and no mystic.

   > *"Foreknowledge cannot be gotten from the ghosts and spirits, cannot be had by analogy, cannot be found out by calculation. It must be obtained from people, people who know the conditions of enemy"* (Sun Tzu 1988, *p.* 168)

At first sight, this seems to refer to the idea of Saarinen and Hämäläinen (2004b) whereby most people would change their actions, if they knew the larger picture. However, these ideas are not consistent because, in Sun Tzu's problem, the specific emphasis does not lie in the distinction between the small and large picture but between the late and *early* picture. SI does not include disinformation either, although a systems intelligent ice-hockey player may still bluff the goal-keeper. So, Sun Tzu's view of foreknowledge may not correspond to the general guidelines of SI but it is in agreement with the concept of SA - it is clearly understood that the most useless and expensive information is what is out-of-date. Unsurprisingly, Niou and Ordeshook (1994) find that Sun Tzu's idea of choosing a strategy with foreknowledge of an opponent's choices is advantageous in any case regardless of whether the opponent is aware of this or not. Instead, these authors put their criticism on Sun Tzu's inability to react in the situation where both sides

feed each other false information in complex cyclic reasoning, *i.e. The Art of War* suggests double agents but not triple agents, and so forth.

The ideas of spies presumably do not meet with high moral standards but we might still speculate whether they refer in Senge's terms (Senge 1990, Senge et al. 1994) to the inquiry or advocate mode. We find –loosely speaking– that Sun Tzu is a profit seeking person, a character related to the advocate mode but he is wise enough seeking profit using the nuance of inquiry.

> *"One cannot use spies without humanity and justice, one cannot get the truth from spies without subtlety. This is a very delicate matter indeed."* (Sun Tzu 1988, *p.* 170)

3. Throughout *The Art of War* there is one outermost practical advice for success: The tendency for favouring early activity and avoiding delays. This seems Sun Tzu's second tenet how to approach the opportunity problem. In other words, the natural counterpart of early knowledge is the early *action*. This obviously does not mean slapdash work but an early start. Simple methods do not mean dummy ones either. That is to say: *"Organisational behaviour can be improved enormously by simple, even trivial means."* (Saarinen and Hämäläinen 2004b)

   > *"Thus, though we have heard of stupid haste in war, cleverness has never been seen associated with long delays"* (Sun Tzu 1910, II/5)
   >
   > *"When you do battle, even if you are wining, if you continue for a long time, it will dull your forces and blunt your edge."* (Sun Tzu 1988 *p.* 57)
   >
   > *"The most important success factor in competition is speed. Simple methods are effective and inexpensive. Try them first. If they do not work, you have still time to try something else. Staying on step ahead of the competition is worth more than any other advantage. When you are ahead, the competition must react."* (Krause 2002 *p.* 113)

We may interpret delay as a situation where one temporarily looses a grip on the system. The third passage, on the other hand, relates also to an idea of controlling the system and creating opportunities.

4. We argue that Sun Tzu's third and most sophisticated tool to execute the opportunity timing problem comprises of adaptability, flexibility and ability to exploit new, unforeseen methods and unthinkable ideas. We find this is an area which is barely found in SA literature and where the SI of Saarinen and Hämäläinen (2004b) can particularly contribute. In *The Art of War*, this means the use of normal (*cheng*) and extraordinary (*ch'i*)[5] forces which are interpreted *e.g.* as direct and indirect (Sun Tzu 1910), orthodox and unorthodox (Sun Tzu 1988) or expected and unexpected (Krause 2002). The levels of operations are blurred and translators refer to unexpected 'methods of attack', 'tactics' or 'strategy', which, as we have noted, do not yet disturb but favour systems intelligent interpretation. In short, according to Sun Tzu, the use of the unexpected is the way how to

[5] It is not clear how these terms should be translated. In our phenomenologic discussion it is important to note that the terms are mutual. *Cheng/ch'i* maneuvers were employed by Chinese to expose adversary vulnerabilities and weaknesses via *cheng* for exploitation and decisive stroke via *ch'i*. It is not *cheng* or *ch'i*. It is *cheng* and *ch'i*. See *e.g.* http://www.belisarius.com/modern_business_strategy/richards/chi_and_cheng/cheng_and_chi.html

win against all odds. Survival is based on the expected while triumph is based on unexpected.

> *"Those skilled at unorthodoxy are infinite as heaven and earth, inexhaustible at the great rivers."* (Sun Tzu 1988, *p.* 95) *The executive who is skilful at using unexpected tactics has infinite resources"* (Krause 2002, *p.* 40)

According to Saarinen et al. (2004a), the assumption on the static solution is the trap of systems thinking while SI is implicitly based on dynamicity. The critical questions with respect to SI are whether the orthodox-unorthodox problem refers to static or dynamic characteristics and whether it has any phenomenological analogy to mental, perceptual, and behavioural change discussed by Saarinen and Hämäläinen (2004b).

When Niou and Ordeshook (1994) analyzed the unexpected tactics (or strategy) of *The Art of War* in terms of game theory, they found that Sun Tzu's tactics are unexpected if one thinks one's opponent does not anticipate it and if one's opponent thinks that one is unlikely to use it. In particular, they found that in order to maximise the unexpected character one indeed needs to follow Sun Tzu's advice to randomise choices to keep the enemy guessing. As a criticism, these authors found that *The Art of War* does not give an exact guideline when one should use the minmax strategy which maximises our gain (or minimises the maximum loss) and when to use a mixed strategy which minimises one's loss to an equally skilful opponent and takes advantages of his mistakes.

This makes perfect sense but is also a trivialisation. Because game theory seeks to isolate general principles of strategy when the outcomes of one's choices depend on what others decide, it may implicitly assume that everyone is equally aware of their mutual interdependence, which, however might violate the systems intelligent interpretation. However, as also suggested by Niou and Ordershook (1994, *p.* 172), an alternative way of interpreting the unexpected is to regard a strategy as unexpected whenever one's opponent does not know whether it is possible or feasible. As this interpretation implies open dynamic characteristics, it would clearly fall better into the purview of SI. In other words, in unexpected game theoretic chess, one's opponent does not know one's next move, while in unexpected systems intelligent chess he knows how to move pawns only.

We support this assumption further by making the following observations, which are quite natural from a systems intelligent point of view. First and foremost, Sun Tzu definitely means that there are nominally two tactics types but they form an *infinite* number of options for one to select. No tactics are always either purely expected or unexpected but the reality lies in their combination. We propose that not only the previous interpretation of the unexpected, but also the infinity of options implies dynamic, rather than a static 'the battle is given' picture.

> "*There are not more than five cardinal tastes (sour, acrid, salt, sweet, bitter), yet combinations of them yield more flavours than can ever be tasted"* (Sun Tzu 1910, V/9)

> "*There are not more than two methods of attack, but these two in combination give rise to and endless series of manoeuvres."* (Sun Tzu 1910, V/10)

Even if the options were set out at the beginning, Sun Tzu implies that anyone cannot get a grip on them (even afterwards) and everyone is *not* equally familiar with them (Krause 2002, *p.* 48). The last point obviously agrees with the game theoretic interpretation where one tactics is known and another is unknown by opponent. We may also interpret that a piece of advice where no successful tactics will ever be repeated as such (*e.g.* Sun Tzu 1988, *p.* 112) refers to the case where the opponent learns from it and thus, it is initially assumed that the opponent had not been familiar with its feasibility. This is, of course, a speculation but it does not disagree with the previous proposal.

> *"All men can see the tactics whereby I conquer, but what none can see is the strategy out which victory is evolved."* (Sun Tzu 1910, VI/27)

> *"Do not repeat the tactics which have gained you one victory but let your methods be regulated by the infinite variety of circumstances."* (Sun Tzu 1910, VI/28)

This interpretation contradicts the static assumption of Niou and Ordeshook and business interpretations (McNeilly 1996). We do not criticise them at all but underline that it is a new insight which is provided here. Furthermore, this interpretation expands the view of *The Art of War* related to the Japanese continuous improvements tradition (*e.g.* Benjamin 1993). Altogether, our interpretation rather, touches upon that of Zhuge Liang (1989) where the combination of speed and unexpectedness are understood to reverse otherwise insurmountable odds. Furthermore, when realizing an infinity of available options, we seem to have a phenomenological connection with the idea of *comprehension* the 100-fold improvement possible (Saarinen and Hämäläinen 2004b). Again, this does not mean that one could necessarily create an opportunity of a 100-fold improvement but comprehending this is one crucial *prerequisite* and critical when executing suggested systems intelligent actions. Otherwise, an ice-hockey player would never begin his training program in the first place.

5. While the first three tools are technical and may reveal external character, the last major vehicle to execute the opportunity timing problem is, as SI itself, personal and existential. We find that according to Sun Tzu selfishness type traits and *cowardice*, respectively, prevent one from recognizing subtle features in complex systems and acts at the appropriate moment.

> *"There are five dangerous faults which may affect a general: (i) Recklessness, which leads to destruction, (ii) cowardice, which leads to capture, (iii) a hasty temper, which can be provoked by insults, (iv) a delicacy of honour which is sensitive to shame, (v) over-solicitude for his men, which exposes him to worry and trouble."* (Sun Tzu 1910, VIII/12)

In *The Art of War*, this is contextually related to the adaptations section. Elsewhere in *The Art of War*, particularly the loss of emotional control is understood as a major handicap. Unsurprisingly, *The Art of War* is full of advice to recognize and utilise these faults, especially anger, of the opponent, which can be clearly recognized as an opportunity too.

We cannot know what Sun Tzu exactly meant with 'the dangerous faults' but we note that according to Saarinen et al. (2004a) a systems intelligent person has (at least) the following traits: (i) Ability not to ignore (less obvious) possibilities, (ii) ability not to fear the system, (iii-iv) ability not to be provoked. It seems to us that the observations of these sources do not totally disagree. The last section, on the other hand, touches closely upon the timing problem and also, the last section is interpreted so that excessive worry about popularity makes one hesitate at the critical moment which is in agreement *e.g.* with the notes of Cao Cao (in Sun Tzu 1988, *p.* 129). Characteristically, Sun Tzu believes that one can and one *should* improve one's traits. This does not seem to disagree with the change optimism of Saarinen and Hämäläinen (2004b). Finally, we note that the execution of *all* Sun Tzu's ideas, and thus also tentative SI, do not underestimate the very basics of human welfare. *"Take care of your health and avoid stress, consolidate your energy and build up your strength."* (Sun Tzu 1988, *p.* 153)

Towards Systems Intelligent Awareness

So far, we have concluded that SI linking a system and intelligence adds to traditional thinking and practitioners' traditional skills and proposed that Sun Tzu's opportunity and timing problematic represent SI. Next, we naturally ask how this relates to the contemporary practice. We believe that SI in the discussed opportunity-timing problem makes sense. Unfortunately, we also know well that the serious difficulty of this problem still lies in practical realisation of the timing or the 'instinctive' part of suggested systems intelligent behaviour making its value questionable.

When Endsley and Robertson (2000) studied aircraft maintenance teams, they made a distinction between technical skills, decision making, and SA, and found that most errors pointed to a lack of SA rather than poor decision making or technical skills. Based on our experience in research and research teams we have noticed something astonishingly similar. To make a phenomenological distinction between SA and SI in general, we propose that valuable initiatives and new observations are stuck and most delays originate from a lack of their intersection, that is to say *systems intelligent awareness*. This is obviously hard to illustrate. Keeping the characteristics of suggested SI in mind, we believe that the 'instinctive' savvy may be phenomenologically discussed and the timing problem considerably enhanced by getting a grip on not only the larger, instead of the limited picture, but the essence of the larger one as early as possible, although the further detailed consideration is still required to clarify the complete picture. In other words, although the system—Columbus' journey to America—is always complex, its essence —Columbus' egg— can be trivial, not yet visible. Its early comprehension, however, can be extremely important. The Chinese would say that knowing after seeing is not worthy to being called knowing, and comprehension after action is not worthy to being called comprehension (Sun Tzu 1988).

Statement *S*(*n*): In any group of *n* people, everyone in that group has the same age.
The conclusion follows from that statement by letting *n* be the number of people in Canada.
Proof of Statement *S*(*n*):
Step 1: In any group that consists of just one person, everybody in the group has the same age, because after all there is only one person.
Step 2: Therefore, statement *S*(1) is true.
Step 3: The next stage in the induction argument is to prove that, whenever *S*(*n*) is true for one number (say *n*=*k*), it is also true for the next number (that is, *n* = *k*+1).
Step 4: We can do this by (1) assuming that, in every group of *k* people, everyone has the same age, then (2) deducing from it that, in every group of *k*+1 people, everyone has the same age.
Step 5: Let *G* be an arbitrary group of *k*+1 people, we just need to show that every member of *G* has the same age.
Step 6: To do this, we just need to show that, if *P* and *Q* are any members of *G*, then they have the same age.
Step 7: Consider everybody in *G except P*. These people form a group of *k* people, so they must all have the same age (since we are assuming that, in any group of *k* people, everyone has the same age).
Step 8: Consider everybody in *G except Q*. Again, they form a group of *k* people, so they must all have the same age.
Step 9: Let *R* be someone else in *G* other than *P* or *Q*.
Step 10: Since *Q* and *R* each belong to the group considered in step 7, they are the same age.
Step 11: Since *P* and *R* each belong to the group considered in step 8, they are the same age.
Step 12: Since *Q* and *R* are the same age, and *P* and *R* are the same age, it follows that *P* and *Q* are the same age.
Step 13: We have now seen that, if we consider any two people *P* and *Q* in *G*, they have the same age. It follows that everyone in *G* has the same age.
Step 14: The proof is now complete: we have shown that the statement is true for *n*=1, and we have shown that whenever it is true for *n*=*k* it is also true for *n*=*k*+1, so by induction it is true for all *n*.

Figure 1. Systems intelligent awareness and a 100-fold improvement. Analytic intelligence may need minutes to tackle the statement but SI needs only seconds. Adapted from the website 6.

Figure 1 is a statement and reasoning of the age of Canadians and tries to approach an anatomy of what is the quantum in comprehension early on the thinking and acting of (i) an individual or (ii) a group (*e.g.* in science like physics). We are mindful of the gross over-simplification of the example and that the consideration of an isolated event contradicts the holistic character of SI and that the choice of Canadians may sound like an artificial human system. However, we do this by concluding some elements based on the practitioner's experience on what is common in versatile holistic issues, not by trying to apply an over-simplified concept to the complexities. Also, this is by way of a phenomenological illustration only. A systems intelligent group is assumed to consist of systems intelligent members and, therefore, it is important to consider both the individual and the group separately. SA of individuals does not necessarily result in team SA. Correspondingly, systems intelligent individuals are not assumed necessarily to form a systems intelligent group.

In the simple consideration, an individual faces a statement that all Canadians are the same age. This represents a very frequent situation (*e.g.* in science) to which one must react swiftly without time for external help. At first sight, the induction containing 14 steps seems to prove the statement that all people in Canada are the same age. In order to say whether this statement is correct or not, an analytic way of thinking considers the steps of induction, one by one, trying to isolate the inconsistency. Despite all the triviality of the reasoning, some time, *e.g.* two minutes, is required, and it may not be self-evident to everyone where the fallacy lies. In contrast, in a

[6] http://www.math.toronto.edu/mathnet/falseProofs/index.html

systems intelligent consideration, *no time*, or *e.g.* two seconds, is required and it is immediately obvious *and* apparent that (i) all people in Canada are not same age and (ii) this –first of all– is the most useful fact while the analysis of fallacy is of the secondary importance. In our interpretation, this is in a certain agreement with an idea of a 100-fold improvement in the SI of Saarinen and Hämäläinen (2004b). We propose that this touches also upon both Saarinen's considerations of ice-hockey as well as Sun Tzu's ideas of critical information, quick results, not prolonged activity (Sun Tzu 1988, *p.* 57-58), and the idea to use simple methods after which there is still time to do something else, should they do not work (Krause 2002, *p.* 113). SA researchers would refer to missing critical information due to distractions (Endsley and Robertson 2000).

1. We claim that much time in creative projects (*e.g.* in science) is wasted when people are facing their everyday problems and bogged down in the secondary details, important but not paramount, without recognizing them as secondary. Phenomenologically, we propose that the individual's SI in opportunity/timing problem manifests itself as an intuiting, a quick and correct guideline to the complex problem even without the detailed understanding at the given time, and – on the other hand – when several alternative approaches are available, as a habit to use quick and inexpensive (and most probably efficient) methods first. In other words, it is important to investigate the collisions with elks and it is wiser to drive slowly at night, but, at the very moment you face an elk on the road, it is vital put on the brakes.

2. We suggest further that the SI of early comprehension of an individual relies roughly on two factors. First, is an experience taken from real life. A person has been in Canada and experimentally knows that everybody there is not same age, a fact that cannot be overthrown. This corresponds to Sun Tzu's first hand information. However, in real life it is likely that one's experience is incomplete – one is likely to have visited many countries but not necessarily Canada or an ice-hockey or chess player may have played a large amount of games but definitely not all. Second, if one has not visited Canada, one may still rely on his 'instinctive' savvy which suggests that a country where everybody is of same age does not make sense, although it would be theoretically well possible that a group of people of same age would decide to form their own country.

3. We may note that in the outlined picture, a systems intelligent person may not only arrive at the correct solution a hundred times quicker than a person who considers the analytic solution but one may do this without being familiar with either the intimidate details of analysis or the theory about the country founded by a group of people of the same age at that time. So, one may not give a complete analysis about Canadians at the beginning but it may happen that a competitor, who is otherwise equally skilful but not systems intelligent, may not give *either* the complete analysis *or* a correct answer (in seconds) and is stuck in secondary details which are nothing but secondary, because the proof is false and the theory of same-age Canadians nonsense having thus little value even for the sake of perfection.

   Do something before it exists. Sense something before it becomes active.

4. We can of course criticise this not only because of simplification but we may also say that rapid comprehension is important in stock markets or ice-hockey, but the intimate consideration has an intrinsic value *e.g.* in sciences. However, although comparison is irrelevant, when considering competition, getting a grip rapidly on the essential is the decisive factor in sciences as well—to present a complete analysis is naturally far easier *after* having a reasonable hypothesis of the outcome.

5. We can present more serious criticism. At first sight, 'instinctive' awareness benefits from strong experience. The more one plays ice-hockey or chess the more sensitive of reading the game one is expected to become. However, experience may also lead to the too facile choice. Intuition may lead to rapid comprehension but this fails, when the reality is counter-intuitive. How could one develop an experience, because new and unforeseen things cannot be known from experience? How could one improve the ability to respond in an 'instinctive' way, because one acts most likely based on one's past experience and, for a new situation, any relevant experience may not exits? In Sun Tzu's terms, one cannot compete against unexpected tactics. We can obviously say that with systems intelligent awareness we refer to the distinction between the core idea and the secondary details and the core idea can well be counter-intuitive as such. Still, we cannot give the requisite answer how to respond to the counter-intuitive situation and Sun Tzu cannot either. Unsurprisingly, Niou and Ordeshook (1994) find that Sun Tzu's analysis of unexpected strategy fails by not taking into account cyclical reasoning *i.e.* the opponent's ability to establish the same (unexpected) strategy. On the other hand, in our interpretation, Sun Tzu sets an infinite number of options. As a consequence, one may thus (in principle) always establish a new situation and surprise the opponent. At first sight, this interpretation is more about Saarinen and Hämäläinen (2004b)'s change optimism than 'the battle is given assumption', traditionally connected with *The Art of War*. Perhaps, a counter-intuitive core idea or unexpected opponent might thus be approached by seeking an analogy from Saarinen who suggests that people can react to unforeseen opportunities better and quicker, if they have anticipated and thought about a large amount of imaginary prospects and future plans. Saarinen says that one has far wider options if one has not artificially excluded them beforehand. In order to face the 'unexpected opponent' we should thus be broadly-minded and tend to *think the unthinkable as a habit*.

Finally, we observe that although a rapid comprehension relates to 'timing' in the previous discussion, it can also be understood as an 'opportunity'. This selection is to emphasise a distinction between long-term (preparation) and short-term (realisation) actions. We note also that, by the use of 'instinctive savvy', we are by no means referring to a 'do first, think afterwards' practice but, like in SA, comprehending a system so that it renders early actions possible, if they are vital. Without this, it would not be possible to recognise their possible vitality.

Team Systems Intelligent Awareness?

Next, we consider a meta-level multi-disciplinary team working to get a grip on the age of Canadians. The prototype starting point is a team of 14 people and their leader. The task is not considered independently by 15 people, but rather it is divided so that everyone has one single step to consider. Nobody is familiar with the work of the others and the leader is not familiar with the whole chain either. This may easily happen in natural sciences and e.*g.* theoretical, computational and experimental work may not necessarily form truly independent parallel studies. Such a team represents an organisational system where its members are clever but where the system with its bad leadership, that is to say lack of SI, causes mediocre results and, almost as a rule, a swamping of questions of secondary importance. When good results are achieved under bad leadership, they are – to our mind – many times achieved notwithstanding, rather than due to, the system and arise from the extreme commitment of some members. This wastes time and resources hugely. Breakthrough results remain unattainable but neither the talent nor diligence is the bottleneck. Needless to say, the members' good life is barely promoted either. When Endsley

and Robertson (2000) investigated team SA in aviation, they found the phenomena general for a wide variety of industrial settings. Similarly, we believe that our observations may be more general.

Team SA represents the degree to which every member possesses the SA required for one's *own* responsibility (Endsley 1989). We propose that this works so far as the goals and objectives are 'known' and regulated, while the situation is more complex when working with an 'unknown' subject. In the best case in our example where everybody does perfect work, 13 people may claim that their work supports the hypothesis that all people in Canada are of the same age while only one would say his work was not supporting the statement. If one person in aviation says that according to his observations set and *well-known* standards are not met, everyone is assumed to take this seriously. Instead, if little is known about the Canadians in advance, it is (paradoxically) likely that the 13 other experts do not really care the work of this one member as long as they know that their own work is correct. Obviously, they feel even better when they know that 13 of 14 persons support their result, although they are not familiar with the work of others. Furthermore, it is even more likely that a person, say a CEO of a company, who use the results of 14 experts, is not familiar with their work at all but the only thing he can do is to conclude that 13 experts from 14 support the idea of the same age Canadians and presumably this must be the case, especially when lots of time has been used to work out the individual steps. Now everybody has done his *own* work correctly. A leader has formed a group and divided the tasks for appropriate members, the members have done perfect science, and the CEO has made the most natural conclusion.

Where an individual is swamped over a long time by details without comprehending the essence, or the distinction between primary and secondary issues, the best outcome of the team may be that they mostly support the idea that everyone in Canada is of a same age but the opposite result cannot be excluded either. Both unsatisfactory results illustrate root causes why opportunities are scattered and why timings fail in science. We cannot make a comparison to other practitioners of SI but we would not be surprised if they were recognized as something comparable.

We suggest that there are a few solutions to avoid this result. (i) First, an individual or a leader of project, or a CEO, can be technically highly skilful, a person who sees the fallacies in seconds and is familiar with all the work and inter-connections although would not do it personally. Obviously, this works only in rather simple cases. (ii) In realistic cases, an individual or a leader may not be extremely good in analytical reasoning or familiar with all the branches of the work but he may be otherwise perfectionist who knows that devil is in the detail. An individual works day and night and after a long time reaches the correct analysis. A group leader does not suggest anything about the age of Canadians until waterproof evidence exists for or against it. These kinds of people are valuable and in this case good work is made. In Sun Tzu's terms, they are the skilful warriors who make the fewest mistakes. However, this can take a disturbingly long time. The CEO may terminate the project and the opportunities are barely met. Competitors can be far beyond. (iii) Thirdly, an individual or a group may reveal SA and SI. But how? We suggested above that an individual might improve his ability to see the essence by means of improving his technical skills and sensitivity for the unexpected. In contrast, if everyone in the team already performs his duties well, it may not improve the team's performance where everyone still improves their own technical skills.

1. SA researchers would give *technical* tools to help the *system*. Endsley and Robertson (2000) found that tools to improve team SA are (i) improved information flows and (ii) improved ability to properly utilise the information within and across the teams. They observed that teams need to share not only data but also higher levels of understanding of

its significance for goals. Tools, like shared mental models, improve communication and SA everywhere. However, compared to aviation, the problem in our scientific team work is the unknown or fuzzy goal. Methods can be so specialised that no foreman can either truly help or give relevant feedback. The training to recognize something which the team is approaching for the first time is obviously intricate.

2. SI researchers would give *personal* tools to help the *individuals*. Like an individual, a group can improve its SI by means of Saarinen's way of independent thinking including imagination, inquiry mode, new perspectives, reading beyond the obvious, a break-through insight mentality, and humbleness in the face of paradoxes. We have noticed that if the group is skilful with a few of these tools and if the information flow, point (1), is adequate, the group may reach an attitude where it can swiftly recognize counter-intuitive facts even when members are not familiar with the fields of others. Such a group may actually learn to improve its awareness or at least maintain a positive drive which clearly facilitates 'systems intelligent awareness'. In accordance with Saarinen's ideas, we believe that individuals do have new perspectives, they are able to read beyond the obvious, and they definitely would like to a grip on the truth. If the group cannot absorb this potential and is stuck in secondary issues, there can be manifold technical reasons for that, such as delays in communication or gaps in organisation – say there is nobody working with steps 5 and 6. However, again, the human factors are decisive also in bad situations. A major handicap terminating new perspectives and faith in possibilities still lies in broadly defined egoistic and selfish attitudes.

3. We finally propose that Slotte (2003, 2004)'s ideas of dialogue represent an ideal tool to probe situations where one in fourteen represents the different (but crucial) view. In consensus or group decisions, the majority would easily win out. According to Slotte and Hämäläinen (2004), dialogue aims at a far deeper need than bare consensus, investigates and does not defend assumptions, searches underlying structures, and allows different viewpoints, while not defending personal viewpoints. Slotte's ideas are clever but created for long-term processes. However, in our experience, their nuance does not work only when constructing understanding within time but helps indirectly also when rapid action is needed. Realizing the possibility of inquiry approach alone facilitates rapid comprehension and things like fairness, the ability to listen, and the ability never underestimate anyone, presumably both represent and support SI in an early comprehension. When considering 'Canadians', we may not immediately visit Canada, which takes both time and money. It is very difficult to question the statement itself either. Understanding this takes time and the individual's early comprehension requires a high SA. Instead, seizing a counter proposal presented by *another person* usually never requires *either* time, *or* money *or* extraordinary skills. This, unsurprisingly, on the one hand, approaches every day's good life – fair play, respect, justice, and wisdom, the moral of SI, and, on the other hand, is highly useful. This is what to do when "*somebody presents an astonishing proposal"* (Saarinen and Hämäläinen 2004b).

Conclusions

Systems Intelligence (SI) invented by Saarinen and Hämäläinen (2004b) and Slotte (2004) represents behavioural intelligence linking the concepts of 'system' and 'intelligence'. Compared to the systems thinking, SI has a personal and existential emphasis. It adds to one's technical skills rather than supplanting them and emphasises a good life and high morals. As a general framework, selected features of SI have been discussed as to how the notion of living a good life

should be taken into account in pragmatic work, what the relationship is between traditional skills and SI, and how SI relates to situation awareness (SA) in competition. We find that SA is implicitly mostly built to prevent errors and serve the system. Instead, we interpret that SI rather creates opportunities and serves an individual and by so doing potentially groups and organizations.

In this paper, SI has been probed by means of and parallel to the classic text of Sun Tzu's *The Art of War*, freely reflected by our experience and previous interpretations of this text. The moral and contemporary relevance of *The Art War* have been unsurprisingly found troublesome. Therefore, the text fails from the systems intelligent point of view. The text contains peculiarities which have nothing to do with SI.

Nonetheless, *The Art of War* paves a way towards a human system concept and anticipates one form of SI by considering the recognition and creation of the critical opportunities and their maximal utilisation by means of action with adequate timing. It is suggested that Sun Tzu's tools facilitate this kind of realisation of SI and include flexibility, adaptability, and information centricity by means of unexpected methods, the continuous gathering of intelligence and the general tendency to act early and avoid delays. In our interpretation, Sun Tzu implies that the critical moments of efficiency take place before 'ordinary' intelligence has mapped out the description of the situation.

In contrast to previous authors, we particularly point out that *The Art of War* sets an infinite number of options with which everyone is not equally familiar. This contradicts the 'battlefield is given' assumption but both views seem to be in-built. This also emphasises the possibility to take big leaps instead of continuous improvement, many times connected to *The Art of War*. However, although Sun Tzu's ideas in SI appear sound, their practical value is questionable not only because of cultural differences. We find that they are vulnerable, if we cannot address SA like rapid comprehension in practice. Therefore, a brief compilation of this problem based on the practitioner's experience is presented. An individual and a team in science are used as prototypes and certain occasions where traditional intelligence is not a bottleneck but does not yield satisfactory results either are discussed. The combination or intersection of SA and SI, that is to say *systems intelligent awareness*, is suggested to play a role in early comprehension and action. We anticipate that SA, SI, and dialogue both represent and support these actions. Borrowing ideas from them might be one way how 'contemporary warriors'—without extraordinary wisdom or courage—can make themselves invincible.

We find it very useful to discuss the issue of SI by means of *The Art of War*. When consideration is accomplished with care and a not too far-reaching interpretation done, we find that such an extraordinary change of perspective falls well into the purview and working methods of SI. We also believe that suggestive analogies between SI and *The Art of War* support the assumption of SI as a key form of human behavioural intelligence, not restricted to the place or time. We have not completely elaborated these aspects or yet exploited them in practice, but we definitely will.

Appendix:

We make finally the following hypotheses: (i) The intersection of SA and SI plays a major role also in the realms where SA is not conventionally considered. (ii) Arrogance, bigness, and an authoritarian environment can prevent rapid comprehension so that this not only cause accidents but also prohibits creativity. This, however, should be taken broadly as artificial constraints of the human system. This may be understood in a way how Saarinen et al. (2004a) define 'systems dictatorship'. (iii) This can occur *irrespective* of traditional skills and intelligence.

According to Saarinen and Hämäläinen (2004b), Ms. Rosa Park refusing to give a seat to a white man in a Montgomery city bus in 1955 was a trigger to change of race distinction system in USA. These authors find this to be related to change optimism, an inherent part of SI. In present terms, Ms. Park realized the essence that was not obvious for all, *i.e.* the iniquity of race distinction. We may imagine her to have been a person who would have been realized the essence of Figure 1, too.

We shall further refer to a case where a 14-years old girl attended a general annual meeting of Ericsson in Stockholm in the mid 1990's and asked what the reason was why Ericsson did not produce cell phones young people liked to use while its rival Nokia did?[7] She was ignored and laughed down. A few years later Nokia attained dominance as the most profitable telecommunication company and most valuable company in Europe, while Ericsson had became unprofitable. Can this anyhow ever relate to SI? Is Ms. Rosa Park vs. a 14-years old girl a totally ridiculous comparison? Surprisingly, this may relate to SI. The inventors of SI say that SI started as an effort to combine Saarinen's Philosophical Practice with Hämäläinen's systems research (Saarinen and Hämäläinen 2004b). We remind the reader that the first developing line, according to our understanding, relates also to Saarinen's impact on the leadership of companies like Nokia. For example, Woods (1998) says that Nokia provided Saarinen an ideal test lab for his ideas. Some related ideas may thus play a role in this field. On the other hand, any further discussion here would be fuzzy and foolish. The reasons for the developed bias between these rivals of that time were, of course, extremely manifold (as were as well the inter-dependencies in race distinction of US). We may imagine turning points but hardly probe them outside the physics laboratory. Nevertheless, we may make qualitative notes based on fragmented public information. First and foremost, in this era (1995-2001) the mobile phone section of Ericsson was first valued highly. There was no doubt that the company was full of the most talented people and its tradition and power in areas of technology, finance and leadership were highly rated while Nokia's history as a multi-business company was very different. The company was recognized to be on a winning streak in the development of phones based on non-domestic standards (see *e.g.* Funk 1998). However, despite all traditional competence to beat one's rival the outcome was different. Then, in 2001, when the tides were turned, there was little discussion on technology or finance but things like 'arrogance', 'waste of time and resources', and 'huge mistakes', a nuance which may be observed in the media of the time, see references[8,9] *inter alia*. After four years, the tide has instead turned against Nokia's models. This time—we do not yet know—we are keen to see whether journalists will use the word 'arrogance'[10] less.

Besides speculations, strict examples are called for. In particular, we ought to give an unambiguous example how a *group* gets can be essentially blind even in the case where the highest standards of scientific consideration are involved. There are examples where a traditional intelligent group in authorised circumstances fails to rapidly recognize the fallacies which would well be obvious to an individual and we might provocatively refer to *e.g.* 'scientific' socialism (see *e.g.* Chalyan 1988) which was once so widely studied at universities but whose scenarios appear quite different today. Instead, we refer to the largest scientific fraud ever which took place in 2000-2002 in physics and nanotechnology at Bell Labs[11] (*cf.* Vilén's (2004) notes on the work

[7] http://www.arbetaren.se/2001/14/a-ekonomi.html
[8] http://netscape.businessweek.com/magazine/content/01_14/b3726075.htm, "Why Ericsson is bleeding."
[9] http://www.guardian.co.uk/business/story/0,3604,475998,00.html, "Ericsson should follow Nokia's lead."
[10] http://netscape.businessweek.com/technology/content/apr2004/tc2004047_7054_tc119.htm, "Looking beyond Nokia's bad news"

[11] http://publish.aps.org/reports/lucentrep.pdf

in Bell Labs). We find this a particularly good example for several reasons. First, this is the research area of a current author who is familiar with the questions involved. Furthermore, the physical society obviously includes people who reveal distinguished 'traditional' intelligence. Any fraud in physics is of course pointless, because it is revealed by experiment sooner or later. The phenomena in many fields are hard to reproduce exactly, but the physical phenomena must be reproducible within limits of error. Apart from this, a German physicist of Bell Labs produced almost a hundred extremely distinguished but totally fictional articles mostly in journals like *Nature* reporting on the discoveries in nanotech such as a single molecule transistor. In the end, this fraud escalated to the mad degree where the exactly same figures were accepted to present different physical devices and phenomena. Astonishingly, it took still several years until anyone dared to use common sense as with the Emperor's New Clothes. At that moment, the absurd construction collapsed in weeks.

Several sources have discussed how and why these authors perpetrated the fraud[12] but little is discussed about how and why this was not recognized already at the very beginning or even after, say, fifty fictional publications. We claim that because the authors came from the most distinguished laboratory of the field having exceptionally high recognition, nothing was questioned even though the result seemed to contradict known physics. Instead, prestigious physicists all over the world fawned around the group of 'the forthcoming Nobel Laureates' providing award after award and invitation upon invitation, while none wondered why the results were not capable of being reproduced, or how this group could write an article every eighth day. Notwithstanding all the analytic intelligence and all the professional skills of the physical society, it proved to be helpless to quickly realize a quite primitive fraud. It is frightening that none of the highly intelligent referees or highly skilful editors of the journals of the day, of the highest scientific standards, could not recognize it. We find that this is a very good example why to exploit SA related ideas of SI.

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[12] http://physicsweb.org/article/world/15/11/2

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Systems Intelligence in Social Systems

Chapter 13

Trusting Systems Intelligence

Tom Bäckström

This brief essay is about hope, trust, faith and the problem of turning speech and ideas into action. Some claim that blind faith belongs to religions only, as if it was synonymous to ignorance and mental sloth. However, as it turns out, lack of faith easily becomes cynicism, a trait of equal contempt in the eyes of systems thinking and intelligence. While it perhaps seems like this essay opens more questions then provides answers, I will argue that trust, faith and hope are essential and, indeed, irreplaceable components of systems intelligence.

Prelude – Allegro

Years ago, two hours north of Reykjavik in a small village church, we were attending the rehearsals of an international choral project. Most of us, the 90 singers, were in our late teens, but our conductors were world renowned. That particular rehearsal was conducted by two conductors. The first one, famous for conducting children's choirs, treated us like children and indeed, the singers behaved like children. They were restless, unable to concentrate and not too interested in singing. An hour later, it was time for the second conductor. She was used to conducting university and professional choirs and treated us as such. And in the blink of an eye, the choir transformed into a different choir. All singers sat silent and still, eager to follow the slightest hint of the conductor. She treated us as professionals and we loved it.

I began to wonder, if it was just a question of attitude and respect, why couldn't the first conductor get it to work? She talked about respect, but couldn't show it in her actions. All she needed was to show a little respect, trust the singers to behave. They would have behaved, but she couldn't.

A Chicken and Egg Problem

To the above anecdote, systems thinking provides an easy answer; when you see the big picture, the thing you must do becomes evident. But if you are supposed to trust somebody or something, then the situation is quite a bit more cumbersome. Fear of failure becomes a significant factor. It requires a lot of courage to begin to trust. When you have acquired a mutual trust, then trusting is easy, but getting there is difficult. If you would have a lot of time at your disposal, then you

would have the option of building trust and respect through joint experiences. But often, we do not have that advantage. In many cases, it is the first impression that sets the tone of an interaction and that tone can be difficult to improve at a later stage.

Then the concept of systemic intervention enters the stage. We call systemic intervention a point of leverage, where a small intervention purports a large change in the system in to a desired direction. In the above anecdote, a possible intervention would be a change of attitude. That would have provided a significant change in the result. But habitual patterns and fear of failure made it impossible for the conductor to see the solution and make it happen. The current system of the first conductor gave no experiential proof that a better system would exist, yet the solution obviously exists for the second conductor. It is a sort of chicken and egg problem; we identify a reasonable alternative, but we sometimes do not find a way to enter the positive cycle.

Definitions

The purpose of this essay is to try to demonstrate how the three concepts, hope, trust and faith, have a central position in systems intelligence. In this aim, let us reflect on the meaning of these three words. Obviously, they are not synonymous, but there is still some overlap. Slightly abbreviated, the Merriam-Webster Online Dictionary states that

> *hope* – to cherish a desire with anticipation
>
> *trust* – assured reliance on ... someone or something
>
> *faith* – something that is believed especially with strong conviction

In my opinion, the anticipation involved in hope implies some level of trust. If it is not a trust that something would happen, it is at least a trust that something could happen. In other words, someone who hopes for something, embraces the possibility that it could happen. An eager hope is then a strong desire for an event, but it does not imply that the desired event has a high probability. Indeed, you can have a weak hope for an event that will almost certainly happen, if the event is not overtly important for you.

Trust, on the other hand, implies that you have a belief, founded on a reasonable level of knowledge that something will happen. It is thus not only possible that something will happen, but according to our best knowledge, it actually will happen with a high probability. That is, we have some prior knowledge that asserts that our event is probable. The type of knowledge that is required is not a trivial question, but it is perhaps not essential in this context. It could be, for example, experiential knowledge.

Finally, we have faith. It is very close to trust, but in my opinion, however, and in contrast to trust, faith does not require reasoning based on knowledge. With faith we imply blind trust, firm belief in something without any proof. Of the three words, faith seems to have the strongest connection to religions. While all these words appear frequently in religious rhetoric, I will try to treat them without their religious connotations. However, some religious aspects will be discussed in Section ”Faith and Religion”.

Interlude 1 – Alla Marcia

A year ago, when we had published the first report of systems intelligence (Bäckström et al, 2003), I showed off the book to my friends with ill hidden pride. One of them opened the book at an arbitrary page and jokingly read aloud a section with ”People want to be happy”, in a preaching tone. He continued reading aloud for a few sentences with purposely excessive zeal and the others laughed. I joined the laughs with a faint smile, but with a saddened heart. He had missed the point, took something out of context and jokingly mocked our work.

The joke did hurt my pride, even though it wasn't meant to be evil, but what really made me sad was that this friend of mine honestly thought he was funny. He didn't even try to understand. I could see his ignorance, but in that moment, I was unable to do anything about it. I felt that the joke had to wear off before I could defend my stand without the fear of being labelled as a humourless person. But then it'd be too late, nobody would be interested any more.

Faith is firm belief in something without any proof.

Cynicism and Positivism

A cynic is, again according to the Merriam-Webster dictionary, a fault-finding captious critic. They have a one-sided world view, where things go bad and there is nothing we can do about it. According to the holistic ideology, the systems intelligent philosophy, a one-sided world view is equal to ignorance. The cynic unconsciously ignores all the positive possibilities. He takes what seems to be the easy way out; claims that everything is wrong, but simultaneously, claims that we cannot do anything about it. We can not do anything and therefore we should not do anything. We could just as well lie down and die. That is not very systems intelligent.

Positivists, on the other hand, as the opposites of cynics, try to find positive perspectives to everything. It would be easy to accuse positivism of the same faults as cynics – ignorance of the opposite, the negative perspective. However, we are all well trained in finding faults. Most of us find it easy to spot mistakes, whereas finding success requires conscious effort. Keeping this imbalance in mind, positivism seems like a balancing perspective. It emphasises the positive side which is usually belittled. This is systems intelligent.

What makes cynics so difficult for positivists, is that cynicism is often funny. Just look at a Woody Allen film – so cynical and so hilarious. But at the same time it is so sad. Complete ignorance of any positive possibilities. Concurrently, positivists are often regarded as well-intending but naive people. A cynic might say ”These happy-happy joy-joy people don't know much about the real world”. The one-sided world view of cynics is thus easily confused with realism.

But if a holistic and system intelligent world-view reveals you all your options, then it is obvious that the cynic will often miss his best possibility. His laziness of trying to find refreshing perspectives pays off with continued misery. Therefore, as long as cynicism and fault-finding are common habits, the systems intelligent way must be a positivistic way.

Fear and Hope

While cynicism and positivism are mostly related to an attitude in the present moment, fear and hope are always related to future events. And with future events, there is always a risk involved,

as well. It emerges from the limits of our knowledge and the choice of domain we have made. We fear that something bad will happen and we hope that something good will come, but we do not know, with absolute certainty, which one will happen. Fear, by it self, embraces the negative possibilities while blind hope, faith, embraces only the positive possibilities.

In the above interlude, my friend had a previously acquired mental model that informal philosophy is humbug. As with any mental model, there is a built-in fear in contending the validity of the model; if you would find a fault in your current conception of the world, you would have to give up a significant part of your whole world-view. Giving up ones trust or faith in experiential facts forces you to accept your ignorance. That is scary because you must then accept that there is more unknown things then you used to believe and there is more uncertainty then you used to think. Unknown things, uncertainty, translate to an increased risk of failure, which in turn promotes fear.

Fear is a primal reaction, while hope requires much more conscious activity. Therefore, similarly as with cynicism and positivism, a systems intelligent approach is to try to emphasise hope. In other words, a systems intelligent person will embrace the positive possibilities in any situation. Such an emphasis on hope balances the weights between fear and hope to a more sane level and promotes systems intelligence.

Fear of failure and lack of hope are easily reflected as a feeling of helplessness. And this, in turn, paves the way for cynicism. Such a progression was visible, for example, in the above interlude, where my own reaction, fear of failure turned to helplessness. I did not find a way to show my friend his ignorance and fear of failure prevented me from trying. The step from my feeling of helplessness to cynicism, to say that things like this do not work, is quite evidently small. But to give up the hope of success is ignorant and thus not systems intelligent.

Interlude 2 – Minuet

Listening to a religious speech at a ceremony or on the television makes me a bit queasy and uncomfortable. It feels awkward. It makes me feel like the speaker is trying to convince me to have faith in something, almost forcefully drag me into a faith without any real reasoning other than ”you should” and ”this is true”. Due to the lack of reasoning I find it difficult to even try to have faith in them.

We need faith to enable our systems intelligence to its full capacity.

But I sometimes get the same feeling when listening to a lecture or reading a book about self-improvement, spirituality or informal philosophy like systems intelligence. Systems intelligence is nothing like a religion, but some level of faith is required in systems intelligence similarly as in religions. Sometimes it is even difficult to distinguish between texts of philosophy, self-improvement, spirituality and religions. I find that disturbing. For me, listening to something that requires faith requires that I lower my defences. Upon reflection I find that my greatest fear is that my friends ridicule me if I'd turn to some spiritual faith. I would like to pick and choose my faiths, but I don't think that is possible.

Faith and Religion

As we have seen, embracing possibilities, to hope, is easy to motivate. Equally we can readily motivate that trust is essential. Both rely on a choice of attitude drawn from conclusions of

knowledge. Faith, however, does not involve facts. Still it seems like we need faith to enable our systems intelligence to its full capacity.

Religions are systems of belief that essentially rely on some axioms, predetermined truths which are not open to debate. In other words, faith is always an essential part of a religion. Personally, I am not prepared to condemn or support any particular religion, but I am sure that there are supporting and opposing views to any religion. The fixed truths might be good or bad, but I will leave it to theologians to decide which one is which. However, the defining property of a religion is the set of axioms, the choice of truths.

Systems intelligence, in contrast, requires faith and trust, but the target is not predetermined. We can give some general guidelines, such as, having faith in the goodness of people and that things eventually have a happy end, but they are bound to change. The choice of the object of faith always depends on the circumstances.

Making Things Happen

What, then, is the difference between systems thinking and systems intelligence? My personal view is that the most significant distinction is their relation to action. Systems thinking is an approach more concerned with *observation* of wholes and interactions, while systems intelligence puts your self in the middle and tries to *make* the best out of it. Systems intelligence is then a question of putting philosophy into practice and making things happen.

I believe it is a fairly common problem that the best of ideas are not always implemented, especially if the ideas are unconventional. It is largely a question of fear of change, fear of failure and fear of trusting unprecedented ideas. From my perspective, the first step towards improvement is hope. If we have hope, we can embrace the possibility of better solutions. We can learn to have faith in that improvement is possible. With success, our hopes can turn into trust. We can learn to trust the positive possibilities and not just as possibilities, but as opportunities. This is essential to systems intelligence.

Trusting the unbelievable.

Faith, however, remains a small mystery for me. For example, having faith in people often pays off. It is systems intelligent. But gaining trust beyond rationale, to gain faith, requires fearless commitment. How can we achieve that? Where do we get the courage to thrust ourselves into the unknown? In the spirit of the catchword of Robert Flood (1999) ”Learning within the unknowable”, I would argue that systems intelligence essentially requires having *faith in the unknowable* or *trusting the unbelievable*.

Postlude – Apologia

I am not, by any standard, a man of religious faith. I am a scientist, a cold scientist if you prefer, one who believes in logic and knowledge, black and white facts. At least this is what I used to believe. Perhaps that is what I used to be. It is just that things are not that simple in the real world, outside mathematics and logic. I did not realise it until I noticed that I could not understand everything nor control everything. There are just too many things, too many details, there is no way I could keep all of it in my head. There will always be things outside my scope, things that I cannot be aware of and things too complicated for me to understand. I can just hope that the things I do not know and understand are not too important, and that the things that are beyond my control will not hurt me.

And there I was, amidst the realm of pure logic, forced to *hope* that I knew enough. I did not know enough, of course, and couldn't but to *trust* that I did the best I could. Worse, I was driven to have *faith* in myself that my best efforts would be enough. And once the door was open, with trust, faith and hope inside, there was no stopping. That was, early as it was, just a beginning, a small step. Later, in all aspects of life, I had to learn to accept hope, to trust and to have faith. And for a convinced atheist like me, that is painful and a still ongoing task.

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Chapter 14

From Neuro-Linguistic Programming to Systems Intelligence

Sakari Turunen

Systems Intelligence (SI) is fundamentally about communications. Learning to work more effectively at the human interface, meaning in relation with other people and oneself, leads to an increase in Systems Intelligence. Neuro-Linguistic Programming (NLP) offers valuable insight in a technical sense on the psychological skills for understanding and influencing people. Hence, as I argue in this article, NLP offers tools and practices for anyone to stimulate their SI.

A Short Introduction to NLP

Neuro-Linguistic Programming (NLP) was first developed by John Grinder and Richard Bandler in the 1970's. "Modeling excellence" was in the heart of NLP, especially in the early days. This meant learning in detail what the best individuals do and repeat the same recipe or process to get the similar result. NLP was influenced by the recent findings of therapy practices and research in different areas of psychology, especially by psychotherapy. (O'Connor and Seymour 1990)

"Neuro" refers to neurological, meaning that the human experience of the world is filtered from all the sensory, cellular-level input through the five modalities: vision, audition, olfactory, taste and touch. All senses or "modalities" as they are referred to in NLP literature are a factor in forming the experience.

"Linguistic" comes from the distinction that language gives a structure to mental processes and experiences, even though language is merely a representation, not reality in itself. Quoting Wittgenstein, "the limits of our language are the limits of our world" (Wittgenstein 1922, section 5.6).

"Programming" is a metaphor that refers to conditioned habits. In psychology this is often addressed as "conditioning". People repeat or "run" habitual behavioral patterns without being acute or perceptive to this. For example watching ones own reflection always when passing a mirror, always tying first the left shoe lace, scratching ones nose when excited about something, or getting mad when called "a liar". Usually people are not aware of the "software" that runs on their brain to form the life they experience and live.

The basis of NLP is formed by a number of processes or techniques that one can learn on three levels (Grönfors 1997):

The first level processes are directed to help an individual to sharpen his or her sensory acuity and thus build awareness of how they behave, and how their own mind and body work together, but also, how other people behave. Becoming aware of micro-movements of the face, tension of the skin or breathing patterns can be named as examples.

On the second level the processes help to lead or direct communication and cooperation in any environment to a direction that is meaningful to all participants. Thus, a practitioner backed by his or her improved acuity can take control of the success of an event he or she participates in.

On the third level the processes give insight on the structures of human interaction. An example that has been also discussed by Senge (1990) is the inquiry mode.

Introduction to the Article

NLP approaches the world pragmatically. One of NLP's strong areas is this action-oriented approach of developing concrete techniques to address issues of human behavior and here I wish to put my attention also. I believe – though I may have mistaken – that trying out NLP will neither kill me. Instead of criticizing NLP I wish to concentrate on a number of NLP applications. I wish to gain insights from these hypotheses and explore their possibilities.

NLP as the study of human excellence, even though admittedly controversial, has produced a vast number of techniques and mental exercises that help an individual to understand better how a human being behaves (O'Connor and Seymour, 1990). This way it offers valuable insight to how an individual can improve his or her communication in several respects by adapting a belief set and using certain techniques. NLP will highly likely offer illuminating insight for every student or practitioner on how to increase his or her own SI.

A number of authors in this volume and others (e.g. Backström et al. 2003) identified a number of prerequisites for being a practitioner of SI. These included abstract terms such as "changing beliefs", "mental models", "seeing through the eyes of another" and "thinking about thinking". As these authors also noted, there is a gap between the lucrative vision and the means of making these dreams a reality. The practical means to incorporate these ideals can't be derived that easily.

"Philosophers have only interpreted the world. The point, however, is to change it." (Karl Marx)

In this paper I will discuss the basics of NLP and a selection of techniques from the viewpoint of SI. I wish to shed light on some of the key arguments and techniques of NLP and to address the issues NLP brings into the foreground. These aim further to establish techniques and behavioral tools of technical nature as serious and functioning possibilities to work on and improve ones SI capabilities.

In the appendix I have listed some NLP exercises and techniques for the reader to try out to get a more personal or concrete feel for what NLP is about.

The Relevance of NLP in the Field of SI

If there is a 3-minute seminar on NLP, the presenter will walk in front of the audience and write on the board three words

1. Outcome
2. Acuity
3. Flexibility

This shows some of the high level of systems intelligence behind NLP. To elaborate on these three, knowing what one wants, the outcome is in the heart of systems intelligence. In very abstract terms this refers to what is called the Good Life in philosophy (see Saarinen and Hämäläinen 2004, Chapter 1, The Moral of Systems Intelligence). Outcome sets the direction of movement.

Acuity refers to awareness of what is going on in the systems, what are the interactions and interdependencies. A highly systems intelligent person can identify and conceptualize, how she and others think and behave. Therefore she is skilled in understanding human thought patterns and has considerably high awareness to identify these. She has a good internal model of human communication and is highly aware of details.

Flexibility is about taking responsibility of the situation. Every human is an individual and needs to be approached as one. A person can only change himself. A systems intelligent person therefore adapts his behavior always to the environment.

Both SI and NLP take the viewpoint that the fundamental solution to any problem lies deeper than its symptoms. Hence, in human systems, it is the belief level that has most influence on the realized behaviors that produce the symptoms.

NLP can be described as an “attitude and methodology”, i.e. certain paradigm, worldview or mental models and the practical tools, techniques or processes. More concretely NLP includes mental exercises. Conceptual thinking, building ones internal models of the world and modeling are a key to more effective work. Managing beliefs and mental models is thus a critical SI area NLP may prove helpful with.

Each of the NLP process levels builds on the previous one and therefore they should be learned consecutively and in order. Getting into grips with the first level, working on perceptiveness of what goes on for example in human interaction, is necessary to advance studying the second and third. The second and third level aim to build a systems view and enable the practitioner to be more active and involved in the system and also take responsibility of its effectiveness.

System structures tend to conceal themselves. Very often systems are not recognized and therefore the generative power of system structure is also neglected. As shown by Senge (1990) the structure of the system evokes patterns of behaviour. Because of this, people get into a rut, submit to the system and let it dictate their behaviour. “When placed in the same system, people, however different, tend to produce similar results” (Senge 1990, p. 42).

The third level of NLP processes therefore helps on developing ones “pattern sense” and with this ability to break old limiting habits of behaviour.

Next I will discuss areas of NLP and some techniques.

Channels of Communication & Acuity to Nonverbal Communication

Humans receive information about the world through their five senses or modalities. Of these, visual (seeing), auditory (hearing) and kinesthetic (bodily sensations) are more pronounced than olfactory (smells) and gustatory (taste). From the vast stream of input a person then filters out what is held to be relevant. These filters can be seen as bottlenecks that limit the quantity and quality of information that the person needs to process consciously. The bottleneck is necessary since a person cannot appreciate all input that comes in. The stream is too vast for conscious processing.

Humans represent their experience of the world in terms of these modalities. All memories as an example are coded in the mind with a representational system that link different modalities together.

The output channels of human communication include language, the posture and movement of the body, voice qualities and so on. These are the ways people express themselves.

One cue to SI is to become more sensitive on the channels of input. The senses form an interface with the outer world and if a person wishes to succeed in the context of complex systems and involving interaction and feedback (Saarinen and Hämäläinen 2004, Chapter 1, Introduction), she needs to be acute on what her senses tell of the world.

To become more sensitive to sensory experience can be started from first exposing oneself to what are called submodalities, which form the break down of sensory experience in more detail. These include for example:

Visual	Auditory	Kinesthetic	Olfactory	Gustatory
Color	Volume	Temperature	Odor/Smells	Taste
Brightness	Pitch	Tension	Freshness	Sweetness
Size	Voice color	Pressure	Rancidity	Bitterness

Also, how people express themselves is of high importance in human communication. Usually a layperson listening to a lecture will consciously only notices the words and neglects the non-verbal messages.

Yet at the same time systems intelligent people would not limit themselves to their current view of the world and thus, what input they appreciate. Rather they wish to challenge over and over again what they listen to. A systems intelligent person has sensory acuity to all channels of communication and can both send out and interpret messages on all these channels. Also, the acuity can lead the systems intelligent person to listen better to his or her own communication. As an example one might note communicating submissively with ones boss. In general terms, conceptual understanding of communication and a theory to analyze the communication process will be helpful in behaving in a systems intelligent manner.

To find out your own primary mode of thinking there is an exercise in the appendix.

Understanding how humans communicate helps to respond to it systems intelligently. From the many ways of communication I will first focus on language.

The Power of Language and Reframing

In NLP the research on language began from developing the Meta-model of language, one of the first models of NLP. One of the presuppositions of NLP says, "The map is not the territory". Maps are a representation of the actual word, a simplified version of it. In the same sense, words are only a projection of reality, not reality in it self.

Language is the means by which humans can communicate about their experiences. Words, however, are not the experience but a transformation or a projection of the experience, which has a richer structure than we can know from the language. There is a clear difference between the deep structure (experience or thoughts) and the surface structure (language and words).

Noam Chomsky (Johnson-Laird, 1988) argued that the deep structure of all languages is the same and the processes of the brain set this up. The environment and culture only determine the surface structure, which of course varies in different languages. The next cue to SI is to get into connection with the thoughts behind the misleading words.

Thoughts are expressed in language and other behavior that don't convey fully the thought. The deep structure of thought goes through a *process of meaning-depletion*, or in NLP terms, of *generalization*, *distortion* and *deletion* before it can be verbalized in language. By this Wittgenstein's quote gains now new, more concrete perspective.

What you see and hear on the surface is only the tip of the iceberg.

Take the example of these two phrases, i.e. surface structures, both derived from the same deep structure:

Susan fell running down the stairs and strained her ankle.

and

A girl hurt her foot.

From the same deep structure can be derived a number of surface structures such as these. All of them give only a partial verbalization of the actual event. Also, they differ in how much meaning is lost.

The Meta-model is mainly about gathering info about the map a person has by asking questions to clarify the deletions, distortions and generalizations. This will be useful for anyone to explore his or her own mental models or mental maps or, as Bandler and Grinder noticed in therapy sessions, asking for clarification leads to creation of possibilities. Once a person confronts and thus notices the limits of his current mental models, he or she can more easily adopt more functional ones to accommodate to the actual reality.

Here some examples (O'Connor and Seymour 1990):

Type	Example	Clarifying question
Universal quantifiers	*All* generalizations are wrong I am *always* late	Has there been a time, when … not? Always?
Necessity	I *ought to* learn these SI theses	What would happen if not?
Unspecific nouns	*They* wouldn't want me *there*.	Who? Where?
Unspecific verbs	He *traveled* to France	How? And why?
Comparison	SI is a *more pragmatic* form of intelligence	Compared with what?
Judgments	*Obviously*, she is not the right for me	Who is making this statement and on what grounds?
Nominalizations	*Education* doesn't work	*Who* educating *whom* doesn't work in *what way*?

Let us shortly go through the last example of the above table to make this more concrete. Nominalization is a process that is turned into a noun. These are very intangible and hide to a large extent the differences between people's mental models of the world. Examples of nominalizations include *education, memory, discipline* and *respect.* To clarify nominalizations one should ask about the verb behind it: "Who is nominalizing what, and how are they doing it?" (O'Connor and Seymour 1990, p. 96).

Gregory Bateson credits Bandler and Grinder, the developers of NLP, in the foreword to Structure of Magic I (Grinder et al. 1975) for "succeeding in making explicit the syntax of how people avoid change and, therefore, how to assist them in changing". People usually don't know how to choose words; rather they use the words they are accustomed to. Choosing constraint words and speaking in abstract, meaning depleting words prohibits clear and effective communication.

Human beliefs are also determined in terms of words. Fixing ones words closes a number of other possibilities. This leads to an experience of "no choice". This, however, is only one possible framing of many.

A framing is what defines the outline and nature of human perception. A glass of water can be framed half full or half empty, whereat the perception of the situation is dramatically different. The way a person frames a situation influences his experience of it for a remarkable part.

A frame of reference is the set of views, concepts, presuppositions, values, and habits that form an outline of a cognitive system to perceive and evaluate a data. A frame of reference determines

from what standpoint a person perceives a data, such as sensory input, and experiences a given situation. A frame is what gives the meaning to anything.

"We are not retreating", said a general, "We are advancing backwards."

The most promising or productive framings from an SI point of view concern not states but possible actions, possibilities, opportunities, possible futures as opposed to existing states or personality characteristics or any such ontologically stable entities. On the other side, the unsuccessful framings concern states and are not sensitive to see development and possibility. They are also locked in a narrow and self-centred point of view and do not explore the viewpoints of other participants, outsiders or in relation to system outline and the time span.

In the NLP, reframing can happen on the level of content, *what* something means, or context, *where, when* or *to whom* something occurs. A reframing can be about comparing a situation to something worse that could happen or appreciating the positive consequences of an event, the positive intention behind it or the positive meaning of what happened. Also, humour is great tool of reframing, since it helps to see what is good. Awareness for the positive side of things is essential in constructive framing. Reframing, as discussed in NLP, relates mostly to what has been discussed earlier (Saarinen and Hämäläinen 2004) as mental or perceptual change.

By choosing ones words or the frame of reference a person can take responsibility of a situation and responsibility of himself or herself. He or she can choose not to dwell in negative thoughts and instead focus on what is good. This is where possibilities open up.

In systems intelligence the belief in the possibility of change is very important. SI is about opening up and enriching ones thinking. By exploring the mental model or map a person has and the reductionism of this opens up the gate of possibility. Thus the means of the Meta-model in exposing the reductionism helps to advance in this direction.

What the Meta-model really does from an SI perspective is that by adopting the concepts one can increase ones acuity to what sort of derivations, surface structures, one chooses and what other people choose. The systems intelligent person understands that words and thoughts are different. Expressing thoughts with words always looses meaning in the process.

On a deeper level, the systems intelligent person should note that the image he puts together in his mind of another person based on all communication, verbal or non-verbal, is only surface. With every person there is a bigger, more interesting and in innumerous ways gorgeous and magnificent person underneath the mask of words and actions. Thus, building a harmonious relationship is critical in communications and this theme is explored next.

Attuning to the System of the Other Person

People are best influenced from within their own system. This is to say, people are more open to people whom they associate the feeling of commonality, or in other words, which appear to share their system so to say in a notable extent.

Churchman (1968) pointed out "Systems approach starts when you perceive the world through the eyes of another person". Saarinen and Hämäläinen (2004) ("Systems approach starts when you perceive the world through the eyes of another person") elaborated on this and listed a small number of techniques to pragmatize this statement, but here I wish to go more in detail.

Every observer perceives the systems around him differently and also, he is constraint in his own perception, which can only cover a narrow portion of the whole. “Seeing the world through the eyes of another” helps to relate to other possible standpoints and to get a fuller perception of the whole.

Considering new points of view will therefore enrich ones understanding about the system at hand. Also, “the eye cannot see itself”, which means that a person can see himself as a part of the system if he is willing to give up the first-person viewpoint and perceive the situation from the viewpoint of another person, the third-person view. The systems perspective includes the willingness to see the world as composed of systems, examining these entities as wholes before inspecting their parts and from the starting point that the entity appears different to all observers, as there is a plethora of possible views to the same system.

“Seeing through the eyes of another” calls for meeting the other person in their world. Here, you don’t push or advocate your view of things. The guideline of Stephen Covey, “Seek first to understand, then to be understood” is valid in the context of NLP also (Covey, 1989). One will not lose his or her personality by exploring the viewpoint of another. Respect for the other person doesn’t’ call for you to buy it fully or submerse yourself under it.

To really go in the experience of another person works best, when one attunes to being the other person. By modeling the physiological and mental state to the detail will let you to share the experience of the other. Sharing the same system, so to say, will lead to better mutual understanding and trust, which can be seen as necessary requisites to produce any meaningful interaction.

With their endless question-asking Meta-model practitioners started to get a lot of people seemingly irritated. This influenced strongly the need to build more harmonious interaction or, in NLP terms, rapport. Two people tend to like each other, when they feel like each other. This feeling of commonality is a key ingredient in rapport.

On the physiological level this is created by matching the appearance of the other person, for example adapting her breathing pattern, facial expressions and posture. Also, the tone of voice, rhythm or words can be copied to further enhance the feeling of commonality. Pacing the other person’s reality is simply a process of describing and to reliving her ongoing sensory experience. Books and practitioners note that the other person hardly ever notices if the other person mirrors her communication style, even though this might seem so easy to notice.

Communication isn’t restricted to merely words, but all sensory modalities, as they are called in NLP. Thus, matching multiple modalities at once will help to build better rapport. And rapport or a harmonious interpersonal relationship is necessary to make room for the kind of cooperation SI calls for (See Saarinen and Hämäläinen 2004).

To sensitize your self to matching the mental-emotional state of another person you can try out the exercise at the end of the chapter.

Pacing the Reality of Another Person

Milton H. Erickson MD, famous in the field of hypnotic techniques and brief therapy, was one of the biggest sources of influence for early NLP modelers and a NLP model is entitled after him as the Milton model (O’Connor and Seymour 1990).

In the Milton model language is used (1) *to pace and lead the person's reality*, (2) *to distract and utilize the conscious mind* and (3) *to access the unconscious resources*. (O'Connor and Seymour 1990). Pacing and leading is an application of what was described under the previous heading, aligning with the reality of another person and thus gaining more influence. The following example of pacing and leading, is fully covered by Haley in Uncommon Therapy (Haley 1986, pp. 189-193)[1].

> "Three-year-old Robert fell down the back of the stairs, split his lip, and knocked an upper tooth back into the maxilla. He was bleeding profusely and screaming loudly with pain and fright. […] As he paused for breathing, I told him quickly, simply, sympathetically and empathetically, "
>
> "That hurts awful, Robert. That hurts terrible."

After a few seconds Erickson continues to say:

> "And it will keep right on hurting."

One might consider, as Haley (1986) notes, what Erickson does is give the child negative reinforcement that adds to his misery. For Erickson, however, this is a means of building the relationship to such a level that change becomes possible. He moves on to state:

> "And you really wish it would stop hurting."

All of these statements do nothing more than state what the child is actually experiencing and what he most wishes at the moment. What this does, instead of assuring that "It doesn't hurt, will be fine" (which is not true), Erickson establishes himself as a person to be taken seriously. He knows what is going on. When the child trusts Erickson and knows that he understands the experience, Erickson can give the suggestion to make change possible:

> "Maybe it will stop hurting, in just a minute or two."

Once Erickson has paced the reality of the child or, in other terms, attuned to his system, Erickson can continue to affect the situation in a positive way. He can lead the situation in a direction that is beneficial to all parties, which is really the goal of this sort of increased impressiveness of the individual.

Using Senge's (1990) terms, for most of the times people tend to rather *advocate* their view rather than *inquire* what other people are thinking and saying. The Milton model stretches the inquiry mode of Senge even further: It is about demonstrating, that one can and is willing to adapt the view of the other.

True systems intelligence is the willingness to explore the viewpoint of another person as characterized in these two preceding chapters. What people often fear is that adopting another person's frame will lead to loosing their own. This is why they hold on to their reality as hard as possible. Systems intelligence calls for the mental ability to encounter the other person *in their reality*. One will not loose ones personality by this but rather build more harmonious interaction.

[1] Many people consider this negative reinforcement, or a suggestion to continue in distress. To Erickson it is a way of getting together with the patient in a type of relationship that makes change possible, which is the goal. Once he has done this, he can offer a move for change by saying, "Maybe it will stop hurting, in just a minute or two".

This only means that one is willing to respect the other person and not try to force ones own reality upon the other person.

On Some Critical Notions on NLP

SI and NLP have many things in common. Therefore it is important to look at the criticism of NLP – will these prove to be the pitfalls of SI research as well?

The main arguments against NLP include that its literature is mostly of technical nature. Academic research is skeptic about NLP, since only parts of it have been proven scientifically (Malmelin 2001). One main reason to this is that NLP is more of a layman science – a concept under which umbrella anyone can publish their thoughts without any imperative to prove them. Many developers of NLP have applied findings of for example social psychology, psycholinguistics or communications, but not all have invested the time to learn them properly. Thus, some techniques have only shallow evidence to back them up. So far the NLP community has not been able to wipe out the inner incoherence, which sheds a shadow over the whole.

Another major issue is manipulation. The myth of being able to control and dominate other people is often associated to NLP (Malmelin 2001). This can be perceived as a powerful selling argument – what would anyone want more than to be able to change other people?

An area of NLP, which I haven't described in detail before is persuasive language patterns. These can be seen as a form of manipulation but another possibility is to frame them as an effective way of communicating to another person. From the viewpoint of getting ones point across the use of certain techniques of persuasion seems more or less reasonable.

A lecturer can't stay home, on his own territory, in order hold a lecture. She has to go in the classroom, among her students and do her job – in their reality.

NLP teaches tools of persuasion, yet it forbids manipulation using its models and processes. The situation is the same as for a student of martial arts: she practices the skills of fighting so she would not need to use them – but she could. This ecology, however, is in both situations in no respect binding. Hence, the choice stays with the individual.

Undoubtedly this is the case for SI as well: The study of SI aims to improve the influence of the individual over systems. It can be argued that, if correctly applied, a good internal model of human interaction grants the individual mental leverage to where influence can be found. To take communication as an example, awareness of more persuasive language patterns increases the individual's ability to influence other people. How she uses her added impressiveness is left to her own choice.

There are a number of situations where a person would like to express a higher level of systems intelligence. Wouldn't it be great if systems intelligence could be mechanized to such a degree that this person only would need to choose from a toolbox of exercises, which to apply? Probably not, any toolbox is useless unless one knows how to apply them and why; the intent for doing something is more important than the action itself. Neither the intent or mindset nor the techniques work as they are supposed to if taught separately.

If NLP or SI is seen to embody information that can be used in ill will if fallen in the wrong hands, should this information somehow be contained? Should the NLP and SI communities somehow censor or limit the information that they publish to control the situation? These might

be questions that people raise, but it seems distorted to hold any body of knowledge leading to added impressiveness accountable for the actions of an individual.

Haley also gives an illuminating view on the topic of manipulation regarding to Erickson's therapy: "Those who are concerned about 'manipulating' people rather than behaving 'straightforwardly and honestly' [should note that as in the example before] at no time was the boy given a false statement. It would be far less straight forward and honest to reassure the boy by telling him [as most parents would do] it didn't hurt, to try to minimize what had happened, or in other ways to dismiss the boy's experience of the situation." (Haley 1986, p. 193)

As noted before, often times people desire intensely to change other people. They do all sorts of things. The difference of those applying a technique and those who don't is that both desire as intensely to influence other people but the latter are just less successful.

Concluding Thoughts

In this article I have referred the basics of NLP and given a run-through on some applications, which I explored from the viewpoint of Systems Intelligence. I have taken these applications as hypotheses and ideas to explore in order to find tools to stimulate systems intelligence.

The first theme I explored was building awareness to bodily sensations, that usually are neglected by the conscious mind but that pay a key role communication. Second, I moved on to discuss language processes that stand in the way of conveying thoughts clearly, namely deletion, distortion and generalization. Still in the roam of language, the next theme dwelled on how changing ones viewpoint – reframing the situation – can reshape the experience. Finally, I discussed how to apply the previously mentioned skill areas to attune to the feeling state of another person, and thus building a harmonious and productive communication situation.

A tool chest such as NLP can serve beneficially in many respects while trying to learn to work more effectively with other people – or at the interface between people. Habits that make the life of the individual every day are most often unconscious programs.

A student of SI will in different situations become aware that his or her habits are not fully supportive but rather counterproductive to the outcome. Adopting a technique will facilitate learning and the acquisition of new habits, which at first feel difficult to apply, counterintuitive or silly and stupid. "A technique can function as a transitional object, which helps adult learners make the transition from feelings of incompetence to feelings of competence" (Hirschhorn 1990, p. 116). Like a teddy bear, as Hutton et al. (1997) note, helps a child carry his anxieties, to carry all his inner feelings, thoughts and imaginings, a concept or a technique can do the same for an adult learner. Thus, opening up to try out a technique may well lead to valuable learning.

This is not to say, however, that techniques are the ultimate solution. People want to believe that there is an easy way to handle things. This is one reason that quick fix techniques are so popular. Also, as SI notes, the best solutions are often so simple that they seem too simple to even to be even tried. Thus, simple techniques can be very helpful and produce desired results. But they won't in every situation.

A technique can serve as such a solution in one type of situation, but one cannot control all somewhat similar encounters with the same technique. Each situation is unique and needs to be treated as such. Or, framing it differently, it should not be expected that a technique would solve each and every situation, since techniques are devised to work in a general situation. Techniques

work at most situations but not all – there are always exceptions that can't be included in the guidelines.

What techniques actually aim for, rather than being supposed to work in all situations, is to help to condition a new way of behaving in a specific type of situation – in such a way that is more supportive of the general outcome. A technique is something that is applied consciously, when an unconscious behavior or pattern doesn't work as hoped-for.

Learning with a technique will therefore look something like this. First, a need for learning is noticed. For example, an individual becomes aware of a habit that doesn't support him. Then, he works on changing his behavior. Once the body has learned, i.e. the new behavior is conditioned this behavior soon becomes unconscious again – it is self evident that this area is in control since the habits are supportive and thus there is no need to pay attention to it consciously all the time.

A junior swimmer can't start to swim faster just applying more force. In fact, he will just splash more water and tire out sooner, with only a marginal improvement in speed. In swimming, it is not so much about force as it is about technique. With the right technique, swimming is fluent. Having mastered one technique, he can move on to learn something new.

An art student first copies the styles of old masters and then later develops his or her style. Here also, once one knows the techniques, he or she can step outside of them, apply them creatively and express themselves in their own style.

Knowledge is true power, when it is acted upon and put to use. Thus, making the first step in applying knowledge is the most critical. The truly systems intelligent person is both an academician and practitioner, she both thinks and acts. Here SI and NLP share the epistemology and technical interest in knowledge: It is not so much the strictly academician interest of "is it true" but the pragmatist interest, "does it work".

In future, SI research should take ideas and hypotheses from NLP (and other pragmatic ways of creating new behaviors) to work on to create for SI it's own tool chest of techniques to initiate systems intelligent habits and behaviors. If a scientific approach is applied here, SI will prove more advanced and not fall behind in the areas where NLP has been criticized and where it lacks supportive evidence.

Appendix A: Application Examples and Exercises

In this last part I have included some exercises that should prove helpful in order to apply the ideas presented above and give a small insight on NLP. I have done this taking the risk that if these exercises are applied hastily they probably will not work. It may be advisable to refer to NLP manuals or practitioners if the exercises don't work for you.

Smile Your Frustration Away

For two or three minutes stand up in a good and balanced posture, put a big grin on your face, look upright towards the ceiling (or sky if you are outside), pull your shoulders back and put your chest out. Now, in this position and *without changing any aspect of your body* try to feel depressed. After a while you will notice it impossible to feel sad, since your body is giving a totally opposite message to the brain. In fact, should you feel tired or frustrated, try smiling this way for 5 straight minutes. You will notice a shift in your mental state also.

Primary Modality

To develop acuity to modalities you could either scan this text and note, which modalities (visual, auditory, kinesthetic) I have mostly used and thus what is my primary modality. Also, you could read something you have yourself written and try to find out which then is your primary modality.

Finding ones primary modality may prove helpful in analyzing the patterns of communication. From the viewpoint of SI this means better understanding of the structure and underlying systems of one's own habitual communication. Becoming aware of what used to be unconscious, habitual and passively repeated is a step towards SI.

Tune Into the Same World

This exercise is quite funny and gives a hint of the possibilities and benefits of matching and mirroring the other person. At best, even though you haven't spoken a word, you can experience the feeling state the other person is in such a strong way, that you can even feel reliving the same image or feeling yourself.

Do this exercise with two friends and you are from now on referred to as A, B and C. A chooses a memory she associated strong and vivid emotions to. Then, she closes her eyes, adjusts her body to the detail in the same way as she was in the real situation. She goes fully in the emotional state by hearing, seeing and feeling everything that went on in the experience.

When A is in state, B and C look at her posture and expressions, feel her skin or muscle tension, notice her breathing and do what ever they can. After that B stands next to or opposed to A and tries to copy A. As she closes her eyes, C will help by adjusting B.

When C feels that B copies A fully she asks B about her feelings ("What emotions do you experience?") and if she can image, hear or sense anything special. After B has described her emotions, A can describe her actual experience. If B didn't fully get in the same feeling state before, she can now adjust.

How the Surface Structure Fall Short of the Deep Structure

This exercise shows rapidly, how limited explanations are. This exercise is for two people and you need paper and pen to complete it.

First, person a makes a drawing on a piece of paper so that person B cannot see. (1 minute)

Putting her drawing away, person A explains it to person B. Person B tries to draw based on A's description without showing the result to A. (2 minutes)

Next, person B asks person A questions about the picture. Neither of them get to have a look what the other person has drawn. (2 minutes)

Lastly, person A and B both take out their pictures and compare.

What this exercise shows is that the picture in the mind is much richer than a thousand words. The key point here is that an explanation is not complete, but asking good questions can help to complete the picture.

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Chapter 15

Accelerated Learning, Teaching and Systems Intelligence

Nina Sajaniemi, Raimo Lindh, Hanna-Maija Sinkkonen and Elina Kontu

Human beings have natural prerequistes for the systems intelligence. However, this potential capacity seems often to vanish. The purpose of this paper is to elucidate the basis of human system intelligence as a developing ability. The role of teaching and accelerated learning in the context of system intelligence will also be emphazised.

Introduction

This article introduces some basic learning functions in the human mind in the context of systems intelligence, featuring communicative and environmental connections together with genetic feedback in regular and deviant developmental environments. The aim is to give an example of such a pedagogy that fulfills most features of systems intelligence. This pedagogy is accelerated learning and teaching (AL) (see for example DePorter 2001 and Meier 2000). It is a well thought approach to teaching the whole person, containing specific elements that, when used together, empower students to learn faster, more effectively and joyfully. Today AL could easily be compared to the concept of emergence as they defined it in the Complexity Research Center Santa Fe, AZ (Gell-Mann & Murray); our reality can be built out of decentralized, self-organizing interaction of its parts (see Johnson 2001, Lindh 2004 and www.santafe.edu). Interpreting the concept of emergence through, for example these writers, it seems to be similar with the concept of Systems Intelligence.

The Systemic Human Being

Systems intelligence can be defined as a function that creates new phenomenas with interactive feedback. The human being is an excellent example of systemic intelligence in this view. Within every man exists a tiny universum that uncompasses enourmous capacity and fine tuning in order to support life.

Living things are made up of individual cells each having its own independent task. Cells maintain chemical balance within defined variance even even if the is a ”hell” in external space, If a single cell does not succeed in its task it will dye. (Damasio 2000)

Let us think about the amoeba. It is a one cell creature without brains even though it needs to survive, and it can also succeed using that exquisite adjustment mechanism it has evolved.

New challenges arised by a complicated environment, and more efficient adjustment mechanisms were needed. Evolution created the nerve cell which increased greatly survival potential. The nerve cell made possible for an organism to increase inner communication, and it also crystallized the meaning of interaction (Damasio 2000).

Inevitable Communication

Human nerve cells are formed in the central nervous system (brains and spinal cord) and in the periferal nervous system. Nerve cells are messangers that the body and environment are constantly using when conversing with the brain. Uncommunicative nerve cells are condemned to languish and they will dye. Brains degenerate and lose their retention ability without interconnected neural networks. Outside stimulus tunes up conversing circuits of the brain and makes it function in social and innovative ways. Frequently misfocused or ill-timed stimuli are rioting in those circuits inhibiting their formation and finally destroing them. As a worst result there may be brains frozen into a disabled condition where messages run on slow motion without a goal or meaning (LeDoux 2003).

The human brains are quite an incredible machinery that is comparable to every single wonder of nature and every achievement in the area of high technology. Uniqueness of this machinery is seen in its constant and time specified interaction with the surrounding environment. The brains do not recognize any kind of linearity forming reality out of the chaos theory. Enormous and shocking changes for the brain function can be caused by a tiny alteration within inner basic elements of the brain and body (entzymes, proteins and fatty acids) (LeDoux 2003).

Interactive Feedback

The amount and direction of the change depends on our living environment because environmental stimuli have strong influence on the transactions in our organism. One example is the serotonin transporter (5-HTT) gene that enlists a serotonin messanger to the service of our brains. Serotonin acts as a chemical shower and the lack of this shower has a connection to depression, panic disorders and anxiety. An optimal or powerful shower is related to different kinds of pleasure experiences. The serotonin messanger is needed to transport this important substance to be sprayed to different sides of the brain. There is also a short allene variant of the 5-HTT gene which reduces efficient functioning of this gene. A transportation problem will arise and the amount of serotonin is reduced. In other words the short allele variant of the 5 -HTT gene confers susceptibility to mood disorders suhch as depression and anxiety. Plain susceptibility is, however; not a sufficient explanation. Caspi et al. (2003) have proved in their research that susceptibility to depression and anxiety was connected to the short allele 5-HTT gene only when combined with hard life experiences and neglected childhood. Several research results prove that if mother provides for her child the short allele 5-HTT gene susceptibility can be prevented (Champous et.al. 2002). Similar findings are made with a gene variant that predisposes to aggressive behaviour. This X-chromosome gene, if deficient, affects MAO (monoamineoxidase) enzyme functioning. This deficient gene reduces enzyme monoamine oxidase.

When the child's distress messages are responded to in the appropriate time and level he realizes that he has an active influence on his own well being even if it takes a long time. Without active experience about one´s own self, it is not possible for a person to relate oneself to other human beings and to become systems inntelligent. Accumulated mind calming experiences stabilize synaptic connections and mould functional structures of the child's brain. The child builds up subjective temporal experiences which resemble phases in music. It is a narrative unit with its actor (child), function (e.g. getting nutrition), goal (gaining pleasure) and context (another person). These temporal experiences establish memory and thinking. Human behaviour can be learnt, analyzed and foretold by them (Sinkkonen 2003). Systems intelligence is learnt by them.

Through cumulative mind calming experiences the child learns to trust that overexitement will fade and pleasure will recover. Then this child is able to challenge new situations without depressive fear. Fylogenetically old and subconscious brain structures do not gather connections which could strengthen fear sturcture (Schore 2002). Instead images containing mind calming experiences will be gathered. These are learned when using the adjusting inner mind set; "Suddenly I remembered mother when all my was gone". Children in their developing years get used to knowing that disappointments are not lethal and words do not kill. These people can feel free to try out new things without being afraid of humiliation. Learning prerequisites for systems intelligent functioning are well grounded.

Frequent inconsistent or too slow reactions to the child's emergency signals will create stimuli which are not connected to the original unbalancing stimulus. Then it is possible that fear structures are strengthened and even neutral stimulus will trigger negative emotions (Schore 2002). In other words, the child begins to see terror everywhere. The field of functioning will be narrowed, rigidity will grow and this person is forced to live frugally. It is possible, in this case, that the systems intelligent functioning will dry up.

The Power of School

In Finland every child goes to school for at least nine years regardless of living conditions, parents and prerequisities. In principle the years at school may represent a window of opportunity to redirect abberant development back onto normal trajectory. Development potential can be increased and students can be guided to use their capacity fully. There are possibilities at school to create such neural connections that help to increase systems intelligence. Clearly, the schoolchildrens´ brain are extremely plastic, but with this enhanced plasticity, comes enhanced vulnerability that is not fully understood. For examlple, strengthened stuctures of fear can narrow the window of opportunity by restricting the learning capacity. Mediocre activities create ambique situations where children with a beneficial socioeconomic status might begin to thrive but children with low SE may loose their chances totally. Our schools are powerful enough to transform a child´s future, even if it takes a long time.

School is a miniatyre society. It has changed a lot during last years. Many problems have become critical and the threat of alienation can be seen in some children already in the primary grades. Chronic school problems are derived from situations where students are unsuccessful in their tasks, ignore their school work and are frequently fighting with their peers. These daily puzzles give extra stress for both teachers and students and they heavily disturb creative learning. The majority of school teachers, however, suevive with their natural instincts. Many problems of learning and living will be solved by teacher innovations. However, many problems will be cumulated by differing belief systems, mental models.

Preventing Change

Arguments based on predestination can be seen as change preventing mental models. An aggressively or defiantly behaving adolescent may be faced as a person who has got a psychic problem, attention deficit disorder or difficult living conditions. There is a clear tendency to find genetic and neurological explanations for learning learning difficulties. These explanations may be adequate and there may be truth in them. They can deepen the understanding of a person's life history when succeeding because the human being is built out of past experiences but also orientates for the future (Schachter 2002).

Furthermore, change preventing mental model is to describe that problems derive from the structure. Scant resources, class size and school buildings can be seen to limit creativity. All this is true: resources have been trimmed, class sizes are too big and school buildings are not often functional enough. Another example of a disadvantaged mental model is the so-called regression interest. It means sticking to old, familiar and secure ways of thinking. New ideas are felt as a threat and full of contradictions. It is easier to swim in a channel than in the ocean where the oppisite shore is not seen. That is true and human because changes are energy consuming and there always seems to be a lack of energy.

The mere explaining, however, does not constitute any change. Something must be done differently in order to change anything. It is not possible to replace one's personality, life situation or the past. Improved resources will not reach the school in real time. That is why must new directions and perspectives for one's thoughts must be found.

Scool as a Learning Organization

The school system is made out of teachers, students and other personnel. Everything that happens at school has effects on the classrooms and vice versa. The classroom is a system interacting with the environment, for example other classes, homes, kinderkarten and co- workers. The teacher is a memeber of many systems; his own class, teaching personnel, PTA etc. In open systems the teacher understands that his behaviour effects all the students and vice versa. The teacher understands students come from different kinds of families which have varying values, expettations and hopes. The systems intelliget teacher is an instinctive master who figures out reality attentively.

This systems intelligent teacher is always trying to get rid of stereotype thinking channels. He realizes needs for change in his own work and can define problems with new ways (Molnar et al. 1989).

Here is a story of a teacher:

> *"Kalle was be a seven year old first grader. He always wanted to be the first in the queue. He expressed it by pushing and poking other students. It had been clearly agreed that each student could be first, taking turns, of course. Kalle, however, thought that the first place in the queue was always his. I had tried to remind Kalle about minding others, waiting and being fair. I had him stand second in the queue and, when poking started, moved him to the end of the queue. My trials did not succeed and Kalle went on behaving unacceptably.*
>
> *So I decided to redefine the situation. I had considered Kalle unfair and boisterous. I tried to concentrate on finding a new angle. After considering various alternatives*

> *I found out that Kalle was really quick. I had to hustle and persuade other children to gather them from the yard but Kalle always rushed fast into the queue. I tried to take advantage of Kalles swiftness and made him the queue assistant. Kalle was permitted to choose leaders for the queue and write their names on the board. Every time someone was the leader Kalle checked his name. Kalle took care of taking turns as a leader. Kalle eagerly carried out this plan. He continues to write respective leaders' names on the board and is getting extra writing practice. Kalle cooperates well and walks last in the queue to supervise other students."*

Redefinition influences mainly the person who is doing it. Things can be said and done in a new way by thinking differently. The need for redefinition is systems intelligence. A teacher explained:

> *"There were many aggressively behaving boys in the class. They often fought and their "trigger treshold" was really low. I did not know what to do with them. I had tried out many traditional ways. I had given detentions, talked with them and their parents, had them passed to the principal. Nothing had helped. I knew that these boys loved ice hockey. Most of them practiced regularly. I got a desperate idea and decided to try it out. One morning I said to the boys that from now on ice-hockey rules are applied here. After every fight there will be a cooling penalty for violent behaviour. If a player thenresists the referee´s desicion there will be a game penalty. It was a surprise to me when the boys became inspired and committed to the rules. Atmosphere in my class began to calm down clearly."*

The teacher realized that it was better to give up ways that did not change anything. She was able to change her point of view and could emphaty with the boy´s thoughts. He acted in a systems intelligent way.

Teachers have many other ways to act systems intelligently. Creativity and potential capacity can be found. It should just be put into use. Every teacher can develop into a master. It demands energy, struggle and intelligent diligence. The principles of accelaerated learning could be useful in striving for masterhood.

Accelerated Learning and Teaching

Basic theoretical background of Accelerated Learning and Teaching is defined by IAL, International Alliance of Learning. This organization gathers and develops AL methods internationally. Their website explains that Accelerated Learning is multifaceted, encompassing a wide variety of methods and techniques. Powerful learning must engage both the analytical brain and the emotional brain, along with both states of mind-the conscious and unconscious.

- Knowledge About the Human Brain
- Emotional State
- The Learning Environment
- The Role of Music and the Arts

- Personal Motivation
- Multiple Intelligences and Learning Styles
- Imagination/Metaphors
- Suggestion
- Team Learning and Cooperation
- Improvement and Results

Learning expectations should be clearly defined and shared with participants and constituents so that:

> *learners are able to comprehend the relevance of the subject matter to their lives*
>
> *and*
>
> *instructors can measure progress and generate objective data that can be used to continuously improve and add value to planning, assessment, and process improvement (see www.ialearn.org).*

Mental Imagery Learning and Teaching is a version of AL**.** More than thirty years of developing crystallized three phases in mental imagery learning and teaching (Lindh 1998). These phases include different states of consciousness, emotions and feelings, memory, creative intuition and multiple intelligences in the learning process (Lindh 1996, 1998).

1. The optimal mental state. Mental state means good social classroom atmosphere and an open, relaxed mind in order to widen the field of perceptions including peripheral sensations, and to free energy and focus on unexpected creative solutions in learning. **2. Imagestreams.** Imagestreams of different sensory modalities (visual, kinesthetic, auditory) then carry learning material up to the conscious and unconscious mind creating a global stimulation into short time and/or working memory. **3. Expressive activation.** This fresh imagestream is connected to previous memories by expressing it through activations within multiple intelligences giving new understanding and learning experiences into the long term memory (Lindh 2004). These three phases express systems intelligence principles in our minds and social interactions when learning and teacging is carried out acceleratively.

Two practical examples of accelerated learning and teaching could be a teacher story of the tearchers further education AL course and summary of AL-history in the University of Helsinki (see Lindh 2004). One of our teachers wrote her experiences:

> *”My <u>first objective</u> was a change in attitudes. Could the accelerated way of teaching and learning change negative attitudes towards the Swedish language. I think that I succeeded in this. None in the experimental class pupils applied for special education and exemption from Swedish lessons even when there were several potential students for both. The <u>second objective</u> was to improve language practice and drills. Positive feedback was received even here. After some activity one of the students sighed: “ Just cool. Why don’t we also do this in the English lesson!”*

Broader educational objectives were to develop students' self confidence and inner knowledge. In teacher's viewpoint both of these grew. For example, in the beginning of term there were students who did not want to come in front of the class to perform anything. Now, during spring term everyone comes. Personally I am very satisfied with accelerated methods. Earlier individualization of learning in heterogeneous classes used to be a problem. Now every student can do activities to her/his own capacity. Separate programs for gifted and slow learners are not needed. I got good results with AL especially with slow learners Gifted students learn in spite of the method at least on some level.

The accelerated learning and teaching history was viewed in light of the research results which were achieved here in the Department of Teacher Education, Special Education Section and Further Education Department. Direct effects were looked into through teachers' further education and the class teachers' special education course (see Lindh 1998 and 2004). Indirect ways of reviewing the effects of AL training were to look into students' interest in AL which was manifested by own research in the area (see Lindh 2004).

Direct studies showed that after teachers' AL training 1) Their students learnt better, 2) Teachers could use adequate concepts when participating in educational conversation, 3) They had confident ways of integrating AL-elements in their own teaching and 4) They could increase the level of energy, idea fluency and improve their interpersonal relationships. When a special education university course was conducted by AL, students learnt personally accelerated learning and teaching and could easily acquire basic theories and concepts of special education, get to learn and experience essential special education methods, get readiness for cooperation with school committee and create own special educational models for a community school system.

Indirect studies showed that AL-trained teachers used main elements of it even after six years. In special education teachers found that AL as a method of teaching and learning was sigificantly better compared to traditional classroom teaching and learning. They also found that the students' self esteem was enhanged by mental imagery learning. Also relaxation and mental imagery programs could be learnt in early grades.

It can be stated that AL courses taught during twenty years at the University of Helsinki have been successful and serve well as an example of systems intelligence. Students learnt a new educational method for their own pedagogy. They found that out by learning AL and special education through it. When they used AL in their own experiments they were also able to learn about its effectiveness compared to traditional educational methods.

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Systems Intelligence in the Arts

Chapter 16

Systems intelligence and multiple intelligences in performing

Henri Penttinen

This article discusses some issues related to performing and reflects them through the concepts of systems intelligence and multiple intelligences. The discussed themes are divided to what occurs before, during, and after a performance. The main concepts discussed and described include charging, presence, spans, reflection, and communication.

Introduction

Performing in front of an audience is often thought as something frightening, some, however, are very natural and fluent in it. A person in the audience who is not a skilled performer can easily notice even gentle imperfections in a performance. That is to say, some things related to performing are very easy to understand, for all of us. This article will discuss some of the issues related to thriving towards a better performance or being a better performer. The concepts will be divided with respect to time, so that issues related to things that occur before, during, and after a performance are discussed separately. The issues and concepts will be discussed on a general, conceptual level, i.e., a list of specific activities to reach the goal will not be given. Rather, the point is to raise some relevant issues and treat these through the concepts of systems intelligence and multiple intelligences.

- Multiple Intelligences - MI, is a theory developed by Dr. Howard Gardner (1983). The theory criticizes a single intelligence view and instead proposes at least eight different intelligences. The theory is based on scientific research in fields ranging from psychology to anthropology to biology. In addition to linguistic and mathematical/logical intelligences, usually viewed as the forms of intelligence, Gardner includes the following items to the list: musical, spatial, bodily/kinesthetic, interpersonal, and intrapersonal. In 1999 he added naturalist intelligence and existential intelligence to the list (Gardner 1999). He claims that all humans have these intelligences and that the development of them is strongly affected by the cultural surroundings. His view also includes the possibility to affect and develop these intelligences. The intelligences are seen as independent and they develop in different time periods to different degrees. However, they are closely related to each other and development in one area may improve the whole constellation of intelligences. In fact, there is strong interaction between these independent items,

but it is still unclear how and why this happens. The interplay between the intelligences is a field under scientific research (see e.g. Milovanov 2000) and at the end will most probably prove the importance of all intelligences. Furthermore, one of the key elements is that what ever the intelligence profile of a person is, things can be learned through all of these intelligences, and not only through language or logic. Next, a short description of the first seven intelligences is provided.

Linguistic intelligence is the capacity to use language, speak, write, read, and listen skillfully. A person with linguistic intelligence is very likely to achieve good results with in the traditional western school system. Poets and writers are a natural example of people with linguistic skills. **Musical intelligence** involves understanding and expressing melodic and rhythmic themes – music –. In other words, not only is reproduction of music through an instrument an important part of musical intelligence, but also the ability to listen, hear, and recognize music. A person with **logical – mathematical intelligence** is able to manipulate numbers, quantities, and operations with ease. This also includes the ability to solve different kinds of problems through logic. **Spatial – visual intelligence** includes visual perception of the environment, the ability to create and manipulate mental images, and the orientation of the body in space. Navigators and chess players, for example, often possess intelligence of this domain. **Bodily – kinesthetic intelligence** is the capacity to use the whole or parts of the body, including physical coordination, fine and gross motor skills. **Personal intelligences** are divided into two: interpersonal and intrapersonal intelligence. **Interpersonal intelligence** involves understanding of other people and how to communicate and work collaboratively with them. A teacher, a salesperson, or a politician most probably possesses interpersonal intelligence. **Intrapersonal intelligence** refers to understanding of yourself, your inner emotions, and feelings. A person with intrapersonal intelligence typically knows what he or she can do or cannot do, including the ability to control emotions and thoughts and work with them consciously. In addition to these specific intelligences Gardner sees that humans have higher order cognitive capacities such as common sense, metaphorical capacity, and wisdom. (Gardner 1983)

- Systems Intelligence - SI, is a concept launched by Saarinen and Hämäläinen (2004). Systems intelligence is seen as a higher order cognitive capacity to perceive interactive entities and seeing oneself as part of it. A systems intelligent person knows how to act purposefully in complex systems with multiple feedback paths, so that the system as a whole produces desired positive results. SI acknowledges that a system produces behavior, not only the individual components, and that positive change is possible. SI is a holistic approach. A subject acting with SI wants to see things from different perspectives, realizes differences in mental images, produces collaboration through interplay, and is able to contribute and influence a system in a positive way.

SI draws and elaborates on the MI concept (Gardner 1983) and Peter Senge's theories on thought (1990). SI differs from systems thinking (see e.g. Churchman 1968) in the sense that SI sees humans inside and as an active part of dynamic systems, whereas systems thinking conceptualizes and models structures from the outside. For a more elaborate discussion on SI see (Saarinen and Hämäläinen 2004).

This article is an outcome of the seminar held during fall 2003 by prof. Esa Saarinen, prof. Raimo P. Hämäläinen and researcher Sebastian Slotte. This text reflects, adds, and takes further some of the themes related to performing raised in the discussions during the seminar.

The structure of the article is as follows. In the next section the main points of the concepts will be shortly introduced. Then the themes will be discussed in more detail by grouping the concepts

with respect to time, so that issues mainly related to things that occur before, during, and after a performance, are discussed separately. Other related issues, not discussed in the time alignment sections, will be treated after this. Discussion and conclusions are presented at the end of the article, respectively.

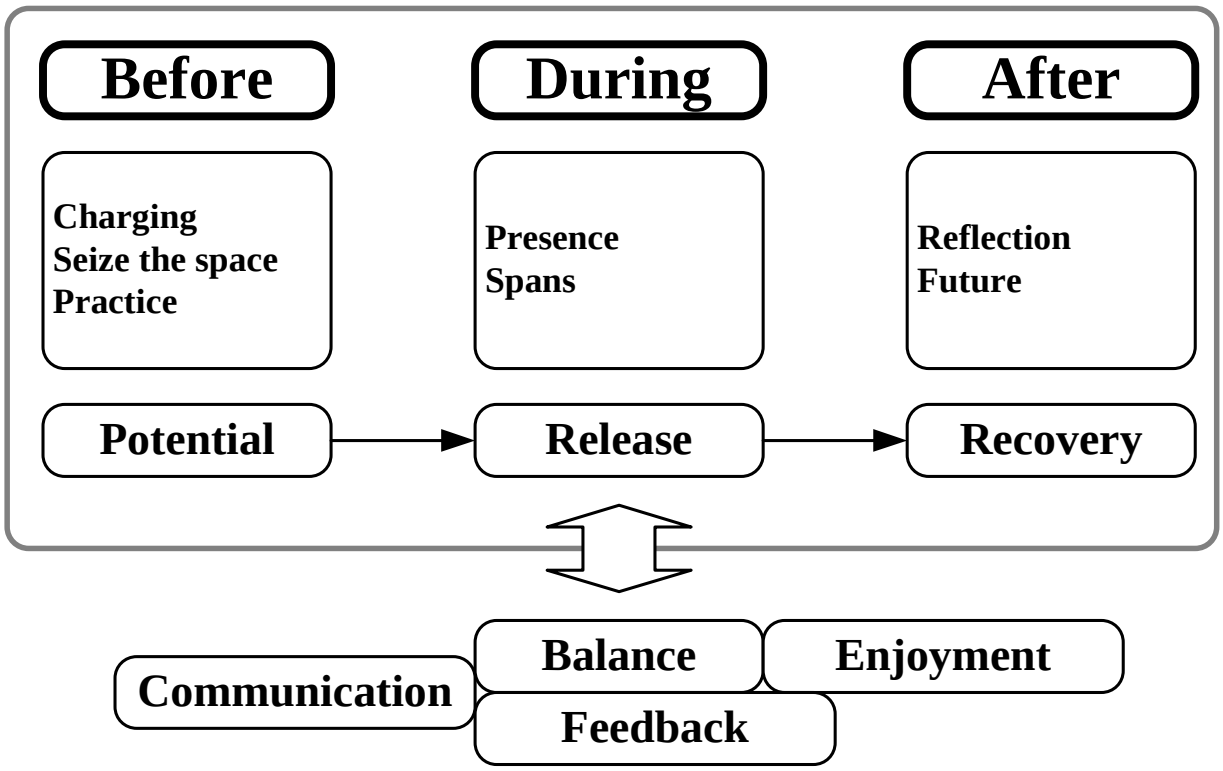

Figure 1. A block diagram showing the discussed concepts in relation to time. Concepts concerning and included in all the time steps are shown outside the box with grey outline.

Next a short overview of the main concepts treated in this article will be given. These themes will be explored in the following sections. Figure 1 shows the main concepts as an outlining and supportive block diagram, where performing is divided into segments with respect with time. A performance can be seen as a process where potential is first built up by charging (preparing), then during the performance the potential is increased and released, and finally the performance is reflected upon through self examination and outside feedback. Furthermore, a performance is seen as any appearance in front of an audience, be it a music concert, scientific lecture, or a short speech at a wedding. For a very short performance some of the raised issues are a bit ample, but still relevant on the whole. Overlapping between the discussed themes does occur, and a few concepts (feedback, balance etc.) have been separated from the time segmentation. These things are common with all the time steps and are depicted outside the grey box of Fig. 1.

Before a Performance

When preparing oneself to a performance people typically gear up, psyche up, or gird oneself for a performance. Here this action will be discussed as a charging process, as building up potential. As another concept, as a part of charging, seizing the space will be elaborated. But first, the themes of practicing and insight will be tackled.

Practice

The importance of rehearsing or practicing is unquestionable. But what is the nature and true objective of rehearsing? Rehearsing and the use of aids help to learn and control both physical and mental behavior. The essential goal is to make these behavioral patterns natural. For a learning apprentice, thriving and rehearsing takes painstakingly lot of effort, whereas the master has already walked this road and things come more naturally. In addition, a theme I would like to raise from the undisputable advantages of practice, is the shortening of the time to take a skill from a practicing level to a practical level. This speeding up of learning is linked to the process of a skill becoming more natural. As in all practicing, development takes time. Taking development steps further too fast will end up only in partial results. Therefore, the virtue of patience is an attribute that should also be kept active.

The old saying, practice makes perfect, could rather be formulated as: practice improves one's abilities, indefinitely. This includes the possibility for unforeseen improvement. With a positive outlook, the outcome of practicing and rehearsing retains unpredictable possibilities. This chain of thought can be explained by underlying the fact that no one is perfect and no one will ever be. However, when you obtain new abilities, new possibilities are opened, and therefore myriads of new combinations are available. This again opens the number of possible paths to such a vast number that in a way, the situation can be described as having unpredictable possibilities.

The system dictates the amount you interact.

From a system intelligence point of view, practicing should be viewed as interaction between entities with multiple feedback paths. An apparent example of this is a rehearsal with people involved. The method how a group of people is led through a rehearsal is an essential question. The leading method and the leader will greatly control the amount of interaction. In a top-down method the leader can for example encourage or disallow interaction. As a top-down method settles down, everyone learns how to work within the rules. As a result, the system controls the amount of encouragement given towards interaction. An SI leader allows a healthy amount of interaction that gives the best overall results, whereas a dictator suppresses interaction attempts. In a situation where the participants are on an equal level, the possibilities to affect the rehearsal in an SI manner are more profound. For example, at a rehearsal of a jazz quintet one participant's mood or opening comment can set and determine the atmosphere for the rest of the session. In a tired or awkward atmosphere the rehearsal most probably does not end up with a breath taking jam. Here an SI participant tries to avoid dictating the atmosphere with a bad mood or fatigue. In both cases, an SI person realizes the possibilities to affect a rehearsal with ones being, in a sense, finds his or her role and plays it out as best one can. Also, understanding group behavior and dynamics is an important SI component.

A counter example is a situation where a task is repeated over and over, alone. At first glance, this situation does not seem to withhold any SI components. But when considering the system and the goals, one realizes, e.g., the use of variety, mental preparation, easy and rewarding tasks etc. are tools and methods that stimulate the performer to reach results with a positive outcome.

From the view point of MI, evidently the intelligences straightforwardly related to the genre of the performer are important and shape the rehearsal situation. In addition, both inter- and intrapersonal intelligences are significant, as can be understood through the examples above. Intrapersonal skills are often essential in both physical and mental arts. In physical activities, as dancing or singing, the student has to listen oneself, with purpose to not over do anything. Here an effortless place not to listen to oneself, e.g., is when a task is practiced in a group where all

other participants are at a higher level. In this situation, one easily goes with the group and might end up hurting oneself. On the other, practicing with people at a higher level than oneself often supports fast development. This is due to exerting oneself and learning by example. An SI ability here is to learn from positive examples from different fields, especially without choosing a suitable one in beforehand, but rather letting positive influence overwhelm independently of the field.

A definition afford sharpening here, is the one of an SI learner (one who practices). There is a difference between an apprentice who follows an SI practice-program and one who creates one. That is to say, it does not make a person SI, if one follows a practice-program which implies the use of SI. It gives the possibility, but does not ensure it. An SI learner follows the practice-program while being alert by listening to oneself and others, by influencing the system etc. To follow an SI practice-program one does not need to be SI, but to create one it is a requirement.

Insight

Insight denotes a mental restructuring that leads to a sudden gain of explicit knowledge allowing qualitatively changed behavior (Wagner 2004). Insight is the act or result of apprehending the nature of things. Before the moment of insight a subject or matter may seem incomprehensible, but after the insight the subject becomes understandable and natural, in a totally new manner. Furthermore, with time and practical usage of a particular insight its meaning and impact is easily forgotten – it has become self-evident –. This can be a problem when confronting drastically new situations or when trying to understand another person's perspective. On the other hand, a self-evident process or mental skill comes very naturally. Here a sharpening of thoughts and becoming aware of personal insights of the past, can help one to obtain more insight(s) and adapt in new situations. The nature of a personal insight is closely linked to learning and the process of rehearsing.

An insight in itself is not enough to bring it to a practical level, once more, practice steps into the picture. It is only through practice, an insight rises to a practical level and possible adaptation. Also, to gain competence and comprehension of a humongous (or devastating personal) subject matter, a chain of insights is needed, possibly including re-visitations of some insights.

In the case of personal insights, some of the SI and MI angles are the ability to listen to oneself, confront things, and participate in dialog. On a general level, here an SI skill is the ability to grasp larger entities and to connect different insights. Similarly, for an insight to occur, at least one of the intelligences of a particular field is needed.

Preparing – Charging

Here preparing for a performance will be discussed as charging, as building up potential, which will be released during the performance. There must be as many charging styles as there are performers and the charging procedure highly depends upon the type and length of performance at hand. A two hour rock concert is inevitably different from a fifteen minute technical presentation. What ever the occasion may be, some kind of a charging procedure surely improves the possibility to deliver a good performance. Besides charging oneself appropriately before a performance, an SI person would also account for the whole group of people possibly participating in the performance.

Depending on the type of the occasion the preferred physical and mental charging acts definitely differ. Whereas a rock star pumps him or herself up, so that when coming on stage he/she is full of confidence and ready to explode, a lecturer might calm him/herself down and is very sound and relaxed. Even if radically different, some kind of a charging process has occurred before entering the stage. Before a physical performance, warming-up is a very natural way to get prepared. In addition to physical maneuvers, mental charging is an often used aid to get ready.

Performance anxiety gnaws almost every performer. Even experienced performers might get nauseous or shake like a leaf before a performance. There are many techniques how to decrease performance anxiety[1, 2]. They have a lot in common and typically advise to, e.g., focus all your energy on the task in hand, be positive, see the big picture, and let the audience be at your side of the team, rather than against you. These are all attributes which can be linked to systems intelligence. Positivism and taking the whole system, with its feedback paths into account, are all a part of SI.

Seize the

a) day,

b) space.

Another, essential fact about performance anxiety is to accept it as a part of the system. Many world class performers suffer of performance anxiety, but will perform outstandingly. In a way the anxiety is a part of their charging routine. When the anxiety does not crucially disturb a performance and it has been accepted, a fundamental ingredient related to performing has been pinpointed.

In addition to being charged and not too nervous before going on stage, one should realize not to mentally lock and freeze the chain of upcoming events. In the sense that, if a slight change in plans occurs it can sweep the positive charge away and a plunge to a negative and disordered reaction will most likely follow. In other words, one should be prepared for changes since they will occur, no matter what. A small change in the act does not necessarily mean a change for the worse.

Seize the Space

Here, seizing the space is a possible charging process, and means familiarizing oneself with the space and spending some time in it, in a relaxed mood. By doing this, it will be easier to create mental imagery concerning the forthcoming act. Unknown or un-comprehended things are often seen as threats. Hence, when the performance space is more familiar it should not be as threatening as before. In the realm of SI, getting familiar with the system improves the tools, which can be used to affect the system in a positive way. Therefore, seizing the space can be seen as SI behavior. A person with keen spatial intelligence (MI) could be very talented in seizing a space or realizing its possibilities.

[1] Counseling Services University of Wisconsin - Eau Claire. 2004. Coping with Music Performance Anxiety. URL: http://www.uwec.edu/counsel/pubs/musicanxiety.htm

[2] Psychological Services Center. 2004. Test and Performance Anxieties. URL: http://www.psc.uc.edu/sh/SH_Test_Anxiety.htm

During a Performance

Next, the concepts of presence and spans during a performance will be discussed. Issues like the use of space, physical composure etc. have been left out, but are still relevant subjects concerning the act of a performance.

Presence

In the French language, in addition to presence, présence stands for the ability to perform[3]. The English dictionary Merriam-Webster[4] cites presence, among other things, as being a quality of poise and effectiveness that enables a performer to achieve a close relationship with an audience. Both descriptions include reference to the act of performing. Also, presence can be defined as the sense of being in an environment. Lombard and Ditto have six detailed definitions for the concept of presence, but argue that it is such a basic state of consciousness that the concept is only useful when restricted in mediated environments (Lombard and Ditton 1997). In this context, however, I would like to set the emphasis of presence as being a state of mind, which improves concentration and the connection to the performance. Moreover, the term presence could be described as, mind being present while performing, with a high degree of focus.

Be prepared for changes.

Be prepared to change.

In addition, the concept of Flow comes very close, and is interleaved, with the concept of presence. Flow was formulated by Csikszentmihalyi (1990) as an optimal experience or as "the holistic sensation that people feel when they act with total involvement". The writings on the concept of flow are many and the concept is well defined. The most essential overlapping between the concepts of flow and presence, as discussed here, is the focus on the task at hand. The connection between flow and SI could be a subject for an article in it self, however, this text will now flow towards deeper insights on presence in performing.

For example, presence is not active when your mind wanders off while reading a book. The risk to let your mind wander increases significantly while performing a task, which is highly automated, i.e., you do something you have practiced persistently. Actually, while performing one often executes a multitude of automated tasks, the dancer has practiced movements of the body, and the musician can play the piece in his/hers sleep. Many of these tasks are executed at a speed that does not allow the mind to react or change the process during the execution, e.g., the fingers on the piano keyboard run up the scale at a lightning fast speed. Here the process can be stopped, but it is very difficult or impossible to change it radically during execution. In these kind of situations, the movement of the mind towards something else than the task itself is quite natural and humane. With this is in mind, presence could be expressed as, focusing of concentration towards the task at hand, while restricting distracting movements of the mind or thoughts. Moreover, presence is not something that will lockout the outside world from the performer. In this sense, presence is not only an ability to concentrate, but also the ability to be a part of the whole performance, by taking the other persons and objects involved into account.

Through practice of presence, this kind of focusing should and will come a more natural state of mind. In spite of this, it is always possible to fall of track, even for an experienced performer.

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[3] Kielikone Oy. 2004. MOT sanakirjasto. URL: http://mot.kielikone.fi/mot/tkk/netmot.exe

[4] Merriam-Webster. 2004. URL: http://www.m-w.com/

Therefore, it is essential to keep the concept of presence actively in mind. With time, the transition from a confused and disordered state to a more concentrated state will be shortened. In effect, by actively using and reminding oneself of this process, it is easier to switch to a focused state. In a sense, diving deeply into a performance would become more natural. Benefits of activating presence would be, e.g., improvements in the clarity and intensity of a performance. An indication of good presence is loosing track of time during practice or a performance.

Presence can be seen as a parameter for both SI and MI. Presence is an ability to concentrate and via this increase empathy and the ability to dive into a performance. However, the extending attribute, saying feedback and interaction are a part of presence, imply links to both SI and MI. Feedback and interaction are at the core of the definition of SI. So even if concentrating on ones personal performance, a person with SI considers the whole system at hand. As for MI, interaction (with persons) is a crucial part of interpersonal intelligence. Therefore, a person with no interpersonal skills could not be considered as a person with outstanding abilities regards to presence, even if possessed with enormous concentration skills.

Presence is here seen as important since such descriptions of a performance as giving everything and intensity are strongly linked to presence. The importance can also be seen through bad performances where the person is not present, or seems to be distracted.

Spans

Processes with different time spans and different phases are at work during a performance. Realizing that there are different levels of development during a performance helps one to view and harness the process itself.

A performer has typically charged him/herself before the taking the stage. The audience on the other hand, might be in a totally different state of mind, perhaps they have just arrived. Therefore, after the act has started, it takes some time for the audience to get warmed up and responsive. In the same manner, some kind of development during the performance takes place for the performer, especially in the case of a long performance.

In some cases, the audience might be ready from the start. This, however, requires some kind of charging of the audience. This can be self induced through a learnt habit, such as waves and sheers before a hockey match or rock concert. The other option is to charge the audience in a controlled fashion, example by a warm-up act.

If the performer realizes and understands these different spans and phases it helps him or her not to get distracted and disappointed if instant reaction from the audience is not obtained. Typically the audience lags slightly behind the performer, particularly in the beginning of an act. When these spans and levels are comprehended, understanding of the system at hand has improved, and the possibility for systems intelligent behavior grows.

After a Performance

What happens after a performance is first some kind of a recovery of the physical and mental state. In addition, at least an SI performer reflects upon the just ended performance and looks into the future. These issues are discussed next.

Reflection

Reflect through as many perspectives as impossible.

Here, reflection is considered as a thought, an idea, a remark, or an opinion formed as a result of consideration of some subject matter, i.e., the subject matter is thought through afterwards. In this context the subject matter is naturally the performance. For the act of reflecting, two perspectives can be classified: objective and subjective. In both cases, a systemic view on the matter helps to divide and define relevant strengths and weaknesses. However, a purely systemic view does not include the subject as an active participant affecting the whole system. Therefore, an SI view pushes the possibilities for improvements drastically forward.

During subjective reflection, intrapersonal intelligence is an important ability when trying to understand what one thinks of oneself as a performer and what he or she wants to do and accomplish as a performer. Similarly, interpersonal intelligence is vital when reflecting oneself with the other performers and the audience. To deepen subjective reflection, the subject doing the reflection can change the viewpoint and look at the situation from a different perspective – try to be objective –.

Objective reflection can be though as happening through people involved in the performance, such as other performers and persons behind the scenes, and outsiders, people who are not involved, such as the audience and critics. The level of objectiveness during dialog with people involved is naturally debatable, but the bases of these viewpoints inevitably have different perspectives. Feedback from the audience and critics is also an important source of information when the objective is to get an extensive conception of a performer and a performance.

Desire to confront.

While reflecting, the ability and desire to confront things is important. This is typically not easy, since the procedure often involves confronting imperfections in the performance or the performer. This difficulty of sincere confrontation is up most challenging in both subjective and objective reflections. In addition, the practices of reflection and confronting are made invalid and useless if the subject lacks the desire to improve.

Future

The description SI withholds the concept of feedback paths. The strongest feedback path a performer has to improve, is to look into the future, what can be done better and why. How can the next rehearsal take the flaws of the previous performance into consideration, should something be changed in the charging process, how could the audience be more involved, was the timing of the start and end correct, were the other performers taken into consideration, and so on, the list of relevant SI questions goes on. Only the future can tell.

Other Related Issues (Time Independent Issues)

This section discusses themes that cannot directly be mapped into the performance time line or are relevant in all time stages. At some level these concepts are more related to attitude and self development, but are given a performing aspect.

Loops and spirals

Often things are seen as a chain of reactions. In this context the performer practices and prepares before a performance, does the act, and recovers. This forms a clear chain. When adding the concepts of SI to this, feedback paths, among other things, appear into the vocabulary. One feedback path here, is the path from recovery to practice and preparing, i.e., from the end to the beginning. When this path is linked, the chain forms a loop. Viewing the process as a chain, that starts and ends, the task is always started from the beginning. When the perspective is a continuous loop, the actions taken during any stage, can more easily be seen as having an effect upon future events. An action taken does not set up a chain of reaction that ends at a certain point in time, rather, it starts a series of events that will keep on affecting and starting new events.

As for a performer, overcoming performance anxiety, succeeding beyond expectations, and so on, are positive incidents that should support ones belief in ones skills. Sometimes people get a so called streak of good luck or a succession of successful events. Putting it in another way, this could be seen as a positive loop or spiral. Naturally, everything comes to an end and the streak or loop ends. However, for a performer having positive loops as an objective and putting effort in creating possibilities for them, definitely promotes faster progress and a positive trend. Undoubtedly, there are also the negative loops and spirals. In the same manner as positive ones, these feed them selves by feeding back from bad experiences and failed performances. The sought after ability here is to analyze the situation and identify the paths how to break a negative spiral, in a sense, use basic SI tools. For a performer this could mean, seeking for continuance and renewal of practice routines, while setting rewarding goals that give aspiring possibilities to develop.

Balance

Balance between things is important in any field or subject. As a caricature example: an apple a day keeps the doctor away, but a full basket makes your stomach ache. In the same manner for a performer, there exists a multitude of issues that should not be over or under done. Some of those are presented here, through word pairs.

Self confident – Humble. A performer who is too self confident will at the end of the day start to irritate, but in the same manner, exaggerated humbleness does not give out all the possibilities of a performer. The problem here is also the fine line between healthy self confidence and shameless cockiness. A healthy load of over confidence can in some situations be a suitable cure. In spite of this, the results of over confidence on the long run are not too healthy. This is because, for example reflection and confrontation will be overridden by over-confidence and development will not happen freely. **Control – Letting go.** A perfectly controlled performer/performance often feels rigid, at least with time, even if the eye for subtle nuances can grow. Similarly, a totally chaotic system has its problems. At a personal level, a too rigid and controlled attitude or mind surely prevents drastic artistic leaps and explorations. **Practice – rest.** Practice makes perfect, but too much makes one insane. In this day and age it is easy to understand that too much work and carrying out endless number of assignments will lead to a dead end. Just recently, research has proven that sleep has an essential role in both learning and creative tasks (Wagner 2004). Therefore, it is essential for a performer to have enough rest during both practice and performing periods. Respectively, sleep does not compensate for practicing.

These word pairs might most probably seem self-evident, however, often when a performer has a slight problem or goes even drastically over board in one of these, the perceived notion of the

performance or performer typically gets degraded. This again is an indication that self evident issues are not always easy to perceive or control.

Motivation, Enjoyment and Goals

Where does the motivation for performing come from? If the need for performing is in a way or another self inflicted, motivational and enjoyment issues come quite naturally. In contrast, when a performance has to be carried out as an assignment issued by someone else, motivation can be difficult to achieve. This extreme negative case is understandably difficult to overcome, but motivational problems are confronted by all who perform frequently.

In a positive case, performing is done since the performer wants to, thinks it is fun, desires to, or it is a means to do a primary function, such as doing arts of some kind. When this is the starting point, enjoyment is most probably strongly linked to the event of performing. However, when standards are set very high, reaching predetermined goals and succeeding might not be satisfactory. This can easily lead to a negative spiral even if the goal, at the beginning, was positive. The worthwhile ability of an SI person is here to anticipate these kinds of mood and motivational changes and take necessary precautions. Possible tools for resolving these kinds of issues would be to use variety in practice situations, mental preparation, and easy/rewarding tasks that impose positive loops.

Realism prevents gigantic leaps?

The question of setting goals is an important issue because; when the goals change the system changes and therefore the optimal SI behavior pattern changes. Too demanding goals are easily unrewarding and can become unrealistic to reach. On the other hand, if the goals are set low, higher grounds will never be reached. This is straightforward, but still holds a lot of truth and at the same time has a dualistic nature. Meanwhile, if a so called realistic view contains many constraints and is of a negative nature, the goal setting is most probably on the low side. On the contrary and unquestionably, many ground breaking leaps in arts and sciences have been such gigantic steps, that a realistic view at the time, would have prejudged the goals to be impossible. So the SI objective would be to find a balance between realistic and reachable goals and an open mind for unseen possibilities.

Communication – Interaction and Feedback

Communication, interaction, and feedback are essential parts of everyday life and are also crucial when it comes to performing. So far, the term feedback has been used in this article as evaluative or corrective information from the audience and critics, or for describing feedback paths in systems when viewing things through SI. Now the emphasis is on feedback and reaction that is instant, without delay. When feedback and reactions are instant, without real delay, the processes are more intuitive and reactive, than in processes where there is time to ponder upon options. When the process does not have a delay people use mental models. For a performer an objective is to learn creative and supportive mental models, in contrast to destructive and judgmental.

The practice and performing systems are highly complex and for apparently unexplainable reasons one day things work out much better than another day. One of the factors that adds to this complexity, is communication between people. Unspoken, bodily communication is an important communication path. It can reveal a multitude of moods and meanings, without anybody saying a word. Therefore for a performer, it is substantial to realize the influence of bodily communication and its influence power on the system and its feedback paths.

For a performer, communication occurs at every stage of the performing process (before, during, and after). In different fields of performing the importance or emphasis on communication naturally vary. Nevertheless, if the performer has the objective of analyzing and increasing the amount of communication and interaction at every stage, new levels of understanding and succeeding will be reached. As a result of increasing interaction at every stage, of course the number of feedback paths increase. Still, if the paths are exploited properly the benefits exist. For example, if a lecturer tries to interact with the audience by asking questions and arousing discussion, the audience most probably will be more alert and learn more. Or an actor takes an unexpected turn, throws something (e.g. a ball) to the audience, and involves the audience. Indisputably, increasing interaction opens new possibilities.

Discussion

- Define the system at hand - A skilled performer understands which components are important and which are not. Here excluding things out of a particular system related to a performance facilitates SI behavior, since unimportant things are left out and do not disturb. Focusing on essential things also improves efficiency and makes analysis of the situation slightly easier.

When facts and information have to be delivered to an audience in an interactive situation, the criteria is different from artistic situations. When delivering facts the performer has to know the field, rather than being a virtuoso on stage. The system where the performer operates defines some of the criteria to be met.

Basically the systems involved in a performance are the individual (the performer), the audience, the space or media where the performance takes place, other performers (including a director and other people involved), and the work or piece being performed. The interaction and importance of these systems varies between *and during* performances. Figure 2 a) illustrates a situation where many systems overlap and the audience is at the center, whereas in Fig. 2 b) the audience is attached from the other systems the performer is in the center. For example Fig. 2 a) could become Fig. 2 b) any time, on purpose or by accident. Moreover, it is in the hands of the performer (or director) to try to control this situation. This is a simple and crude example, but the purpose is to underline that the amount of interaction between systems varies and is dynamic. In addition, Fig. 2 could also be two different interpretations of the same performance. This again means that even if the performer defines his or her system(s) at hand, it inevitably looks and feels different for the other participants. Finally, it is the dynamics and different viewpoints of systems that will challenge every performer.

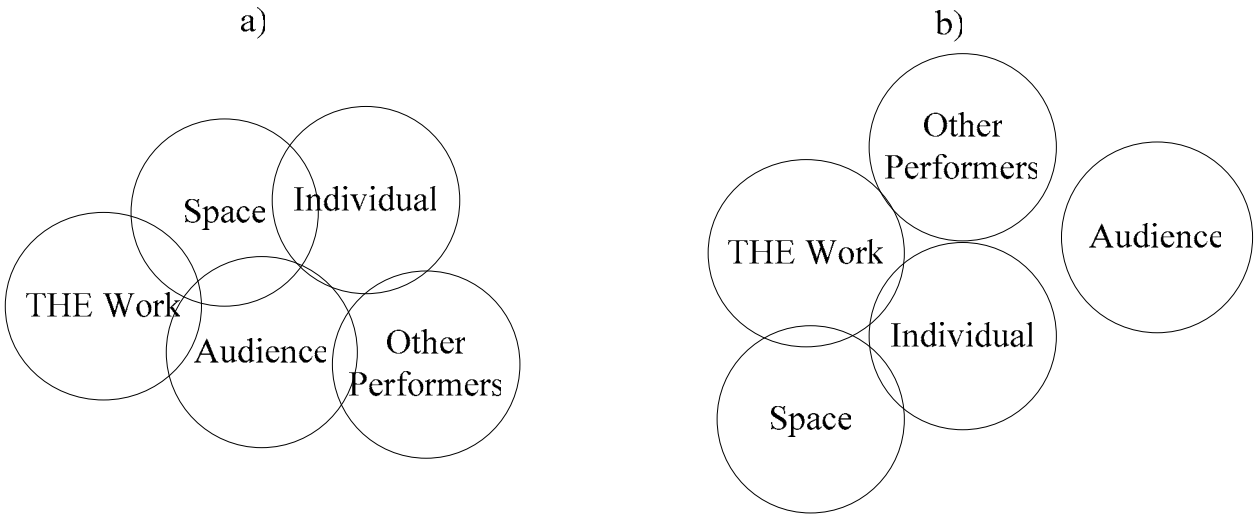

Figure 2. Defining the systems at hand. Examples: a) the audience is at the center, b) the individual is at the center and the audience is attached.

- Natural - An important characteristic for a performer is to be natural, to be yourself. The audience can easily see through an act if it is not very well practiced or natural. Typically, the performer does not want the audience to feel awkward discomfort, but by playing a role that does not come naturally, this can easily be achieved. Therefore, to achieve goals typically set for a performing situation, it is more reasonable to be natural than act out a role. For an actor in a play or suchlike, the situation is naturally different. A point given here between the lines is that one does not need to be a super-talented and self confident artist to perform.

- Inflexibility - When Gardner discusses the socialization of human intelligences through symbols (Gardner 1983, Ch. 12, he mentions that humans often become inflexible with age. That is to say, with age people are more reluctant to try out new things and the will to experiment decreases. Although, some persons are able to maintain their flexibility or discover it again. For a professional performer a rigid attitude towards exploring is not the most sought-after characteristic, even if some superstars definitely have this quality. By definition, ground breaking performers have explored existing boundaries and broken them. Personal inflexibility is one barrier to overcome, but so are cultural, social, and systemic inflexibilities.

- Drastic Changes - A system intelligent person is someone, who learns and is willing to adapt, if the system requires it. Naturally, one cannot know and master all the systems in advance. Moreover, humans do mistakes, miscalculations and errors. This means that an SI person should be ready to do quite large transitions in ones opinions and attitude. In practice, this can mean quite drastic changes in personal behavior and attitude. Drastic changes in attitude and behavior usually take a lot of time. Here, the word patience, once again, resurfaces.

An example of this regarding performing could be the development of the flute. In the 19th century a new flute made out of metal was introduced. This new design outperformed the wooden version in almost all possible ways, such as, playability, and dynamic range. However, the opposition it got was strong and persistent. It took circa 50 years for the new flute to become the dominantly used one, as it is today. In a sense, this is an example of a new generation of players/performers is needed to accept a new instrument. Turning this example back to this text, an SI performer would not prejudge a system before trying it out and understanding it, at least without proper arguments.

- Affecting a system that causes behavior - A performer should realize the environment and atmosphere the audience is involved in, will produce and influence their behavior. In short, the environment, atmosphere, audience, and the performer form a system that will produce behavior. As a forte for the performer, when this system is set up adequately, the audience will be ready to behave exceptionally, compared to everyday conduct. This can be understood through an adult audience screaming and jumping in a rock concert. On the contrary, when the system is set up un-optimally, the performer has to give extra effort to affect the system. An example of this is a university lecturing setup, where the audience sits quietly without participating and practically waits for boredom with a negative attitude. Then again, even small changes in this kind of a system can radically alter the future course of the system.

- Use of all intelligences - To become a balanced performer all or most of the human intelligences proposed in Gardner's MI theory are actually needed. That is not to say, one needs to be a virtuoso in all the intelligences to be a good performer. Rather, while performing, the strict use of the single intelligence directly related to the field where the performance is occurring, is not enough.

As an example of using all intelligences and SI in a performance: a pianist plays a piece of music. Musical intelligence is unquestionably needed and bodily intelligence is needed for physically controlling the piano. For understanding large and complex musical pieces often some sort of logical/mathematical abilities are of help, since music profoundly contains large sets of rules. In addition, for example rationalizing a practice program can increase efficiency. Visual intelligence can help the player to keep on track in long pieces of music, when they visualize the course of the piece through images. Some people also visualize musical themes and chords through colors and images. If the music contains lyrics, linguistic intelligence helps to understand the feel of the piece. To interpret the music, it helps if the player knows what the composer wants to portray or/and what he or she personally wants to add to it. This again means that the player should know what he/she feels like, which means that personal intelligences should be in use. As described in this text, also systems intelligence can be used, e.g., for picking out essential affecting components and reflecting the performer's role in the overall picture.

The example above, underlines that performing is a complex and wide process, which needs a vast set of skills. What it also tries to clarify is that a weakness in a particular intelligence can be compensated by a forte in another. For example a slight weakness in a certain musical ability might be compensated through logical reasoning. Also, the possibility of an intelligence to radiate to other fields of intelligences should not be excluded.

- Good vs. SI - A good and motivated performer probably does many of the things discussed in this article. Therefore a few relevant questions should be discussed: (I) Is a good performer an SI person? Naturally, a person can be a good performer without being system intelligent, but considering things in an SI perspective, things can be improved or at least understood in a different manner. In addition, an SI performer can be good in a particular system and environment but if it changes drastically, the talent/intelligence may not be at the same level. A good performer might also possess some SI-like features, such as affecting the system in a positive way, but lacks a holistic perspective on things. (II) What separates a good performer and a systems intelligent performer? Basically the SI performer views the big picture and realizes his/hers possibilities as an affective element, which have an influence on other components. Whereas, a good performer may do many things just right, but does not have the same perspectives and multitude of viewpoints as the SI performer. For a holistic SI view to rise to its full potential, the performer should be aware of the concepts and use them at a conscious level. And yes, since the concept of SI is new, a good performer can be SI without knowing it.

Conclusions

A systemic view on the performance process helps to define different stages and influential factors. The comprehensive picture, in a systems intelligence sense, is obtained after including the subject as an active and positive force. This addition of the subject does add to the picture and increases the web of ever changing feedback paths. Regardless of the added complexity this addition is a crucial one to obtain a comprehensive picture.

From a SI perspective a good performer realizes that he/she is a part of the performance system, so that he/she can affect the end results before, during, and even after a performance. An SI person also sees the strong feedback loops between the performers and the audience and performers, and has a systemic view on the complex entity. Through the concept discussed in this article a good performer could be described as one who charges before a performance, possibly seizes the space, is highly present during the performance, and reflects upon it afterwards through many perspectives. In addition, the performer is prepared for changes, tries to tie things together for a complete picture, searches for a balance between things, is positive, intuitive, and open minded. This utopistic performer also acts as an example and is influenced by positive examples, while being humble. When a performer reaches a proper level of skills and a balance, and understands the system at hand, he/she can dazzle and mesmerize the audience with skill, intuition, and ease.

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Chapter 17

Systems Intelligence and Method Acting

Meri Pakarinen

Systems Intelligence as well as the Method is work on our behavior patterns, emotional conditionings and most of all habits that restrict us and inhibit our awareness from ourselves and from the systems we try to function in. Both Systems Intelligence and the Method see human beings as holistic unities: body-mind-emotions. I introduce correlation between Systems Intelligence and American Method Acting as I am looking for various ways to creativity through relaxation techniques, movement exercises and dream-work etc. All of these exercises could be utilized outside acting world as engines to creativity - opening up your whole instrument in order to be able to behave Systems intelligently and get closer to Personal Mastery.

Introduction

Systems Intelligence is defined as an intelligent behavior in the context of complex systems involving interaction and feedback. It is a behavior that engages productively with the holistic feedback mechanism of her environment, perceiving herself as a part of a whole and acknowledges her influence to the whole and the whole upon herself. And by observing her own interdependence in the feedback intense environment, she is able to act intelligently. (Saarinen and Hämäläinen 2004).

In the world of acting and stage, interaction, feedback and behaviour are the key words in order to accomplish any kind of performance. All stage productions are within some kind of system consisting usually at least the actor/director relationship, the most important dynamic on stage in terms of ultimately communicating the meaning of the piece to the audience. In that sense it seems to me that Systems Intelligence is vital to any productive stage effort.

My own artistic work is based on the technique of the Method acting. My perception is that the Method, as a technique and with its tools, can produce SI behaviour and increase your awareness to see and be in the world in a more Systems Intelligent way. The sensory exercises and relaxation technique of the Method acting were developed by American Lee Strasberg from the classical stanislavskian acting system. The Method sees human being as a holistic unity with body-mind-emotions. The purpose of the exercises is to increase your sensitivity, sense of reality, keep you in the moment and in touch with your own emotions. The acting technique also aims to

keep you grounded with who you are in connection with the circumstances and in interaction with others during the whole acting process.

Penny Allen is an actress, stage director and an artistic advisor in many film projects for several actors and directors who are on the top of their field. As long as I have known her during the last fifteen years, she has always worked towards the way I've now come to name Systems Intelligence. Strasberg invented exercises that took actors' work from the "head" to the "body" enabling an actor to have an experience on stage with the help of a specific technique. With her own experience and knowledge Penny Allen herself is applying creatively and freely new exercises to this holistic way of working with actors. As I see it, after my experience working with director Penny Allen and developing together with her my one woman show that deals with women's creativity, you can't separate your artistic growth from the growth on personal level.

Not only do I recognize in my collaboration with Penny Allen the dynamics of SI, but as I have become increasingly involved in the SI concept and practise, from the texts and especially through Esa Saarinen's lectures in Helsinki University of Technology, my whole previous artistic work have started to make new sense to me. I have become more aware of the potential possibilities and benefits that many of the techniques of the Method can have in creative work and especially in terms of personal life and growth if consciously aspired towards that end. Now, I don't believe the techniques of the Method acting are restricted only to artistic and personal development but I've come to realize that same dynamics apply to any other system where people are involved. Therefore my acting training have reached even broader meaning and larger scale that I hope will give some beneficial input developing SI in practise as a self discipline towards better way of being.

You can't separate your artistic growth from the growth on personal level.

In my article I'm sharing my own experience of a two month rehearsal process that I felt had something similar to many SI concepts (Saarinen and Hämäläinen 2004). I attempt to focus on things like, for instance, in what way some of the most beneficial exercises could be applied outside arts and stage, within the reach and benefit for everybody interested in personal growth. In addition to finding ways to apply some of our work to everyday level that can bring something new to Systems Intelligence, I'm also looking for Systems Intelligence to open some new channels and directions to take into my own artistic work.

Amazingly many of the basic concepts and practises in our way of working are applicable to the Systems Intelligence. Seeing my acting work through this new perspective is very exciting and revealing especially in terms of the artistic/personal process I've gone through in this project with Penny Allen. It certainly deepens the meaning of our work and gives a possibility to expand it to wider systems. By applying the concepts of SI in my artistic work the weight and the meaning what we were accomplishing gets much clearer in my mind as well as in my body, in the concrete way of experiencing the process.

The Lore of Method

The Method Acting was described by Strasberg (1991) anything that works for you. In that sense it is not any rigid system you have to follow literally. In my understanding both Stanislavski and Strasberg were developing their systems until the very end of their lives and saw the possibilities beyond what they reached during their lifetime. Here is one SI feature which is strongly related to Method work: It is for you to take and develop it for your own benefit in order to further you art, not as an end in itself. Many exercises I describe here are not the basic Method exercises, but

something that Penny Allen has developed herself in creative way, not stuck on any pre-written pattern. That itself is an example of SI in practice.

The Method is anything that works for you.

Sharon Carnicke has discussed in her book *Stanislavski in focus* (1998) an interesting point: almost all of the knowledge of Method in America has been transmitted by lore from teachers to actors and to students since the Stanislavski System came there in 20's. Stanislavski own students passed this lore to Strasberg and others whose legacy has been continuing by lore with their students. This has created a situation to me now, that when I talk about Method and it's practise in this article I'm talking about the knowledge from my teachers, mainly Penny Allen and Charlie Laughton, (both from NYC and presently living in LA.) passed on to me and at the same time their own lore from Lee Strasberg. Since I have integrated The Method into my own acting –in my own body and in my mind – very much as practise it is difficult to refer to any particular reference source, especially from literature. I have solved the problem here by choosing some books where Strasberg talks about the issues I will bring up and give them here as a reference for those readers who would like to get into subject more closely. One is Loraine Hull's book *Strasberg's Method* (1985) and the other one is *Strasberg at the Actors Studio,* based on Strasberg's tape recorded sessions and edited by Robert H. Hethmon (1991).

So mostly I'm either talking on my own behalf or referring to Penny Allen and our recorded tapes from our rehearsal sessions 2002. The exercises Penny Allen gave me and her way of working in general is taking Lee Strasberg's lore a bit further from the ordinary in her own unconventional way, especially with movement- and dream-assignments. In that sense there is not much reference points in acting literature at all. My main aim here is to share my experience with you and make connection with Systems Intelligence as I see how Penny's and my work and SI meet.

The Base in Method and Topics of the Article

The base for any work on Method acting and all techniques within it is the active relaxation. The state of active relaxation simply means you are only using the energy that is needed to accomplish any given task. All the excessive energy beyond that is tension. The first thing I'm going to talk about in this article is how the state of relaxation is the basic condition even to thinking and being able to function and interact within any system. The second topic I will discuss is why it is often easier not to live in the moment and how the experiencing the moment to moment living can be strengthened also in everyday life with conscious effort as it is possible to carry out in acting. I will also talk about living your life with more imagination and possibilities to choose from different alternative course of actions and how you can within so called *as-if* exercises get a new experience in some aspects of your life in order to begin a positive change in your emotional and/or behaviour patterns. I will also describe how you can activate your own unconscious to work for yourself during *dreaming* in your sleep, for example on issues that you hope to go beyond everyday solutions. In all my topics I intend to talk about integrating your being and your senses with openness related to your emotions and actions you take in your life.

The state of active relaxation simply means you are only using the energy that is needed to accomplish any given task. All the excessive energy beyond that is tension.

The way of working in my art, the Method, fascinates me and is my thing because I am forced to and allowed to deal with my own personal problem issues that could be limiting my actions and basic functioning in my life. Maybe the biggest reason why this way of working has become such

a big part of who I am is because these very personal limitations are at the same time the building blocks in my artistic expression and development. After all, many personal issues can be the very generators to a unique creative process and even an inspiration and motivation to the best work.

Active Relaxation

The coin has always two sides: The sensitivity which is the talent in acting comes out many times as extreme nervousness, tension, shyness, reacting strongly with emotions and locking things out as a defence mechanism. On the other hand the natural response with sensitivity is total openness and thus letting yourself to be vulnerable. With the Method work, this has its base on relaxation and using your all five senses as holistic unity: body, mind and emotions, you learn to tolerate your talent/nerves and express your emotions to the fullest without tensing up. Your talent is your nerves. In real life you learn to suppress your emotions because you protect yourself, and as a consequence you store and block all these suppressed emotions in your body as a tension.

By actively relaxing and using all your five senses, what we call sensory work, your aim is to show as much of yourself as possible, in contrast to what we tend to do in life in general. So we are showing who we are, not the social you, but opening up your body and emotions by expressing all the sensations and emotions that are going through you at the moment. With expression I mean movement and sound. With practise you learn to tolerate your own emotions and be able to express them without locking into tension. Tension creates subjective emotionality. In relaxed state you are able to sustain the given task, the reality you are creating in acting. All this reality is in your body and you are only able to express it fully if you stay with relaxation. This is the basic concept and the principle to the technique in Method Acting.

How to Relax

The Basic way get into a creative state of mind is an active relaxation. As I have said before, a certain amount of relaxation is needed in order to be able to think, period. Lee Strasberg used to illustrate this with following example:

> If you give an individual an easy problem, one that is not simple but that he can solve – something like -12 x 13 – an ordinary person has to take a little time to do it, but he will usually come up with the answer. If you ask the same person to pick up the piano- something that definitely tenses him- and you give the same problem, no thought can permate his mind. He will have to drop the piano in order to answer you. In order to act, the actor must relax. (Hull 1985).

This applies to any actor in any system. And of course the reason behind the tension can be fear, nervousness as well as habitual ways of sitting, walking, talking etc. So in order to act and think also in Systems Intelligence way, I would assume you do need to have a certain amount of relaxation. Maybe this could be one simple technique that will help you to release the individual potential into highly creative state – the flow (a concept introduced by Saarinen and Hämäläinen 2004) - as a conscious way to reach it.

Here comes the basic relaxation technique: You relax in a position that you could, but won't, fall asleep. The most practical way is to sit in a chair, in an asymmetrical position. This doesn't take as much room as lying on a floor and can be done easily almost in any place. As you sit in the chair you ask your mind to contact specific muscle/muscles and ask them to relax as you breathe out. With every exhalation you let go more of your tension, going eventually through your whole

body, including the mental areas: neck, skull, forehead, eyes, cheeks, temples, mouth, tongue, ears etc. You check your relaxation with movement and sound. The more you practise the more this becomes the second nature to you and also a basic way of being at all times. Like learning a new habit, you just replace the bad old habits of tension with the habit of relaxation. (Hull 1985).

Relaxation Brings You Closer to SI?

With an active relaxed state - your mind, body and emotions are open and you can respond (instead of reacting) as yourself using your whole capacity as a human being. I believe this creates the possibility to Systems Intelligent behaviour: "Thinking transforms into actions and repeated actions into habits. Eventually thinking and habit constitute the persons' mode of being and personality" (Saarinen and Hämäläinen 2004).

In Method the aim is exactly the same but changing habits is basically a very difficult process to do just by thinking about it. Active relaxation is a technique that will give you tools to start changing habits of tension into habits of relaxation. Even more importantly your awareness of others as well as your self-knowledge will increase as you will become more in touch with your emotions. This will be worked through relaxation of physical, mental, and emotional level.

By learning an active relaxation technique you are able to be more open to other people and you can actually listen to what they are saying. Being relaxed helps you also to discard other old habitual ways: thinking patterns, patterns of behaviour and reacting a certain way automatically. You can be more fully in the situation and with the people within it. You will remember your good intentions better too. Maybe you really want to focus on listening to the other person but if you are very tense it is much easier to forget your good intentions than when you are relaxed. Most importantly relaxation helps you to be in touch with who you are and what you are really feeling at the moment. Being in touch with your own feelings will help you to put yourself into the other person's/people's situation and thus, to see and understand better also their perspective.

Relaxation helps you to be in touch with who you are and what you are really feeling at the moment.

The relaxation technique can help you also in real life situations great deal and set whole new good habits of behaviour. But also SI has given me new insights that are beneficial both in acting as well in real life when it comes to be able to relax under pressure. One of these things is accepting you within your own limits and imperfections. This means to me relaxing my mind and taking myself off the hook in the situation like audition or another kind of job interview so that I can accept it is OK to be who I am even if I don't know exactly what I'm expected to be. I've already noticed the difference in many situations that letting go also *on mental level* can benefit you as a whole being. Jumping into the situation with an open mind can lead to being able to surprise myself for the very reason that I'm not making demands to be perfect. (Saarinen lecture, 2004)

I have always had a tendency to demand perfection from myself, what ever that means. It probably has never been clear to me and most likely even less clear to anybody else. I have made it up myself in my own mind as some kind image. SI thinking is the very strife in attempt to be able to tolerate uncertainty and unpredictability in situations instead of expecting a certain result already before hand (Saarinen and Hämäläinen 2004). This goes along with acting principles and the techniques that I've been trying to use. Unfortunately these principles are much more difficult to apply in real life than in a "safe" world of stage, where you at least have rehearsals where you can go through your trial and error process and you know you'll have a second chance to try a

different approach if the first one doesn't work out. So it is after all possible to change yourself just by shifting your thinking and letting go a little bit. Maybe the secret is to love you as a unique individual, that is formed with the imperfections and to love other people for the very same reasons.

The Pool of Vibrations – Setting Your Mind into Creativity

The pool of vibrations is a visualisation technique that I've learned from director Penny Allen as we have worked on our project. The pool of vibration means all the things that vibrate your body, on cellular level and on emotional level affecting inside you in connection for instance a particular role.

For me it sometimes takes a long preparation to achieve the creative state that allows me to use my instrument freely and to connect into my unconscious or to find the creative conditionings of the moment. Before one improvisation with Helene Scherfbeck's character, for instance, during our collaboration on my one woman show, I used about 30 minutes on active relaxation. All our rehearsals began with active relaxation, sometimes with longer sessions sometimes short. The state of active relaxation means that you won't use any more energy to do anything than you need, physically as well as mentally or emotionally (Pakarinen 2002).

A pool of vibration is something that Penny has added to her own way of teaching relaxation. In the beginning of the relaxation you contact and relax your mental areas. After that you contact the solar-plexus area and by visualisation imagine going through to the "pool of vibration" which is inside your body and that begins from the very bottom of the trunk. As you go deeper in visualising the pool and "stepping into it" you recognise all the emotions you have and let all the objects connected to the character you're going to work come to you. You can visualise first a colour, if you want to relax you can imagine a beautiful place or objects connected to role etc. (Pakarinen 2002).

The way Allen uses her "method"- pool of vibrations - is more than just a relaxation technique, since with it the actor has already started to prepare towards the role she's playing. In other words you've already started experiencing the character's life and emotions. And as you are totally turned inside yourself, and find/create these objects in your body and soul in relaxed state, the imagination can work freely without any interruption of the concrete world surrounding you. This method also strengthens your believe system of what you have set yourself to do.

I can see no reason why this exercise couldn't be extremely beneficial in any kind of situations where you've set yourself certain goals or want simply to strengthen your own positive characteristics, change your mood and to concentrate on the task at hand. This is one of the ways you can set you and help yourself to be more open and creative with other people and different situations.

A Vision How It Could Work

How about this vision: There's an extremely important decision to be made on the board of multinational business corporation. The problem needs a totally new and bold solution in order to solve the problem and the company to be saved from bankruptcy. Each member of the board is under a huge pressure and working intensively their brains out on overload in order to solve the problem. The decision has to be made soon. What if, instead of tensing up even more than they already are, each member of the board would take an asymmetrical position in their seats, close

their eyes and start going through their mental areas at the same time breathing, relaxing and letting go of the pressures. They all would be expressing their true feelings about the crises in the company, fears, and their personal problems they can't talk about anybody present. Many of them probably would soon be in tears, shouting and swearing all together out loud, moving their bodies while checking the relaxation. When they get to the pool of vibrations, each would be getting even closer to their emotions and be able to release the tensions that have been building up.

Now, this is an opportunity to each of the board members to visualise the company and themselves in it as they truly would like to see it. Maybe something would come to their imagination they never could have thought otherwise in their wildest dreams. They all have a chance to affirm all the positive characteristics in each one of them and face the fears and feelings coming within it and most of all express them! After this 20-30 minute relaxation session the board resumes its meeting. Now the members are more in touch with themselves as human beings, seeing and really listening to each other. Maybe in the beginning some of them feel a bit vulnerable.

This vulnerability makes them actually more apt to see the company as a structure formed by human beings as well as helps them to be aware of the consequences their decisions and actions will have to an individual worker in the company. But now their minds are clear and their imagination is working, they are able to communicate to one another and nobody is panicking anymore since they are relaxed. A solution that is humane and surprisingly simple is most likely closer on its way than earlier before the board members started relaxation.

Moment to Moment Experience

I think the real reason why I still want to be an actor despite of the toughness of the profession is that on stage/behind a camera you have a chance to go through an experience. Personally the biggest value in acting is transferring the immediate experience to the audience. To be able to do it requires a lot of trust and rehearsing, and of course some magic. On stage as in life the things that seem most difficult are the simplest things of all.

The book – Zen in the Art of Archery – describes the principle of archery in the same way you could describe an acting process: In the back of your head you know that you have to hit the target. But if you think too much of the result you won't hit the target, you forget to take the necessary steps in order to accomplish your task. So you put your concentration into each individual steps: setting the bow on your shoulder, drawing the bow, letting it go etc. Only in the back of mind you are aware that you want to hit the target and where it is. If you leave out even one step, you'll most probably miss the target. At the same time your concentration is on relaxation (mind/body) and on breathing, rather than trying to achieve the result.

Living from Moment to Moment and Experiencing Life

But why do we want to live on stage from moment to moment? Could we not be better off calculating and rehearsing every step? "In Systems Intelligence we want to surprise ourselves and find possible new ways of seeing things" (Saarinen and Hämäläinen 2004). From point of view of the audience it would be matter of taste whether you prefer to see calculated behavior or a human being on stage. What makes me personally enjoy acting is to live, to experience on stage. In order to express yourself emotionally you can't anticipate events or emotions on stage. That means if you want for example to cry you got to live from moment to moment. To cry just on command is

impossible for most people and even for most actors. In real life you usually cry just when you try hard to hold back your tears.

If you sensorily - with your five senses – concentrate to a situation that brings back painful memories, creating the circumstances instead of the result, you'll find out and actually remember the emotions in your body and that would bring the tears for you. Now I'm talking here about the so called Affective Memory exercise, which is many times mistakenly understood as the meaning of the whole Method Acting. As matter of fact being in the moment and experiencing it is much better if you don't even have to decide the specific emotional state beforehand. In our collaboration with Penny Allen (and actually during my previous training) the emphasis has been in creating the imaginary sensory circumstances and responding to them. In contrast creating some trauma from your own life separated from the situation of the play instead of identification and personalization of the character and circumstances. It is much more interesting to find out how would I, Meri, respond to the situation given for the character instead of trying to superimpose my own disconnected experience just for the sake of a few tears.

"In Systems Intelligence we want to surprise ourselves and find possible new ways of seeing things".

Identification to Salome

The exciting thing in acting is to find out what would I feel in situation I've never been in before, Just to make sure I give you a really dramatic example, let's say I want to play Salome (in Oscar Wilde's play with the same title). How would I feel when the cut off head of Johanaan is brought on a plate in front of me? The only way to really find out is to create the circumstances imaginatively with all my five senses. Before I start working I might think I'd be horrified, I would scream, that I'll be disgusted etc. But I won't really know before I experience it. And thank goodness it will only be created with my imagination, it will not be a real thing: But with all my five senses, touch, taste, smell, sight and hearing I will explore the head. It is my choice whether the head is created from a real life person or if I leave it to a total production of my imagination. (Pakarinen 2002)

It is a real person doing a real thing – integrating the imaginary experience with senses and the real experience happening around and in you.

I will touch his imaginary face, lips, feel the blood with my hand and fingers, taste it, caress his hair, and feel the blood drying and sticking to my fingers, looking into his empty dead eyes... While I'm doing all of this I go back to relaxation and ask myself how do I feel and express it with sound, gestures and words of the monologue. The beauty of this kind of work is that I'll never know what is going to happen in the next moment or even next time when I'm practicing or performing the scene. Because my concentration is not in the result, but in finding out the very sensory reality and gaining the experience and because I'm also a little bit different every time I do it, it is impossible to know in advance the exact experience. I might be more tired, something might have happened earlier that day that made me angry or happy etc. All these things can be included into the experience, they will color it and as the result deepen the experience because you're not denying the reality in you. It is a real person doing a real thing – integrating the imaginary experience with senses and the real experience happening around and in you.

It is the same in real life: the experience is all the things that you're going through in that particular moment. By denying this you deny your own experience. If you express what's really

happening it will become part of the situation you are creating and included into the experience. On stage, if you stay loose and let yourself be "knocked off from your feet" you'll be open to changes, physical and emotional (psychophysical) created by imagination and including reality.

Allowing the Unknown

One of the concepts that struck me in SI pragmatic outlines was the aim not to get stuck on patterns of behavior but to be loose and open to changes and surprises (Saarinen and Hämäläinen 2004). I think this is one of the fundamentals in creative behavior and expression. It is also needed in the art of acting where everything is behavior and where it is so much safer to follow exactly the same pattern and expressions instead of creating the situation anew in every performance and jumping into the unknown. But the risk is not that bad after all: if you know your character well and know yourself you can afford to loosen up and improvise within the form. The form here is same as system. So you behave creatively within a certain system for the benefit of yourself and the system.

Salome with the head on a plate: she might be dancing while talking to the head. She's only 16 years old, discovering her sexuality for the first time, she's just destroyed the very thing she loves and desires the most. How can I, an adult woman express this? One possible way to approach the scene and the character is to find out my own sexuality from the time when I was teenager with sensory elements. I could also create sensorily a shower and use that reality as the base of the dance movement instead of making a well planned choreography. I could work on sensory aspects of a shower: nudeness, water running on different body parts, music, the head and desire for him, remembering myself as teenager. All these elements together give continuous discovery of body that will lead to a freedom of sensuality.

Identification - Compassion

"Systems Intelligence starts when a person looks at the world through the eyes of an other person."

Here again we come across some of the SI outlines: "Systems Intelligence starts when a person looks at the world through the eyes of another person" (Churchman 1968). This is of course usually taken for granted in acting. I can't experience this event of Salome's life unless I look through her eyes and from her perspective and see the circumstances she went through - without really listening to her inner reality it is impossible. You should listen to your own body and soul first before you can understand the other person, meaning you will have to imagine yourself in the circumstances of the other person. Whenever you feel compassion to someone or understand another human being, you usually have gone through similar experience or you have to be able to imagine what the other person is going through. "Systems Intelligence is about compassion and love that makes pragmatic sense" (Saarinen Hämäläinen 2004).

In acting the exciting thing is that whatever the character you're playing is you should not condemn them. You have to experience the situation from the character's point of view, even if you never could like them or approve their actions in real life. You cannot judge for the simple reason because you got to understand why they took their actions in a way they did - their motivations behind their actions - before you are be able to play the character. This kind of acting exercise will help you in real life situations: Unless you understand why somebody did something, you cannot see the alternative course for the better action. Through imagination exercises you might be able to start seeing things in a more positive light too. Saarinen and

Hämäläinen (2003) discusses the same subject in connection with what they call a dynamic humbleness, which acknowledges that my perspective of the others might be drastically mistaken. That is why in acting we really want to find out what I would do in the situation of a character, not just jump intellectually into quick answers. This kind of thinking approach that Saarinen, Hämäläinen and Turunen suggest can create a positive behavior pattern in itself for the everyday life situations – only by stopping yourself and not judging too hastily.

Imaginary *As if* - in effort to break the patterns of believe and behavior systems

During the two months I was working on my project with Penny Allen in Los Angeles, the exercises that had most impact on me, also on personal level as well as in identifying process with the character, were the *as if* - movement exercises on Isadora Duncan's character. In our long talks that sometimes undoubtedly sounded like psychotherapy sessions, we went through a lot of my life looking for analogies between the characters and my own life. As I got deeper into my own life and my experiences certain emotional conditioning in my own life became apparent (Pakarinen 2002). One of the most striking impact that SI (Saarinen and Hämäläinen 2004) and things what Esa Saarinen discussed in his lectures during spring 2004, is the SI effort to change the belief systems and behavior patterns that we all have formed during our lives.

Our beliefs reflect our experiences but are also influenced by highly idiosyncratic coincidences. Our beliefs could be something dramatically different from what they are now, had certain particular incidents not occurred (Saarinen and Hämäläinen 2004).

This applies especially in many beliefs that someway restricts us and distort us from who we really are. These are for example behavior patterns that prevent us to take the best possible course of action for particular situation. Instead, we easily fall into our old habits since we do not see any alternatives. Our behavior is most of the times formed by automatic ways of reacting to other people and situations in our lives.

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The exercises that I did with Penny during our rehearsal period gave the alternative experience to me, away how I believed I had experienced myself in certain aspects of my life previously. This made me understand that I was indeed conditioned the way I was. But what would happen if my experience of myself were different? After all, many our self- beliefs - who we are and what we are - are just beliefs and that does not mean they are facts or the truth. But when negative beliefs are taken into unconscious level, it will certainly have an effect on us. Everything does matter and have an effect in human emotions, whether we acknowledge it or not.

In acting, I think before we can get into the experience of the character, it is important to identify our own emotions and feelings and where they come from. So in working on Isadora Duncan's character and aspects of her life connected to motherhood, I had to find out how I, Meri, see myself as a mother. (Since in real life I am not a mother, but even then it would take a conscious effort to find out what my feelings really are.)

Emotional Conditioning

Daniel Goleman (1995) talks about emotional conditioning in his book *Emotional Intelligence* and how these learned emotional patterns form our lives from childhood on. For us actors our emotions are important part of our skills; the way we are able to work with them and turn them on at will. Already Lee Strasberg saw accurately that emotions are part of holistic unity: body-mind-emotions connected together. So all these exercises are based on that insight in mind and amazingly proved right by science only quite recently (Goleman 1995). Daniel Goleman talks about these exactly same fundamentals of human emotional life in his book (1995) as Lee Strasberg taught already since the fifties and the sixties (Hethmon 1991).

So it became evident in our talks and in some of our exercises that somewhere along the line in my life I had taken on belief that I am not able to be a good mother. I am discovering these things as I am sensorily working on an imaginary child and verbally going through my life at the same time. Penny points out that she remembers me mothering my friend in N.Y.C. Making it clear that my feelings are not necessary facts and that it is equally important to remember positive aspects of our lives.

"The behavior of people often reflects their best of rational behavior but that guess can be completely erroneous" (Saarinen and Hämäläinen 2004). This SI statement could be directly taken from a Method acting manual. If we don't know how we really feel about ourselves in connection to our circumstances in systems we are involved, we cannot reflect who we are nor can understand anybody else's behavior. As actors, it is important to identify our own emotions and feelings and where they come from. As a person this identifying process helps me to understand something deeper about myself and relationships in my life. I can start learning about my own patterns in my life and hopefully prevent repeating them in future. I do not know if it had been possible for me to recognize my patterns in my relationships with men with such clarity without this work with Penny Allen. At least the process would have been much slower and definitely less conscious.

Learning Through Own First Hand Experience

In *The Fifth Discipline* (1990), Peter Senge talks about organizational psychology and systems thinking dealing with organizations and learning within them. He points out in his book that the learning is the most effective when you can have your own first hand experience with it. That applies to good and bad experiences. "We learn best from experience but we never directly experience the consequences of many of our most important decisions" (Senge, 1990). But the experiences we have concerning ourselves as humans we do get to experience the consequences indeed. So would it be possible to make an exercise that would give a positive experience and in that way to start unlearning the previous patterns (like in my instance what I had taken on in my relationships)? I also talk with Penny Allen about the effects what being in these kinds of relationships had on me: To be in the position where a person cannot move (being pushed back and forth immobilizes you). I was not able to experience the maternal in me because I had internalized believe that if I am creative I cannot be worth having a child and thus had not had a chance to experience the maternal side of me. As Penny sees it I was put in a position where I cannot move. These are fundamental emotions and seeing this, have taken my development as a person, on the whole, further. (Pakarinen 2002).

I think *The Fifth Discipline* hits the core of what we were looking for in our exercises. It also connects my work with Penny Allen to SI when Senge talks about how it is a waste of time to

blame someone else about the problems one has. We should be looking to find the solution and "fault" in ourselves (as in organizations the problem and the solution to it usually lies in the patterns of their own structures). (Senge1990). I belief it is in the structures of our behavioral patterns as human beings, where we usually find the solution to the most of our personal problems we go through.

So, I, Meri could not solve my relationship problems by changing the other person or changing one person to another. I chose these people in my life and also chose to get out of the relationship as well. The damage in my personal life does not go away just by acknowledging the pattern, but what I can start to do is to begin to change myself in conscious choices of behavior. (Painful but the only way I am afraid.) So if I look back on my work and how it is connected to SI this is definitely closest in my acting work that I recognize SI in practice. So would it be worth of bringing up my own painful memories, in order to work in one character? But as I have already pointed out it is all connected; artistic work and progress in our work as human beings and the growth as an individual. From there we can start making the change by interacting within systems we are part of.

Magic If and Movement

So in our exercise after going through long talks and identification process (as here I was relating myself to an imaginary child I created with my five senses), we are going to look into a possibility what it would be like, if I were not conditioned maternally the way I am through my relationships and my past choices? We were looking for an experience to find out how I would feel if I did not believe somewhere in myself that I was not worthy to have a child. As we are working on Isadora, the dancer, it was natural to do a movement exercise. Penny asks me to lie down on a floor and imagine: "What if that were not the pattern of your maternal instincts?" Then she asks me to start moving without any words: "What if the pattern of your maternal instincts were different? How would you move?" (Pakarinen 2002).

Konstantin Stanislavski created *magic if* –exercises for actors in order to put themselves into the circumstances of their roles. (Stanislavskij 1997) What if you were in the situation of this character? How would you behave? It is extraordinary what our imagination can do to us. This simple *as if* –movement exercise certainly gave me an experience of earth goddess, motherhood that I did not know I had in myself. The abstractions and images as movements that came to me were all about grounded ness, flying, freedom of movement, a flock of children pulling me to different directions, giving birth, experiencing myself as a child to a giant being and so forth. Penny as my acting coach and director saw my impulses and movements all connected to motherhood and female aspects. This was quite an exciting experience for both of us. More importantly I truly experienced something in me as a woman that I had not recognized or felt before. Maybe this could be one of those micro-changes that could grow to a bigger and permanent shift in me. Esa Saarinen (2004) has expressed his understanding of the change taking place as this kind of micro-change beginning and accumulating change in time.

The change taking place as this kind of micro-change beginning and accumulating change in time.

Whether you are a dancer, an actor, an artist or not at all connected to creative work, this kind of movement exercises are powerful to everybody, because it connects your experience directly into your body and to your senses – the core of your being. Allow yourself to let go of planning and intellectualizing of what you are doing. This will help your impulses and lead you to take action

from imagination and from unconscious, beyond your ordinary behavior patterns. The only thing you have to keep in mind is what you're looking for in order to help your experience to be connected into your inner being. In this case I was able to connect myself with my maternal side just with one movement exercise. I believe the exercise really allowed me to be able to begin a transformation of how I see myself in the long run - begin a change in my believe system about myself as a maternal woman. I can see this kind of exercise as the possibility of a learning experience to anybody who needs a positive experience in order to relearn who they are. That is true because feelings are not necessary reality, even if they are valid in themselves and tell certainly something about us and how we relate to the world around us.

This whole idea of movement exercises being transferred outside the art world could sound pretty far- fetched? Do not most people like to dance and move when they are relaxed and in the right place in the right mood, especially under some influence of alcohol at least in our own culture in Finland? If you strip all these outside circumstances and leave out just yourself and space to move, it could be at least interesting way of discovering about your body and something new about yourself. If nothing else how does you feel about moving your body? How do you feel about moving your body in different ways than you ordinarily do? How would you experience your body if you thought yourself as a Gift e.g.? (As I did in our next exercise discovering more about Isadora). Are we not gifts to each other as unique human beings all in different ways, but do not appreciate it in ourselves or in the other people or even recognize it most of the time.

> *By acting out his inner experiences, man gains clarity about the nature of images which generate in his psyche, through he is able to relate to outward creation in this way. External action and inner experience cannot be separated, because the essence of both is this wholeness and integration (Wosien, 1974).*

I think if this is true to mankind then we all have a basic need in our bodies to do creative movements in order to learn by experience and integrate it into our core of being. So we do have the consequences right in us from our own actions as holistic unities.

I think in this kind of *as if* - imagination and movement exercises can have a freeing effect on how you see yourself. It can start a little change in you, in your self image, that can lead to something bigger in time as you let go of the restrictions that you and other people have set about who you are. I think there are a couple of reasons why this kind of a leap into abstractions and movement can be beneficial addition to SI aspirations of changing behavior patterns through conscious thinking and mindfulness.

Body-Mind Connection and Second Wild Vision

With movement you are in your body and you concretely experience the movement in your body. You are not merely connected to your mind. So the complete you are involved. Since movement is or at least can be abstract it involves less mental anticipation, but gives you a chance to experience and express deeper emotions and associations within you. It definitely demands a risk and taking a challenge in a person who usually would not dance or move without conventional context. You would surely see yourself differently after this kind of experiment; most likely it would shift your perspective of yourself in connection to the issue you would ask yourself. You take action with your body. "SI acknowledges that beliefs influences action and action influences our beliefs" (Saarinen and Hämäläinen 2004). In connection to this SI concept the creative movement exercise could be part of very powerful means of changing our preconceptions of how we look at things and useful a channel into a creative thinking.

A wild vision: The creative team of Nokia would start their meeting with a dance and ask themselves: How would I move if I were the ultimate communicator between all the people in the world? After dancing for a while each person would analyze how they experienced themselves as communicators and how they communicated. They might discuss the problems as well as positive aspects they came across and the esthetic values in they movements. Most of all they are really evaluating what was there in their experience that would help them to see their work and aims from a different angle than a concept they already have. This could all be beneficial before going back into the more technical details of their work.

"SI acknowledges that beliefs influences action and action influences our beliefs".

"A man dancing is at the same time put in touch with his own inner being" (Wosien, 1974). This is how it used to be in the beginning of times- so that all dance that is somehow imitative and expressive be a way to identify with the very thing you are observing and dancing. American Indians as well as many other indigenous cultures danced together as a ritual but also creating something while dancing. We all take dancing and ritual part of these cultures for granted without thinking of their deeper purpose. I think there is a possibility that there is something to learn from these cultures, which are more attuned with the nature; how they relate physically, emotionally and on an unconscious level to themselves and to the environment they live in. "Rhythmic movement provided the key for both creating and reintegrating the dream-like forms and was as a means of being in touch with the source of life" (Wosien, 1974). I know there are many other ways to unleash creativity and learn about you than going as far as dancing and physically experiencing yourself. But it is a one way to find out about yourself that can have a direct healing power, I believe, if you just give yourself up to it and take a leap into a new experience.

Dreams and Plugging Directly into the Unconscious

Here I want to dive even deeper into the meaning of the unconscious, in terms of imaginatively working on our emotional and behavioral patterns through dream-work, and most of all finding out new ways of tapping into the creative potential in ourselves.

I am myself a big dreamer, therefore recollecting and working on my own dreams is not a big effort to me. Early on in our two month process with Penny Allen, she started to encourage me to write down my dreams as they seemed to be connected to work we were doing, which is natural that the unconscious would process it in that way. Penny Allen has participated dream workshops in connection to actors work and she has her own way to interpreter dreams, from the work based on the workshops. For three of the characters I worked in my projects, dreams became one of the main sources into the identification process and in terms of creative choices we made. And of course there is no clear separation with my personal life and the character process; they interweave together, the very reason to use unconscious processes, as one source in creative work.

The basic idea with Penny's interpretation of dreams is that everything in the dream is part of you. Different colors, persons, places, all things symbolizes different parts and aspects of you and have they counterparts in the different sections of the brain. The way Penny explains the parts of the brain and the functions is very similar to Daniel Goldman's way to explain it in his book, *Emotional Intelligence* (1995). Here I will not go very much into the interpretation or the symbols in the dreams, since it is pretty complicated and everybody can have they own opinions about

symbols, interpretations etc. For me personally the interpretations gave insight to many personal issues and even opened my eyes into how I really function in the outside world. But mostly what I want to bring in this text to you is the way it gave creative choices I would have never come up with conscious thinking. So from an acting point of view dream-work gave such an enormous creative potential regardless of any interpretations or psychological meanings. Most importantly: it worked for me.

Dream -World Creates Choices?

But how is this dream work connected to Systems Intelligence? SI introduces concept of *higher order change*, which involves a change in the perspective and a deeper solution than just a temporary one - helping to come out of box of thinking and seeing an alternative vision (Saarinen and Hämäläinen 2004). I see the dream work as a possible channel to find new choices in our personal, creative or professional life. To find out an alternative route to take action that is not constricted by our habits, inhibitions or even to our intellectual choices. Dreams can take you directly to the unconscious knowledge of experience. In other words, we can find new ways to approach different question we have of our lives, ways that are not possible to come up with mental and pure intellectual thinking. In the art of acting I have found dream work to be a very exciting and powerful way to creativity, beyond obvious and conventional choices.

How to Activate the Dream World

This is how we activated the dream process in creative work: As an actor, working on Salome's character I would write a letter to my *Inner-Self* before going to sleep at night, asking for an experience in a dream that would help me to play Salome's character. The letter: Dear Inner-Self, if it is your will for me, please reveal in a dream tonight, an experience I need, in order to create the dance in Salome, for my one woman show. With love and respect, Meri.

Dreams can take you directly to the unconscious knowledge of experience.

The same formula applies with personal work: Dear Inner-Self, if it is your will, reveal for me in a dream tonight, what kind of action I should take in the outside world, in order to bring my male and female side together/ further my art/ etc. (Pakarinen 2002)

It is important to be specific with your question and write down the dream you had first thing in the morning in order to remember all the details. As I would do with Penny, when I had a chance, I would tell her my dreams already during our morning coffee. I would describe my dreams as specifically as possible and articulate my feelings about them. She would usually interpret the dream, symbols, meanings etc. And we would discuss about issues the dream was concerning in connection to my life and to the characters. (Dream Notes, 2002). Especially, if the dream was from a particular dream assignment to a character I would physically act out the dream. I was verbally telling the dream, as I was at the same time acting it out. Penny explained to me that verbalization can be very helpful with the movement as it extends and strengthens it.

Salome Dream - Sexuality

There is one dream connected to my work with Salome's character that is still as vivid and powerful to me now two years later, as it was the morning after I saw it when it felt as real as any

experience I could have in real life. It was a long dream but I am going to tell you only the end part of the dream, which was hyper-realistic and extremely vivid: I was in a desert storm. I could see every single golden sand grain in detail, as they were the size of a pea, and round in shape. I was struggling to get through the storm, protecting my face with my hands and arms, trying to see ahead. But the storm was so strong that I was almost blinded by it. I feared that I could not be able to breathe. Suddenly, the storm turned into a bright red liquid. The huge golden sand grains were still present. I was almost in a panic as they were coming onto me. I was swimming in a bright red liquid space and I panicked again, for a moment I could not breathe, but to my relief I had no problem. Now I was almost like running and paddling at the same time in this red liquid space. I became increasingly aroused sexually, and was looking for a man, desperately wanting to have sex. I could not find any man there and looked at my own naked body radiating the same red color as the liquid. I had a spontaneous orgasm as I was floating in the red space. (Pakarinen 2002).

It was as if of an experience from real life, with all sensory and emotional elements. The acting out the dream gave me a new and interesting way of moving as Salome in her dance. It also made me realize she could be metaphorically blinded, and that would be an incredible addition to her character. I could also physically feel through my body, her yearning for love and sex. All these things would have never come to me or been so vivid just by trying to work on my own conscious imagination and regular sensory work. In addition possible inhibitions with the sexuality probably had not allowed me to go as far as in the dream in understanding what she was going through. With the strong psychophysical experience this dream was, it is not difficult to recreate the dream again even two years later. Sexuality is one of the most powerful creative forces. Sexuality in my dream was powerful enough and affirmative experience in itself to confirm this belief in me.

Dreams Helping to Bypass Habits in Creative Work

With this dream I was able to find a new way of movement to the dance and her behavior, without going through long sessions of improvisations, in addition to be free from my own habitual ways. Of course this all was part of who I am too, since dreams always involve your own life issues, but blended into my creative process creating Salome. You can always continue the questions, asking more question in order to go deeper in to experience and discovery. If you make a conscious effort to stimulate your unconscious to solve something, I feel it is possible to find the solution more clearly. On a personal level, one way to utilize dreams could be to get rid of an old behavioral pattern. Once you start asking your inner-self questions, the answers will start coming to you as the transformation process will start unconsciously. At least I think, nothing can be lost if you try. And if you have the will to change yourself that alone will help to get the first little micro-change take place (Saarinen 2004). Habits are difficult to change, because they are ingrained into unconscious. For this very reason, it makes sense to start activating the unconscious for the first step in transforming yourself.

Habits are difficult to change, because they are ingrained into unconscious.

This is all based on my own experience and the results it brought to me as I was working with Penny Allen. Some say you only really dream one dream every night. That would mean that even remembering a short part of your dreams will tell you the issues you are working on unconsciously. Even if you do not believe any interpretations of the dream, the experience you

have in a dream can tell you a lot of things you are working on and maybe, to trigger a creative transformation process in you.

In creative work you better use whatever works for you, and stirs up your imagination, if that is a dream, use it. It does not matter whether the benefits are based on scientific facts or not. If dreams do not work, forget them. Even in the business world, you could ask for a dream to find an alternative route, to act or solve a problem. Who knows, maybe the solution is in your unconscious! I would think that truly original and successful people have this kind of a channel open in them anyway, whether they are aware of it or not. Activating unconscious through dreams, can give anybody a chance to expand themselves a bit further, if you just take a risk and have an open mind.

SI – Method in Everyday Life

I have had couple of reasons to bring acting methods closer to everyday life. One is to provoke the reader to see possibilities within opening up emotionally and experiencing life more fully. This is one way to get closer to our Personal Mastery –as Senge calls the ability of an individual to use her unique potentials as fully as possible to the enrichment of good life (Saarinen and Hämäläinen 2004). By any means I do not want that everybody should be actors, to be able to fully bring all emotions into surface at will. It would mean soon that all actors would be out of work. Who would like to see something that anybody can and will do? So I am not aiming to make you an actor, but simply increase the awareness of the fact that we all are both emotional and intellectual beings. In order to be able to see the world through somebody else's eyes, we need to be first in touch with our own emotions and express ourselves at least to certain extend in everyday life. Here SI comes into the picture: How to respond and how to phrase our words in the interplay with other people, with awareness and compassion as a means to increase co-operation and wellbeing (Saarinen and Hämäläinen 2004).

Personal Mastery –as Senge calls the ability of an individual to use her unique potentials as fully as possible to the enrichment of good life.

The other reason why I am giving imaginative examples to the business world, is that couple of years ago I was giving few experimental courses in 'Presentation in English' for some IT-companies. My aim was to integrate English and a presentational skill together, by giving exercises in order to help these IT-engineers. We practiced relaxation, physical and emotional warming up in order to further their expression. It amazed me how willingly and without prejudices this group of men was diving into using their bodies, voices and emotions, in a way they never had used before. Their relaxation, awareness, and expressiveness in voice and body increased after just two days work. On the other hand, another group that I had expected to be more oriented to emotional and body work, flatly refused any of my suggestions.

My concern is that these exercises I bring up in this article may sound over simplistic and give an impression of instant and easy solution how one is able to function. This is not true in any sense. As a 'method actor' with fifteen years of practice I am always struggling in my work with the same issues concerning relaxation, moment to moment work, getting in touch with my own feelings, and integrating them in my acting etc. So in reality the technique I have described is an ongoing process and continuous effort towards awareness.

In his lectures Esa Saarinen (2004) said so well about SI, that it is not about perfection, but allowing yourself to be imperfect and recognizing your own limits - that is what makes you keep

developing and working on yourself. I do believe some parts of the Method can be applied outside acting and has similarities with some SI concepts in a way of seeing the world and changing patterns of behavior and changing your habits. An important thing is to take the exercises into the 'real world' within the right context and in the right terms connected to the circumstances present, remembering why we are doing it, who's doing it and what we want to achieve with the exercises.

Maybe Method exercises that I have described here could give us at least an awareness of ourselves functioning in the world and involved in various systems we live in and work. The Method applied into everyday life, can sound like a huge step, but just an awareness of relaxation while you are in interaction with someone else, can help you to get in touch with yourself, and at the same time bring you closer to Systems Intelligent behavior. Using excess energy will create tension and tension will create problems immediately in your closest system, within yourself – your body, mind and emotions. That certainly will be reflected to other people, how they react and respond to you, and how you behave and function – responding to others. "In most systems, each subject reacts to the system without seeing the cumulative overall effect, of the reactive behavior of the other" (Saarinen and Hämäläinen 2004). Awareness with active relaxation creates responding, according to our true emotions, not reacting when you leave yourself out what is really happening in you and in the others.

Peter Senge says the true learning happens through experience (1990). By letting we experience the life we eventually will learn from it. With some of these creative tools used with imagination hopefully we can create experiences that will help us learn alternative ways of behavior. We have a chance to relearn and recreate new habits that support our freedom of expression. Virtual reality, computers, internet etc. where our bodies are separated from our minds, create separation of an experience. That is one more reason why the Method combined with SI could be relevant today, not only for actors and dancers, but to everyone. Our senses, emotions and muscle memory can be heightened and brought closer to our intellect - in order to encourage the holistic human being to function in all of us.

SI – Method in Creative Being

The process I have tried to reveal here is in a way a never ending one, you will never become ready or there is always more to work on. That is the very thing that will make the work interesting and always fresh. This also connects it to Systems Intelligence: you do not have to let yourself stagnate and get stuck into a pattern, but there is a possibility to let the performance live with you. Dance and dreams might sound unconventional ways of working even on stage, but everybody can choose the way that inspires and stimulates the imagination the most. With dance I touched the mythological side, and the early ways humans found inspiration and meaning to their lives. I think our unconscious must still work the same way, as it has thousands of years, even if we have become increasingly sophisticated with technology, social behavior and our intellectual aspirations etc... Could dreams and movement still have the channel to our creative and spiritual source?

However, in the Method, the acting is connected to a real person in a real world, not cut off what is really on stage and who you really are, but you to integrate it with your imagination: the circumstances of a play and the character. In that sense, you never hide behind a character or a mask, but instead aim to reveal something human and experience it. It is not only your intellect that is working but the holistic unity, the whole human being. For me, this is the only way to touch the audience with the emotional level, sharing the experience, and pass them deeper

knowledge. Myths and rituals were practiced because they revealed something deeper that cannot be explained by words. I think today, in our increasingly secularized world, a good theatre piece can do something similar that myths did before: give the knowledge of something humane and common to all of us that are too connected to the emotional core to be articulated.

Why not to use the Method purely as a personal tool, as I have tried to demonstrate, in art and in life in general as human beings and for understanding relationships.

It is well known fact of cognitive science and creative research that re-framing is the key to creativity. --- identifying one's favored framing patterns, challenging them and adjusting them accordingly. (Saarinen and Hämäläinen 2004).

"We are what we repeatedly do. Excellence then is not an act, but a habit".

Systems that we are all part of can never be explored and learned enough from. As important as to relate to systems is to challenge ourselves and find new ways to relate to ourselves. Dance and dreams go deep into the psyche, the beginnings of human consciousness that emerged from unconscious -one place to look for power and who we are as we want to understand our humanity, our interplay with each other. Once we get in touch with ourselves, who we are and where our deepest emotions come from, we can increase our awareness of ourselves, of other people and all the systems we act in and are part of - begin functioning with each other and make conscious choices towards Systems Intelligence behavior. After all: "we are what we repeatedly do. Excellence then is not an act, but a habit" (Aristotle).

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Meri Pakarinen is an actress. Currently she is performing her one woman show on Finnish painter Helene Schjerfbeck. She is also developing and expanding her performance into four other female artists. She revealed part of her working process on these characters in this article. She is also working on her Masters Theses at the Helsinki University in the Theatre Research Department.