

## Systems Intelligence (SI)

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## Topics for Discussion Could it be that ...

- SI is a hidden/ignored innate capacity in all of us
- SI is an iconic concept stimulating thinking and action
- Becomes a personal learning challenge
- Is an essential prerequisite for future leadership
- An asset in personal and organizational life
- Can be a wisdom when negotiating and resolving complex global conflicts and environmental problems
- Can be introduced and trained in schools
- SI manifests itself in many ways in our everyday life

## Definition of Systems Intelligence

- Intelligent behaviour in the context of complex systems involving interaction, dynamics 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

- Combines human sensitivities with engineering thinking with the idea of making things work
- **Systems Intelligence** is a mirror that helps to identify productive forms of action one already follows intuitively
- Our conviction is that **Systems Intelligence is a key form of human intelligence**
- A fundamental element in the adaptive human toolbox
- It is a competence that can be improved by learning

## The Fifth Discipline (Senge 1990)

Cornerstones of learning organizations:

- Personal Mastery
- Mental Models
- Shared Vision
- Team Learning
- Systems Thinking

Systems Intelligence is the fundamental link between Personal Mastery and Systems Thinking.

## Multiple Intelligences (Howard Gardner 1983)

- Linguistic Intelligence
- Musical Intelligence
- Logical-Mathematical Intelligence
- Spatial Intelligence
- Bodily-Kinesthetic Intelligence
- The Personal Intelligences – intra / inter
- Gardner: These do not yet explain higher-level cognitive capacities e.g. common sense, metaphorical capacity or wisdom

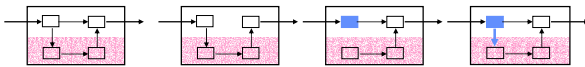
## SI and Multiple Intelligences

- SI points beyond the forms of intelligence of Gardner (Multiple Intelligences), Goleman and others (Emotional Intelligence, Social Intelligence)
- **Links intelligence with the concept of system**
- **Systems Intelligence is another important higher level human cognitive capacity**
- Inspiration from the work of Peter Senge (1990)
- **Systems Intelligence** is a survival asset we have as a species

## Systems Intelligence links with...

- **Systems Thinking** (Churchman 1968, Senge 1990, Oshry 1996, Checkland 1999, Flood 1999, )
- **Organizational theories and learning, Action research, Philosophical Practice and Dialogue** (Argyris&Schön , Schein ,Bohm 1980, Isaacs 1999,)
- **Socratic tradition in philosophy** which emphasises conceptual thinking for the purposes of the good life (Hadot 1987, Long 2002)
- **Therapeutic thinking, positive psychology and situation analysis** (Bateson 2000, Goffman 1974, Seligman 2002)
- **Theories of Decision Making and Problem Solving** (Simon 1956, Keeney 1992, Kahneman, Tversky 2000)

## Systems Thinking - the common understanding



- Observes interdependencies and wholes
- Views matters from different perspectives
- Especially through the eyes of others
- **Becomes Systems Intelligence** when a person takes active personal responsibility for her actions within the system

## Systems Thinking is only the first step

- Emphasizes the importance of wholes and perspectives as it **conceptualises and models** systems of interaction and feedback **from outside**
- **Can become a trap when one only sees systems from outside** and does not recognize herself an active part of them

## Systems Intelligence Basic ideas – Structures

- Structure produces behaviour
- **Beliefs** regarding structures produce behaviour
- **Beliefs regarding the beliefs** others have regarding structures, produce behaviour
- Structures of co-operation are fundamentally based on the assumptions and meta-assumptions people make of others involved in that system of co-operation
- Structures determine the patterns and dynamics of interaction

## Systems can take over

- People can get caught in systems (organizations) that serve nobody's interest
- 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

## From Systems Thinking ...

- The environment and one's place in it are perceived in terms of interconnectivity and interdependence
- The systems perspective wants to see the world as composed of systems, to examine these entities as wholes

But also:

- "Part" and "Whole" are relative abstractions
- They are mental constructs, which are relative to the perspective adopted i.e. subject to redefinition
- Boundaries of a system can always be redrawn

## ... to Systems Intelligence

- Unlike Systems Thinking (in its narrow meaning), **Systems Intelligence is primarily outcome-oriented and not a descriptive effort only**
- Unlike Systems Thinking, Systems Intelligence involves driving change and actively embracing change
- Becomes a challenge for personal learning
- **The theoretical understanding of Systems Thinking does not need to increase Systems Intelligence**

## Thinking about Thinking

- Systems Intelligence begins when a **person starts to re-think her thinking** regarding her environment and the feedback structures and other systems structures of that environment
- Identifying one's favoured framing patterns, challenging them and adjusting them accordingly
- **A Systems Intelligent person** will acknowledge the limitations of her thinking and mental models particularly through **challenging her own thinking**

## Seeing oneself in the system

- The impact of one's behaviours and interaction patterns upon the behaviours of others
- The impact of other agents' feedback on my behaviour
- The impact of the current system on all of us is in the long run
- The modes of conformity I have already adopted as a result of established practices
- The modes of conformity the others have already adopted as a result of established practices
- The desired ideal state I would like to reach with the others

## SI Connects Engineering Thinking with Emotions

- From reactive behaviour into the intelligent management of situations, feelings and the whole
- Human emotions are essential – they cannot be ignored – their systemic effects need to be taken into account intelligently
- **A systems engineering perspective to the systemic impacts of emotions**

## Simple acts of Systems Intelligence in Everyday Life

- Appreciation
- No judgements
- Interest
- Humor
- Listening
- Thanking
- Encouragement
- Friendliness

## Managing the invisible

- In most human systems and organizations the true system often includes **hidden subsystems** such as **fear and trust** generation or **belief** formation
- It is very easy to forget to use behavioural input variables controlling such invisible parts
- To understand the system, **it can be more important to know what is not produced than what the standard output is**
- A Systems Intelligent approach acknowledges and aims to identify and understand both the visible and invisible part of the system and find inputs to impact their behaviour in a positive way

## Optimism for change

- Systems Intelligence focuses on changes as leveraged by the human mental world and the systemic nature of life around us
- Systems Intelligence acknowledges that **beliefs influence actions and actions influence beliefs**.
- There might be a systematic flaw in the way a group of agents perceives the way others think and what they truly want
- **A relatively small change in my behaviour might trigger a chain of changes in the actual behaviours in each of us**

## Systems Intelligence Archetypes

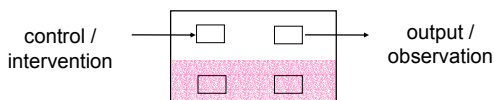
- **“Fixes that Fire”** – triggering systemic change, resonance, bifurcation/chaos with positive long term impacts
- **“Sharing Away the Burden”** – we have a dream, open source philosophy
- **“Miracle of the Commons”** – evolution of co-operation through reciprocity

## Systems Theory and Systems Intelligence

- A system is defined by identifying the **system inputs** i.e. control, intervention, decision or stimulus variables and **system output** variables i.e. the observed responses or reactions
- The **state of a system** consists of the variables representing the elements in the system which determine its future behaviour
- Systems can have many different state representations

## Complexity

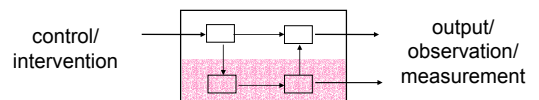
Well known parts – unknown interactions



- The interdependence of subsystems is unknown
- Sometimes a minor intervention can trigger unexpected, chaotic or bifurcating responses in the system
- **The most essential part of the system may be one that was never intentionally built into it**

## Observability

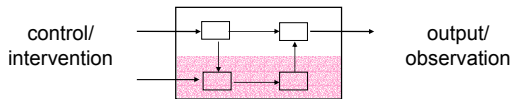
The observability of subsystems



- A system is observable if one can derive the values of all the states by a sufficiently long observation of the outputs
- **Without a sufficient set of observation (measurement) variables one can remain unaware of important active subsystems**
- **You cannot manage systems which you do not see**

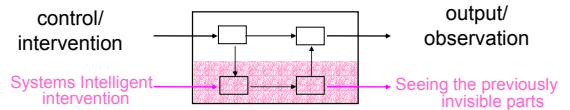
## Controllability

The controllability of subsystems



- A system is controllable if it can be driven to any state value by sufficiently rich controls
- In addition to the seemingly controllable visible system there can be an uncontrollable subsystem – human or technical
- You must have a sufficient set of inputs to cause an impact on all the states

## Systems Intelligence



- SI looks for ways to observe and address the invisible subsystems and interactions of emotions and beliefs
- Without the management of the whole the structure starts to produce uncontrollable behaviour – we have systems dictatorship

## Uncontrollability – System Dictatorship

- The structure and limited input and observation variables can create a situation of uncontrollability – system dictatorship
- Even if a system mainly consists of human agents the overall behaviour can be determined by the non-human elements and dynamic structures such as time delays and sequential communication patterns (e.g. Beer Game, Senge 1990)
- Systems Intelligence is aware of structures: even if all the agents try to do their best the resulting system response can be bad due to the structure

## Systems Intelligent Organization

- Empowers people to share their mental system models of the organization and to consider the effects of their own actions on the whole
- Fosters and sustains inquiry mode and reduces advocacy
- Keeps fear factors down
- Helps people to be responsive to flourishing initiatives
- Builds trust in the good will of others
- Sees that its production capacity is not restricted to the measurable variables but is extended to the world of emotions and well being
- Elevates innovativeness by an environment where emotional variables do not limit performance

## 5 Levels of SI for self-evaluation and measurement of SI

1. **Seeing oneself in the System** – Ability to see oneself and ones roles and behaviour in the system. Also through the eyes of other people and with different framings of the system. Systems thinking awareness.
2. **Thinking about Systems Intelligence** – Ability to envision and identify productive ways of behaviour for oneself in the system and understanding systemic possibilities.
3. **Managing Systems Intelligence** – Ability to personally exercise productive ways of behaviour in the system.
4. **Sustaining Systems Intelligence** – Ability to continue and foster systems intelligent behaviour in the long run .
5. **Leadership with Systems Intelligence** – Ability to initiate and create systems intelligent organizations

## Systems Intelligent Leader

Strives to learn and reach Level 5

- Sees himself in the system with a mission to develop a Systems Intelligent Organization
  - Is aware of the human perspective
  - Operates within the visible system and manages the emotional system simultaneously
  - Is not held captive by the mechanistic perspective
  - Identifies and eliminates structural systems dictatorships
- Systems Intelligence has become an iconic personal growth challenge and a success asset

## Ecological Systems Intelligence

- Evolutionary processes exhibit a **spontaneous emergence of co-operation** generating superior overall behaviour for all the actors (Axelrod 1984, Gintis et al. 2003)
- Human decision making does not follow the axioms of rationality assumed in economic theory.
- Bounded rationality: choice behaviour strongly reflects the systemic decision environment
- We can escape the Prisoner's Dilemma: a deviation from local status quo is not possible by self-interested rationality
- Can be interpreted as a manifestation of ecological Systems Intelligence?

## Games People Play



In experimental games :

- **People do not take everything for themselves.**
- **They choose co-operative strategies reflecting Systems Intelligence.**

## About SI

Esa Saarinen and Raimo P. Hämäläinen:  
[Systems Intelligence: Connecting Engineering Thinking with Human Sensitivity](#)  
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