Book review: Peter Senge, *The fifth discipline*

Introduction, or why we should listen to Peter Senge

In the seminar on City-Marketing, Noordman insisted on the need for a city to develop its own effective organization climate. A city always has an organization climate, but is not often aware of it, and therefore can have a hard time improving its identity and its image. Senge, in *The fifth discipline*, helps us understand how we can effectively change the underlying assumptions, the values and norms and some behavioural patterns altogether. Moreover, this is not just about changing the organization climate for a better one. It goes well beyond identifying and fixing the short-terms problems a city faces: Senge leads us to change radically the way we think, so that cities can build *sustainable* organization climates. Truly understanding the principles of the *learning organization* will even drive us further than building organization climates for effective city-marketing… because city-marketing is merely a part of the whole issue of city-management and city-policy.

I have thus to say right ahead, that I will not oppose any of Peter Senge's fundamental ideas. I rather will insist on how essential his insights are, in order to avoid the misgivings of traditional modernistic thinking, which is too linear and fragmented to help us understand complex systems like cities.

We will follow the plot of Senge's book in its five parts: First getting to know the basic rationale for his plea, then understanding the value of systems thinking before grasping the usefulness of the four other disciplines Senge proposes; and finally addressing some issues arising from their implementation in learning organizations, to find out where this all leads us to.

Part I: "How our actions create our reality… and how we can change it"

The basic rationale of Senge (and other systems thinkers) is presented right in the first paragraph of the book: "From a very early age, we are taught to break apart problems, to fragment the world […] we pay a hidden, enormous price. We can no longer see the consequences of our actions; we lose our intrinsic sense of connection to a larger whole […] We try to reassemble the fragments [but] the task is futile"[1]. Indeed, by committing ourselves to understanding identifiable and clear-cut cause-effect mechanisms in a linear sense, we tend to ignore that the dynamics of our social realities lie in moving interconnections and interactions, thus needing a network-understanding and not a linear one. This is why we need to engage into *systems thinking:*

The world isn't driven by separate unrelated forces. However, individuals have difficulty seeing the whole pattern. "Systems thinking is a conceptual framework, a body of knowledge and tools that has been developed over the past fifty years, to make the full patterns clearer, and to help us see how to change them *effectively"*[2] and *with the least amount of effort* _to find the leverage points in a system.

Systems thinking engages us into a *shift of mind*: we need to continually discover how we contribute to creating our reality[3] and how we can change it. Therefore we should become *learning organizations*: "In everyday use, learning has come to be synonymous with 'taking in

[1] p. 3
[2] p. 7, stress added
[3] Which can also be understood through the constructivist perspective (see the school of Palo Alto, for example ed. Paul Watzlawick, *Die erfundene Wirklichkeit* _I have the french translation_ and the writings of Von Foerster).

information' [… but] through [real] learning we re-create ourselves […] generative learning [is] learning that enhances our capacity to create."[4] Although Senge focuses mainly on private companies, the *disciplines* of learning organizations presented in this book will offer very powerful tools for municipal civil servants and non-profit activists too.

Why should the engaged actors in a city *learn how to learn* in the first place? Because, as Senge points out, we tend to have "learning disabilities: such as:

- *I am my position* (focusing only on one's position and tasks, not feeling responsible for how our interaction with others produces results)
- *The enemy is out there* (the propensity to blame some(-one/-thing) else for problems, ignoring how I/we contributed to the problem and ignored our leverage to prevent it)
- *The illusion of taking charge* (being 'proactive' by taking aggressive action against a single external cause of a problem… which is "reactiveness in disguise […] True proactiveness comes from seeing how we contribute to our own problems"[5]
- *the fixation on events* (only seeing series of events with one obvious cause for each event, not seeing the longer-term patterns of change beneath and the causes of those patterns)
- *the parable of the boiled frog* (like the unsuspecting frog in gradually heating water, we do not perceive those patterns of change because we don't pay attention to the slow and subtle movements)
- *the delusion of learning from experience* (in a system in which each of us is a specialist, "we each have a learning horizon" beyond which we don't experience the consequences of our decisions _we only learn from what we perceive… and our perception is too fragmented)
- *the myth of the management team* (most management teams develop "skilled incompetence", producing "watered-downed compromises or reflecting one person's views" and "blocking out new understandings" that would endanger one's image of confidence)

With the help of a psychological experiment[6], Senge shows how rational individuals that are part of a system but that act in isolation can get trapped in problems related to their own thinking and behaviors. *Structure influences behavior*[7]. "Different people in the same structure tend to produce qualitatively similar results […] systems cause their own crises." Structure is not an external force, it "means the basic inter-relationships that control behaviour. […] People often have potential leverage that they do not exercise because they focus only on their own decisions and ignore how their decisions affect others."[8] We first need to understand how we are the system in order to change it effectively. "We must look beyond personalities and events. We must look into the underlying structures which shape individual actions and create the conditions where types of events become likely."[9] We then have to improve the system through redefining our scope of influence. "Either the larger system

[4] p. 13-14. Also p. 12-13: "At the heart of a learning organization is a shift of mind _from seeing ourselves as separate from the world to connected to the world, from seeing problems as caused by someone or something "out there" to seeing how our own actions create the problems we experience."
[5] p. 21
[6] the "beer game", presented in chapter 3 (p. 27-54)
[7] Here of course, I can never advise the reader strongly enough to read French structuralists: Saussure (linguistics), Lévi-Strauss (ethnology), Braudel (History); and American structuralists (such as Teda Scockpol and Jared Diamond).
[8] p. 40
[9] p. 43. Also p. 44: "These are not interrelationships between people, but among key variables"

works, or your position will not work […] in order for you to succeed others must succeed as well"[10].

The reason that structural explanations are so important is that only they address the *underlying causes* of behavior at a level that *patterns of behavior* can be changed. In this sense, structural explanations are inherently *generative*. Moreover, since structure in human systems includes the "operating policies" of the decision makers in the system, redesigning our own decision making redesigns the system structure.

Part II: "The fifth discipline: the cornerstone of the learning organization"

The second part of the book is focused on unfolding the principles of Systems thinking. It goes beyond the concepts laid out in Part I to demonstrate the value and importance of systems thinking in practice, and to prepare the reader to use systemic analysis.

It first lists the "laws of the fifth discipline", or how linear thinking worsens problems:

- *Today's problems come from yesterday's "solutions"* ("solutions that merely shift problems from one part of a system to another often go undetected because […] those who 'solved' the first problem are different from those who inherit the new problem"[11])
- *The harder you push, the harder the system pushes back* (or the "compensating feedback: when well-intentioned interventions call forth responses from the system that offset the benefit of the intervention[12]")
- *Behavior grows better before it grows worse* (many short-sighted interventions work in the short term, compensating feedback[13] involves a delay… this is why systemic problems are so hard to recognize)
- *The easy way out usually leads back in* (we look for familiar answers to problems, sticking to what we know best, while the fundamental problem persists)
- *The cure can be worse than the disease* (familiar solution as addictive and dangerous, with an "increased need for more and more of the solution")
- *Faster is slower* ("When growth becomes excessive[14] […] the system itself will seek to compensate by slowing down")
- *Cause and effect are not closely related in time and space* (linked to the first and third points above)
- *Small changes can produce big results _but the areas of highest leverage are often the least obvious* ("they are not close in time and space to problem symptoms")
- *You can have your cake and eat it too _but not at once* (some dilemmas "are artefacts of 'snapshot' rather than 'process' thinking [… but] both can improve over time")
- *Dividing an elephant in half does not produce two small elephants* (understanding requires seeing the whole system, "leverage lies in interactions that cannot be seen from looking only at the piece you are holding"[15])
- *There is no blame* ("there is no outside […] you and the cause of your problems are part of a single system. The cure lies in your relationship with your 'enemy' ")

[10] p. 50
[11] p. 58
[12] For example, a too aggressive marketing to tourists can bring them in temporarily, at the cost of other, more fundamental developments… The quality of services declines, and in the long run, the more is spent on aggressive marketing, the more tourists the city loses.
[13] feedbacks will be described later on…
[14] for example urban sprawl, or the growth in number of tourists…
[15] p. 67

In systems thinking, *feedback* is a broad concept. It means any reciprocal flow of influence[16]. In systems thinking it is an axiom that every influence is both cause and effect. Almost nothing is ever influence in just one direction. It helps people to draw feedback loops, and to distinguish "reinforcing" from "balancing" feedback ("positive"/"accelerating snowball effect" and "negative"/"stabilizing resistance to change" feedback loops, respectively), also taking delays into account (interruption between an action and some of its consequences within a feedback loop).

Senge discerns *detail*[17] from *dynamic* complexity _the latter are situations where cause and effect are subtle, and where the effects over time of interventions are not obvious. He argues that conventional forecasting, planning, and analysis methods are not equipped to deal with dynamic complexity. He highlights that when the same action has dramatically different effects in the short-run and in the long-run, there is dynamic complexity. When an action has one set of consequences locally and a very different set of consequences in another part of the system, there is dynamic complexity. When obvious interventions produce non-obvious consequences, there is dynamic complexity.

The systems viewpoint is generally oriented toward the long-term view, and toward the expanded and non-obvious consequences of actions. 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"[18].

Reinforcing/balancing feedbacks and delays are the building-blocs of systems archetypes[19]. The archetypes help us develop an awareness of the structures within which we operate: Systems archetypes are generic structures which embody the key to learning to see structures in our personal and organizational lives. They "will always suggest areas of high and low-leverage change"[20]. Senge introduces several fundamental archetypes, such as *limits to growth* and *shifting the burden*[21]. When discussing each archetype, Senge illustrates the guiding structure, and the resulting behavior (or pattern) generated. He also highlights where in the system resides the leverage point(s).

- *Limits to growth:* "A reinforcing (amplifying) process is set in motion to produce a desired result. It creates a spiral of success but also creates inadvertent secondary effects (manifested in a balancing process) which eventually slow down the success."[22] Pushing harder reinforces the balancing process. But there is another solution than giving up the original goal: it is to look into the balancing process itself, identify and change the limiting factor. But "there will always be more limiting processes [and] growth eventually will stop."[23]
- *Shifting the burden:* "An underlying problem generates symptoms that demand attention. But the underlying problem is difficult for people to address […] so people 'shift the burden' of their problem to other solutions […] which seem extremely efficient [but] only ameliorate the symptoms; they leave the underlying problem unaltered [and it even] grows worse, unnoticed [until the next crisis] and the system

[16] "circles of causality" (p. 73-76)
[17] Detail complexity does not help: "for most people 'systems thinking' means 'fighting complexity with complexity', devising increasingly 'complex' (we should say 'detailed') solutions to increasingly 'complex' problems. In fact, this is the antithesis of real systems thinking." (p. 72)
[18] p. 73
[19] The archetypes are presented in chapter 6 (p. 93 to 113) and in appendix 2.
[20] p. 95
[21] The archetypes are best understood with diagrams. I can thus photocopy some of them and hand them to you as appendices to this review… upon request (allow a few days after requesting by email).
[22] p. 95
[23] p. 102

loses whatever abilities it had to solve the underlying problem." [24] The system is made of two balancing processes (one short-term and one long-term _because delayed) and of a 'snowball' reinforcing process from the short-term 'solution' affecting the long-term solution (which is often a process of addiction to the symptomatic solution). The appropriate solution is to strengthen the fundamental response *and* weaken the symptomatic response. This "requires a long-term orientation and a sense of shared vision."[25] Indeed, to be effective in a learning organization, systems thinking has to be complemented by 4 other disciplines. Senge turns to them in the third part of his book.

Part III: "The core disciplines: building the learning organization"

Personal Mastery[26]:

"Personal mastery is the discipline of continually clarifying and deepening our personal vision."[27] Basically, "organizations learn only through individuals who learn."[28] People need to be motivated, their concerns for their "higher order needs, self-respect and self-actualization", being valorised. Personal mastery, which should be fostered at all levels in the organization (in city-organizations in our case, including community-centres), "means approaching one's life as a creative work. [It] embodies two underlying movements […] continually clarifying what is important to us [_having a personal vision_] [and] continually learning how to see current reality more clearly." [29] Juxtaposing the two creates a *creative tension*.

- *Personal vision*: this means "the ability to focus on ultimate intrinsic desires, not only on secondary goals"[30]. It is different from 'purpose' (a general heading): "Vision is a specific destination, a picture of a desired future. Purpose is abstract. Vision is concrete." Both are necessary[31], in a "process of continually focusing and refocusing" the vision.
- *An accurate, insightful view of current reality is as important as a clear vision*. Creating is achieved through working with constraints.
- But the creative tension can be undermined by *structural conflict:* the belief in our powerlessness or unworthiness. Practically all of us have a "dominant belief that we are not able to fulfil our desires."[32] The solution here is "a relentless willingness to rout out the ways we limit or deceive ourselves […] and to continually challenge our theories of why things are the way they are."[33]

Personal mastery is essential to systems thinking: "As individuals practice the discipline of personal mastery, several changes gradually take place within them […] subtle and often unnoticed […] especially: integrating reason and intuition; continually seeing more of our connectedness to the world [closing the feedback loops]; compassion [undermining blame and guilt]; and commitment to the whole [beyond self-interest]."[34]

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[24] p. 104
[25] p. 111
[26] Chapter 9 (p. 139-173)
[27] p. 7
[28] p. 139
[29] p. 141
[30] p. 148
[31] As "a vision wit no underlying sense of purpose, no calling, is just a good idea [and] purpose without vision has no sense of appropriate scale." (p. 149)
[32] Quoting Robert Fritz, p. 156
[33] p. 159
[34] p. 167

There is no way to force people into personal mastery, but it can be encouraged, especially by being oneself committed to it. Personal mastery works better when combined with building shared mental models and shared visions…

Mental models[35]:

"Mental models are deeply ingrained assumptions, generalizations, or even pictures or images that influence how we understand the world and how we take action. […] The discipline of working with mental models starts with turning the mirror inward; learning to unearth our internal pictures of the world, to bring them to the surface and hold them rigorously to scrutiny."[36] This discipline is of an obvious interest in the context of changing organizational climate, as Noordman calls for.

"One thing all managers know is that many of the best ideas never get put into practice […] new insights fail to get put into practice because they conflict with deeply held images of how the world works, images that limit us to familiar ways of thinking and acting. That is why the discipline of managing mental models _surfacing, testing and improving […]_ promises to be a major breakthrough"[37]. The problem with mental models is that they are *tacit*, below the level of awareness, and thus remain unexamined, and thus unchanged whereas the world around is changing. "The inertia of deeply entrenched mental models can overwhelm even the best systemic insights."[38] Moreover, "we trap ourselves […] in 'defensive routines' that insulate our mental models from examination, and we consequently develop 'skilled incompetence' "[39].

Several skills can help unearth mental models. These skills can change the way we behave in conversations[40] "so that conversations can produce genuine learning, rather than merely reinforcing prior views."

- Recognizing leaps of abstraction (recognizing our jumps from observation[41] to generalization by "slowing down our own thinking processes"[42])
- Exposing the 'left-hand column' (articulating what we normally do not say; this especially shows "how we undermine opportunities for learning in conflictual situations"[43])
- Balancing inquiry and advocacy[44] (*when advocating*: make your own reasoning explicit, encourage others to explore your view, encourage others to provide different views, actively inquire into others'views that differ from your own; *when inquiring*: State your assumptions clearly, state the data upon which your assumptions are based, be genuinely interested in others' responses or forget about it all)
- Facing up to distinctions between espoused theories (what we say) and theories-in-use (the implied theory in what we do)

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[35] Chapter 10 (p. 174 to 204)
[36] p. 8-9
[37] p. 174
[38] p. 177-178
[39] p. 182 (after Chris Argyris)
[40] Here conversations acquire an utmost importance, as in the claims of Klamer about the role of 'conversation' in social interactions (although in the case of Klamer *conversation* has almost the same meaning as *interaction*).
[41] Here I would comment that Senge is a bit naïve, if he thinks that *inductive observation* could exist at all. It is well known now that Carnap's inductivism is no serious claim, and that there is no possibility of genuine innocent observation.
[42] p. 191
[43] p. 197
[44] Because "advocacy without inquiry begets more advocacy [in an] escalation [that makes positions entranched. But] pure inquiry is also limited [it] can be a way of avoiding learning _by hiding our own view behind a wall of incessant questioning." (p. 198-199)

To institutionalize these skills, we need mechanisms that make them unavoidable. Senge proposes various solutions, including "recasting traditional planning as learning and establishing 'internal boards of directors' " bringing several levels together. In cities, that would require inter-institutional discussion-boards cutting across hierarchies and sectoral branches[45]. Some principles are to be respected: "Don't impose a favored mental model on people […] Multiple mental models bring multiple perspectives to bear […] Groups add dynamics and knowledge beyond what one person can do alone. The goal is not congruency among the group […] Leaders' worth is measured by their contribution to others' mental models […] People are more effective when they develop their own models"[46]. The disciplines of team learning and mental models are interwoven…

Shared vision[47]:

To "bind people together around a common identity and sense of destiny […] the practice of shared vision involves the skills of unearthing shared "pictures of the future" that foster genuine commitment and enrolment, rather than compliance."[48] It is clear here that building shared vision is essential to shaping the identity and the image of a city[49].

"A shared vision is not an idea. […] It is, rather, a force in people's hearts […] It is palpable. [It] is the answer to the question, 'What do we want to create?' [and it] is vital for the learning organization because it provides the focus and energy for learning."[50] Why is a shared vision essential for developing a sustainable city-management? "It may simply not be possible to convince human beings rationally to take a long-term view. People do not focus on the long term because they have to, but because they want to."[51]

The discipline of building shared vision "extends principles and insights from personal mastery into the world of collective aspiration and shared commitment […] Shared visions emerge from personal visions. [Thus the first goal is to] continually encourage members to develop their personal visions."[52]

Senge uses the metaphor of the hologram: "If you divide the hologram, each part shows the whole image intact […] But the component 'pieces' of the hologram are not identical. Each represents the whole image from a different point of view. [But with the whole hologram] the image becomes more intense, more lifelike. When more people come to share a common vision, the vision may not change fundamentally. But it becomes more alive, more real in the sense of a mental reality that people can truly imagine achieving. They now have partners, 'cocreators' "[53].

Shared visions take time to emerge, through ongoing conversations where we "learn to listen to each other's dreams."[54] It means more than achieving *compliance* (following the letter of the vision, doing everything expected), if possible more than *enrolment* (doing "whatever can be done within the spirit of the law"). It means achieving *commitment* (creating whatever laws are needed, with energy, passion and excitement, willing to turn around any obstacle).

Vision is the *what*, which is combined with the *why* (common purpose, mission) and the *how* (core values). Vision is the central key in this perspective, being always subject to creative tension (as much as for personal mastery). Also, vision must be managed through a

[45] As also argued in ed. Nyström, *City and Culture.*
[46] p. 190
[47] Chapter 11 (p. 205 to 232)
[48] p. 9
[49] Thus the insights given here are relevant for the second part of your book too.
[50] p. 206
[51] p. 210
[52] p. 211
[53] p. 212
[54] p. 218

capacity to harmonize diversity and to hold creative tension (looking at reality, through a systems thinking perspective _necessary to prevent hollow, event-driven vision-statements). This is why joint inquiry is so important, and why team learning must be developed.

Team learning[55]:

"The discipline of team learning starts with "dialogue," the capacity of members of a team to suspend assumptions and enter into a genuine "thinking together." […] (Dialogue differs from the more common "discussion," which has its roots with "percussion" and "concussion," literally a heaving of ideas back and forth in a winner-takes-all competition.) […] Team learning is vital because teams, not individuals, are the fundamental learning unit in modern organizations. […] Unless teams can learn, the organization cannot learn."[56]

This corresponds to "a phenomenon we […] call 'alignment', when a group of people function as a whole. […] A commonality of direction emerges [bringing] synergy [and this is no less than] the necessary condition before empowering the individual will empower the whole team"[57]. Team learning is fundamentally a collective discipline.

The practice of the *dialogue* as defined by David Bohm is essential. For Bohm, *dialogos* is "a free flow of meaning between people, in the sense of a stream that flows between two banks […] The purpose of dialogue is to reveal the incoherence in our thought"[58]. Senge adds: "In dialogue people become observers of their own thinking. […] If collective thinking is an ongoing stream, 'thoughts' are like leaves floating on the surface that wash up on the banks. We gather in the leaves [and] misperceive [them] as our own, because we fail to see the stream of collective thinking from which they arise."[59]

Bohm identified three basic conditions for dialogue: "All participants must suspend their assumptions, literally to hold them as if suspended before us; all participants must regard one another as colleagues [to suspend the vulnerability and acknowledge the mutual risk that each takes in opening oneself to inquiry]; there must be a facilitator who holds the context of dialogue.[60]" "Great teams are not characterized by an absence of conflict […] In great teams conflict becomes productive"[61]. A learning team is also able to identify *defensive routines* and turn them into a signal showing where learning is not occurring for each member. "It is not the absence of defensiveness that characterizes learning teams but the way defensiveness is faced."[62]

Team learning is a team skill, learning how to learn together. It requires room for practice and experimentation: practicing dialogue-sessions and creating "learning laboratories".

Team learning is interwoven with systems thinking, which provides a new language for thinking complexity, beyond the linear cause-effect thinking pattern of each individual. Each member brings his own vision of a cause-effect chain to the common pot where the reality of complex interconnections and patterns is realised. Team learning must thus include conversations about systems archetypes.

Part IV: "Prototypes"

[55] Chapter 12 (p. 233 to 269)
[56] p. 10
[57] p. 234-235
[58] p. 240-241, quote from Bohm.
[59] P. 242
[60] p. 243
[61] p. 249 (From now on, back to Senge himself)
[62] p. 257

Here Senge discusses problems arising in prototype organizations where his five disciplines have been tried out. This part is useful but less essential, thus we will quickly review its main relevant issues:

- "How can the internal politics and game-playing that dominate traditional organizations be transcended?"[63]… (I have to comment here that it is unfortunate that Senge has such a simplistic and negative definition of *politics* and the *political environment*, as so many management-scholars it seems; by following 'public choice' economists' assumption of self-interested bargains of power, they lose most of the substance of political interaction _but let's go on with this incredibly simplistic definition of politics…) To challenge the grip of internal power-struggles and to bring attention back from the *who* to the *what*, Senge insists on building shared vision (establishing a sense of trust) and openness (*participative openness*: speaking openly; **and** *reflective openness*: challenging one's own thinking _which needs the skills of the five disciplines and thus involves a delay).
- How to distribute responsibility widely and still retain coordination and control? Rather than control behaviour, learning organizations "invest in improving the quality of thinking"[64] and people indeed learn better when they are responsible for their actions. Yet there is no guarantee that local decision will be wise decision. One control lies in fostering common identity. Another issue is that the local level may not be able to perceive the global system appropriately[65] nor to act towards long-term. Signals and incentives can be designed to correct that. But most important, the central managers remain responsible for identifying these common issues, becoming "*manager as researcher and designer* […] understanding the organization as a system and understanding the external and internal forces driving change [and designing] the learning processes whereby managers throughout the organization come to understand these trends and forces."[66]
- "How do managers create the time for learning?" Learning takes time. Senge criticizes managers for wasting too much time on simple short-term issues instead of addressing complex, more fundamental underlying issues (and leaving the first ones to others).[67] He unfortunately doesn't give any further clue to time-management
- "How can we learn from experience when we cannot experience the consequences of our most important decisions?"[68] We learn best through trial and error. Senge describes tools for simulations: *microworlds* (using specific software), creating "a microcosm where it is safe to play". Microworlds compress time and space This can "accelerate organizational learning […] surfacing hidden assumptions, especially those lying behind key policies and strategies, discovering their inconsistency and incompleteness, and developing new, more systemic hypotheses […] In microworlds, the space of action can be slowed down or speeded up […] to see more clearly the long-term consequences of decisions [or] slow down […] interpersonal interactions and thought processes"[69]. In simulations, variables are controlled: some can be eliminated, and other not-yet-realized variables can be brought in. Thus, a wide range of hypotheses can be tested, offering the possibility of "creating alternative future realities."[70]

[63] p. 273 to 286 (chapter 13)
[64] p. 289
[65] as in the archetype of *the tragedy of the commons* (p. 294 to 298)
[66] p. 299
[67] p. 303 to 305
[68] Chapter 17 (p. 313 to 338)
[69] p. 335
[70] p. 338

Part V: "Coda" (a conclusion)

Senge wonders whether other disciplines will build up in the future, adding up to the five ones described here and which he sees as a foundation for the future. Especially, he puts trust in delegating tasks to the subconscious: detailed complexity is too wide to be grasped by us consciously (because of our cognitive limitations), but the subconscious is able to manage complex tasks (such as driving a car). This ability of the subconscious grows out of training (think of the example of learning to drive a car and slowly passing it on to the subconscious). This can free our conscious mind to move on to learning a new task.

The subconscious is programmed by cultures, beliefs, language (for its form and structure[71]) and by practice (as the example above shows). Senge hopes that the learning organizations will foster a great change in the way we all think, bringing systems thinking to the subconscious. Achieving that would need a lot of practice (in microworlds) and mastering the systems language (through articulating archetypes). But it seems to be worth the effort, especially if we want to contribute to the sustainable development of cities with an integrated city-management perspective.

[71] see Saussure and structuralist linguistics here (the school of Prague, Roman Jakobson)…