Sustainability, Systems and Meaning

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ABSTRACT

Sustainability calls for the globe as a relevant unit of analysis, and systems thinking is an appropriate theoretical framework for this task. Yet systems thinking is employed in two contrary ways. The 'accommodating' systems approach is closely linked to the classical concept of science. It bases its credibility on the exclusion of values or any other subjective elements. The 'creative' way explicitly requires a subjectively recognised leading principle, according to which the system organises itself. Following the 'creative' approach, the paper argues that sustainability should be interpreted as a quest for conscious adoption of a global systems identity. It is this assigned system purpose that gives single actions and judgements within systems their meaning. Since subjective elements will always remain antagonistic in any classical approach, only a 'creative' approach offers possibilities for integrating cybernetic systems thinking, giving rise to a concept of systems guided by meaning.

KEYWORDS

Sustainability, systems identity, meaning, artificial outside position

INTRODUCTION

The world is increasingly conceived as a set of co-evolutionary systems (Capra 1996; Norgaard 1994; Riedl 1985). At the same time, more and more systems thinking is employed, yet in two very distinct, even contrary ways: the 'accommodating' and the 'creative' ways (Fuenmayor 1997). The 'accommodating' way sees systems theory as a device for modelling non-linear behaviour within given or principally known environments and structures. Accommodating cybernetic systems theory is therefore primarily concerned with the identification of structural thresholds of current system structures, and with the capacity of systems to accrue and interpret information, and it focuses on the feed-back

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of information within existing evaluation- and guiding structures (Checkland 1993; Pessa et al. 1996). Following the classical approach of science, accommodating systems theory bases its credibility on empirical studies and the exclusion of values or any other subjective elements. It is therefore bound to determine the 'objective' definition and structure of any system in question.

Yet systems rarely reveal themselves objectively. They are subjectively recognised, they might not even 'exist', ontologically speaking (King 1993; Rowe 1989; Funtowicz and Ravetz 1993). Systems theory should therefore be conceived as an epistemologically derived ontological perspective, a suitable construct to talk about the world in its totality (Funtowicz and Ravetz 1994). Following this basic premise the 'creative' systems approach, e.g., critical (Churchman 1979) and co-evolutionary systems theory (Norgaard 1994), explicitly holds that there is no neutral position to take refuge in. Furthermore, critical systems theory claims that, next to the individual aspect in defining any system, plurality and self-organisation are no ends in themselves. Plurality and self-organisation have to make sense. For the 'creative' approach it is thus a functional necessity of responsible human behaviour to assign systems an organising system purpose or identity. This identity will be reflected by the behaviour of the system and vice versa. The 'creative' strand focuses therefore on the quality of relations among and between systems, as well towards their respective environments, and on the resulting weblike structure. It examines also the schemes used in evaluating the potential of systems beyond currently existing structures, and finally, the meta-concepts according to which the various degrees of freedom are recognised (Churchman 1979; Norgaard 1994: 92; Boulding 1981; Schütz 1997a). In the following I shall argue that the quest for sustainability should be interpreted as the challenge of specifying a guiding concept for a creative systems approach on a global scale.

MAKING SENSE OF PLURALITY AND SELF-ORGANISATION

Regarding human systems or systems substantially influenced by human beings, currently there are three main strategies employed in systemic reasoning in dealing with diversity and heterogeneous interests. The first is to consider self-organisation an end in itself, and thus not to interfere with any self-organising process taking place (Leopold 1949; Luhmann 1982; Hayek 1972). The second is to integrate the wide variety of interests into one common denominator or process leading to a unique solution, be it by virtue, by majority voting or by market processes (Feldman 1980; Bossel 1996). And finally, we may observe and influence systems by multi-dimensional sets of indicators (Bossel 1998). All approaches have their specific merits, but all lack a diversity maintaining and integrating point of view (Schütz 1999, 1997b).

The necessity for an integrative co-ordinating element in systems theory may be recognised by looking at autopoiesis (Maturana and Varela 1980). The key element, and the new quality autopoiesis introduces into the scientific explanation of the world, is the capacity of a living system to react, to influence, and to establish relationships with its surroundings (Mingers 1995; Capra 1996). If an object or a system wants to relate, it must be able to read and to evaluate its surroundings in the energy-matter plane (Maturana and Varela, 1980). To do so, it must have the capacity to realise itself as being different from its environment, and it must have a notion of its system limits. But realising and establishing one's outer border requires an identity concept. A system thus needs both senses and the capacity to make sense out of the stimuli it perceives. For analytical purposes we may therefore differentiate any autopoietic system into three planes, the physical, the informational, and the identity plane (Fig. 1).

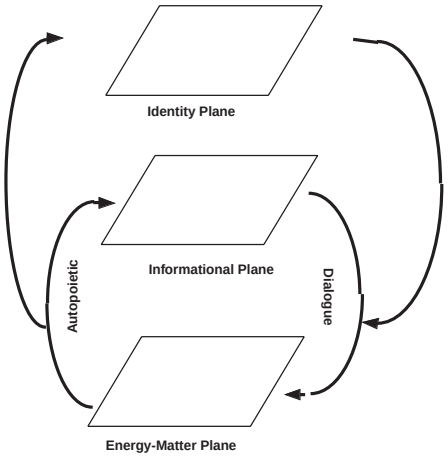

FIGURE 1. An Analytical Structure for Autopoietic Systems

Besides the precisely measurable objects and fluxes within the physical plane, there exists a set of relations within an informational plane that organises the physical reaction and controls the energetic and material fluxes between objects, groups and their environment. Both planes are connected through a circular feedback structure, the 'autopoietic dialogue' (Schwarz 1996). Yet autopoiesis and self-organisation imply more. A system may cease to exist not only if it cannot adjust to changing circumstances, but also if it cannot integrate any partial differentiation taking place. In the latter case a system may either

simply fall apart, or become 'something else', being forced to change its identity. Thus, if a system has any freedom to decide, it must have at least implicitly a notion of its overriding identity. By partially guiding the action of a system, the identity concept thus shapes the appearance and the role of the system both in the material as well as in the informational plane. Following critical systems theory (Churchman 1979), it seems safe to assume that, especially for human systems, organisational relationships not only reflect the laws of the physical plane, but also a unique, though arbitrary element of choice contained in the identity plane (Schütz 1997b, 1996).

SYSTEMS GUIDED BY MEANING

The price for the additional analytic dimensions as portrayed above is obviously the loss of an indisputable viewpoint in scientific analysis. The multitude of interconnected circular causal structures and the necessarily empirically evasive concept of identity open up a vast array of potential starting points for argumentation. One may argue that the metabolic processes in the physical plane continuously create a relational network and the identity of a system. With equal logical justification one may argue that an identity expresses itself via relational sets within the physical world. Philosophers have been trying for ages to resolve this dispute and to determine the correct starting point, but apparently with no success (Russell 1945). For the majority of scientists the capacity to recognise and the capacity to handle material or energy flows simply co-emerge simultaneously within the physical world (Maturana and Varela 1980; Capra 1996). According to this view the various planes may be identified during analysis. The identity plane and its content may also vary according to the capacities of a system to be aware and conscious; however, any perceived systemic identity must originate from the physical sphere. In that way autopoiesis is very well compatible with traditional concepts of natural science (Capra 1996), and one may interpret consciousness, for example, as an epiphenomenon of a minimising process consuming negative entropy performed by the physical body, or the neurological system including the brain, or its neurological ego called the mind.

This might be a valid position, in a world without choice. Either it is all chance or in the genes (Monod 1971). Or it is as in synergetics (Haken 1978), where non-physical elements of identity are not relevant for organisation or even existence within the energy-matter plane. But if systemic existence simultaneously required non-physical elements of identity, what then? What should we do in selection processes of human beings regarding feasible behaviour within the biosphere, or whenever culturally designed systems are established? In all these cases the identity concept plays a crucial role in 'co-creating' the world. The identity concept fulfils two important functions. First, at the systems level, it serves as the final criterion for balancing the various interests of the system

elements against each other, and concerning the interests of the system itself. Second, even if current scientific knowledge will subsequently be directed to specific problems and options of the system, it is the identity concept that decides whether or not the system should turn its attention towards a specific issue. The identity concept seems to be a central key to 'everything'; a key to our personal life, to society, to the biosphere, and to a science for sustainability. Sustainability thus asks for nothing less than an expansion of our personal identity, ideally towards a global one.

Such a concept has been already comprehensively argued, both with a spiritual dimension (Buber 1923; Teilhard de Chardin 1961; Schweitzer 1984; Boulding 1991; Deng 1993; Storm 1994) as well as without one (Vernadsky 1945; Naess 1973; Bateson 1979; Stokes 1992; Capra 1996). The suggestion is that the conscious widening of one's identity may point the way towards determining a working hypothesis for a global system's identity called 'sustainability'. The main reason for this argument is twofold. First, since we not only have the power to design new systems, but implement them, our intentions will shape the 'real' world. Second, despite incomplete knowledge we are forced to connect the bits and pieces we perceive. We have to 'make sense' of the world. The structure and the content of these bridges across 'blank ground' are the blueprint and the cornerstones in this process. We 'make sense', or we 'create meaning'. Even if we might not be aware of it, we do this all the time. We even refer to co-ordinated processes across all three analytic planes as 'meaningful' behaviour. Thus by using our free will, by assigning a certain identity to a system and by securing a continuous interrelated flow of information across all three analytical planes, we let meaning come alive. It is in this sense, that we can think of systems as being guided by meaning. Meaning as an integrative explicit and implicit answer to Why, What, and How; a synthesis of understanding the world including and beyond (natural) science; a balanced answer between individual freedom and systemic requirements, defining the concept of the limits one places upon him- or herself. Meaning as an important prerequisite for current and future system states, for pursuing unknown paths, for unleashing unknown creative potential, and as a general guideline for human behaviour (Schütz 1999). With respect to human systems, meaning may thus be considered as the crystallisation point for integration.

SCIENCE AND MEANING

The situation is somehow one of paradox. The drive to enlarge the field of science in order to widen the base for objective knowledge has effectively undermined the possibility of achieving objective knowledge at all. By defining broadly enough the outer limits of a system we belong to, it becomes, even in an ontological perspective, impossible to adopt an objective outside position. Thus

the notion of a pristine scientific observer is no longer applicable to the study of self-organising systems that involve human beings. How can we nevertheless responsibly evaluate and decide, without an objective outside point of reference? One possibility is to question the relevance of the problem altogether, either from a position of ignorance or from a pretension of universal understanding. In both cases any material version of the world is as good as any other one. Another possibility is to construct an artificial outside position. If we pursue this latter path, at least three potential avenues emerge.

First, let us consider self-organisation an end in itself. With respect to society this calls for minimal interference with individual decision making, except for existential thresholds. Especially, no restriction is allowed of individual freedom due to superimposed integration or system purposes (Hayek 1972). Yet this 'status-quo-approach' is incompatible with the previously sketched principles of 'creative' systems thinking. Second, let us construct an artificial outside position, and base it upon 'spiritual insights'. This will certainly provide orientation and will definitely prescribe integration rules, but it would effectively transfer immense power to 'real' or self-ordained spiritual leaders. Third, let us acknowledge both the necessity of integral considerations for systems severely influenced by human beings, and the impossibility of scientific proof of any position taken. In this case we must consciously discuss, and perhaps agree on, and thus assign certain purposes to the systems we create or belong to.

The biggest challenge for science is certainly the fact that if we are unable to adopt an objective outside position, any holistic concept necessarily includes non-provable elements. Conventional science thinks there is no need for any such unprovable integrating concept. This is wrong. Decisions under principal ignorance (Shackle 1972) can never be reduced to technical selection processes only. On the contrary, any conscious decisions taken under these conditions implicitly describe the 'closing links'. Instead of turning away, it seems wise to accept the existence of 'objective' physical and 'subjective' non-physical elements within the identity plane of any system, and consciously to utilise this duality in scientific reasoning with respect to holistic issues. More and more evidence urges us to realise that there is no unique reality out there to discover, neither a unique 'Gestalt' nor a unique process. There is no indisputable unique solution to discover; only a potential to be determined and to be used in order to create a process, a way towards a vision of identity. A science of sustainability should thus help to identify the relevant issues and sketch out the complementary relationship between How, What, and Why as a basis for theoretical argumentation. The new scientific concepts we have to develop must thus be able to deal with, though not solve, real unpredictability, the creative potential of human beings, responsibility, orientation, and knowledge at the same time. Questions about an appropriate time perspective, an appropriate point of view, about the evaluation of a specific state as good or bad, are equally important for our future as the question whether we are right or wrong in conventional scientific terms.

Not that objectivity should be disregarded, but it is not sufficient. Systems are just not ontologically given.

Finally one may ask, if there is no substantial final truth to discover any more, only relational principles of the physical plane, which are not sufficient to understand a value-conscious system, why are non-physical based elements in scientific reasoning so discredited? Is it the fear of following the 'wrong' truth? The fear of being dominated, once again? Luhmann (1987), a leading social scientist using the concept of autopoietic systems, has dismissed the whole issue of identity and meaning, even though he admits that a realisation process of being different presupposes an identity concept. In his view any inquiry into identity prior to recognition would sooner or later only repeat Hegel's endeavour to conclusively determine the 'Weltgeist'. And this would be dangerous, since the quest for the 'correct' interpretation has only brought about right and left dictatorships (Luhmann 1989: 32). Luhmann's concern is certainly justified, but it is more the fear of dictatorship than a substantial argument against the identity concept of systems that leads Luhmann to reject the notion of a conscious decision for a certain holistic concept. It is therefore important to point out that the call for a system purpose is tolerable only in an atmosphere of tolerance. Assigning a purpose to a system within the theoretical framework presented so far must not be confused with the attempt to determine conclusively any objective purpose. It does not exist, yet its specification is sometimes inevitable. Any purpose assigned to a system is therefore inherently relative, both substantially and timewise. The process of consciously adopting an identity may be compared with growing up. One must be able to decide what one wants to do, and coherently to restrict oneself if necessary according to the system purpose one recognises and assigns (Schütz 1990, 1996). At the same time one should also be aware that any purpose is only one of numerous other possibilities.

CONCLUDING REMARKS

Our western societies seem to find it extremely difficult to accept all entailing consequences of an unbound systemic world view. This becomes very obvious, if we look upon the obligations a political individual must fulfil. One might say that by following the concept of the Modern, our cultures have transformed various hierarchical structures into weblike structures without obvious centres. These transformations have spread power from the head of hierarchical structures to the elements of web-like structures. From a systemic point of view the organisational changes did not only transfer power, they simultaneously transferred the necessity to hold a holistic point of view from the head-position of former hierarchical structures to each and every element of the net.

Yet while it is undisputed that any head of a hierarchical structure must hold a holistic perspective, our current cultural concept refutes the necessity of

holding a common holistic perspective at the elementary level. And according to Luhmann (1986, 1987) we are not even capable of adopting a total perspective anyway. Instead, many deplore the losses associated with these transformations; e.g. Habermas (1985) deplores the lack of orientation, and Beck (1988) deplores the diffusion of responsibility. Only very few stress the creative potential these transformations have endowed us with, and the chances they may hold for our future (Ray 1996).

But do we really have the option to refuse developing a 'total' perspective? Historical experience seems to suggest that any disintegrating forces set free within a system will not automatically be sufficiently counterbalanced by integrative forces. For me, it becomes increasingly apparent that our current western societies err in that respect. The historically unique combination of liberation of the individuals from patronising regulations through churches, absolutism, nationalism, or other political ideologies, and the institutionalisation of a dominating economic market system based upon individual preferences have weakened the integrative forces of society to such an extent, that disintegration started to take place. How much longer can we do without counterbalancing integral elements? To admit that one does not know what to do is noble, but it should not be used as a refuge for doing nothing. We may be 'wrong' with our ideas, but we are forced to decide and to adopt a guiding concept, even though there is no way of knowing.

REFERENCES

Bateson, Gregory 1979. *Mind and Nature. A Necessary Unity*. London: Wildwood House.

Beck, Ulrich 1988. *Gegengifte. Die organisierte Unverantwortlichkeit.* Frankfurt: Suhrkamp.

Bossel, Hartmut 1996. 'Deriving indicators of sustainable development', *Environmental Modeling and Assessment* **1**: 193–218.

Bossel, Hartmut 1998. *Globale Wende*. München: Droemer.

Boulding, Kenneth E. 1981. *Evolutionary Economics.* Beverly Hills: Sage.

Boulding, Kenneth E. 1991. 'What do We want to Sustain? Environmentalism and Human Evaluations', in R. Costanza (ed.) *Ecological Economics*, pp. 22–31. New York: Columbia University Press.

Buber, Martin 1923. *Ich und Du*.

Capra, Fritjof 1996. *Lebensnetz.* Bern: Scherz.

Checkland, Peter 1993. *Sytems Thinking, Systems Practice.* Chichester: Wiley.

Churchman, C.West 1979. *The Systems Approach and its Enemies.* New York: Basic Books.

Deng, Ming-Dao 1993. *Chronicles of Tao*. San Francisco: Harper.

Feldman, Allan M. 1980. *Welfare Economics and Social Choice Theory*. Boston: Nijhoff.

Fuenmayor, Ramsés 1997. 'The Historical Meaning of Present Systems Thinking', *Systems Research* **14**: 235–48.
Funtowicz, Silvio and Ravetz, Jerome 1993. 'Science for the post-normal age', *Futures* **25**: 739–55.
Funtowicz, Silvio and Ravetz, Jerome 1994. 'The worth of a songbird: ecological economics as a post-normal science', *Ecological Economics* **10**: 197–207.
Habermas, Jürgen 1985. *Die neue Unübersichtlichkeit*. Frankfurt: Suhrkamp.
Haken, Hermann 1978. *Synergetics*. Berlin: Springer.
Hayek, F. A. von 1972. 'Die Theorie Komplexer Phänomene', in Walter-Eucken-Institut (ed.) *Vorträge und Aufsätze*, pp. 7–38. Tübingen: Mohr.
King, A. W. 1993. 'Considerations of Scale and Hierarchy', in S. Woodley, J.J. Kay and G. Francis (eds) *Ecological Integrity and the Management of Ecosystems*, pp. 19–46. Delray: St. Lucie Press.
Leopold, Aldo 1949. *A Sand County Almanac*. New York: Oxford University Press.
Luhmann, Niklas 1982. 'Autopoiesis, Handlung und kommunikative Verständigung', *Zeitschrift für Soziologie* **11**: 366–79.
Luhmann, Niklas 1986. *Ökologische Kommunikation*. Opladen: Westdeutscher Verlag.
Luhmann, Niklas 1987. *Soziale Systeme. Grundriss einer allgemeinen Theorie*. Frankfurt: Suhrkamp.
Luhmann, Niklas 1989. 'Ökologische Kommunikation', in J. Fischer (ed.) *Ökologie im Endspiel*, pp. 31–7. München: Fink.
Maturana, Humberto R. and Varela, Francisco J. 1980. *Autopoiesis and Cognition.* Boston: Reidel.
Mingers, John 1995. *Self-producing Systems: Implications and Applications of Autopoiesis.* New York: Plenum Press.
Monod, Jacques 1971. *Zufall und Notwendigkeit.* München: Piper.
Naess, Arne 1973. 'The Shallow and the Deep, Long-Range Ecology Movement: A Summary', *Inquiry* **16**: 95–100.
Norgaard, Richard B. 1994. *Development Betrayed*. New York: Routledge.
Pessa, E., Penna, M. and Montesanto, A. (eds) 1996. *Third European Congress On Systems Science*. Rom: Kappa.
Ray, Paul 1996. 'The Great Divide', *YES! A Journal of Positive Futures* ß2: 55.
Riedl, Rupert 1985. *Die Spaltung des Weltbildes*. Berlin: Parey.
Rowe, J. S. 1989. 'What on Earth is Environment?', *Trumpeter* **6**: 123–6.
Russell, Bertrand 1945. *A History of Western Philosophy*. New York: Simon and Schuster.
Schütz, Joachim 1990. *Die Notwendigkeit von Normen in der ökonomischen Theorie.* Regensburg: Transfer Verlag.
Schütz, Joachim 1996. 'What has Sustainability to do with Ethics?', in B. Nath, L. Hens and D. Devuyst (Eds.), *Sustainable Development Textbook*, pp. 137–57. Brussels: Free University Brussels Press.
Schütz, Joachim 1997a. 'Dreamtime Economics 101', *Human Ecology Review* **4**: 75–83.
Schütz, Joachim 1997b. *Systems Guided by Meaning.* 1st European Dialogue Conference on Science for a Sustainable Society, University of Roskilde, Denmark.
Schütz, Joachim 1999. 'The Value of Systemic Reasoning', *Ecological Economics* **31**: 23–9.

Schwarz, Eric 1996. ‘Systems Thinking, World View and Principles of Action’, in E. Pessa, M. Penna and A. Montesanto (eds) 1996. *Third European Congress On Systems Science*, pp. 255–9. Rom: Kappa.
Schweitzer, Albert 1984. *Die Ehrfurcht vor dem Leben.* München: Beck.
Stokes, Kenneth 1992. *Man and the Biosphere*. Armonk: Sharpe.
Storm, H. 1994. *Lightningbolt*. New York: Ballantine Books.
Teilhard de Chardin, Pierre 1961. *The Phenomenon of Man*. New York: Harper & Row.
Vernadsky, V. I. 1945. ‘Biosphere and Noosphere’, *American Scientist* **33**: 1–12.