Chapter 3
Linking Complexity and Simplicity

3.1 Ways of 'Seeing'

A major concern regarding the treatment of complex strategic choices is that non-intended constraining with regard to the decision space should be avoided. Therefore perceiving the strategic choice in a proper way becomes of utmost importance already in the beginning of the process that will lead towards concrete decision making. How we perceive this choice thus deserves our attention, which is the field of epistemology concerned with cognition, i.e. in our context: how can we address and get to know about the complex planning problem at hand?

The challenge arising from complexity has already been made obvious from previous chapters. The introduction of detail, dynamic and preference complexity that are types of complexities which are at least of relevance for complex foresight tells us that change being related to the strategic choice to be made can in no way be 'tamed'. Going back to Stacey's types of strategic change, the type of change will belong to the category of open-ended change and not to the categories of closed or contained change. Therefore our decision space at the beginning of the preparation of a complex strategic choice is in principle 'unbounded', which means that we cannot determine a finite set of choices that we can be certain will exhaust the choice possibilities we ought to consider. To put it more technically we cannot conduct a complete mapping of the possibilities.

Therefore, when addressing complex strategic choices we need to initially examine different 'ways of seeing', which will then set the background for the process and methodology set out later on for handling complex strategic choices. On a meta-methodological level, which is the focus in this chapter, we will refer to such ways of seeing as paradigms to be described and explained below also as epistemic lenses. Later on in the following chapter these lenses are again the background for what will be called *modes of enquiry* (MOEs). These MOEs are the first practical results to be part of the SP methodology.

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3.2 Two Epistemic Lenses Concerning Simplicity and Complexity

To deal with the issue about ways of seeing, we will make use of the viewpoints formulated by the French sociologist and philosopher of science Edgar Morin (Morin 1974, 1985; Leleur 2008).

According to Morin, we need to examine the overall research patterns made use of in scientific explanation. Since the publication of *The Structure of Scientific Revolutions* by the physicist and philosopher of science Thomas Kuhn (1962), such patterns are referred to as paradigms, so we need to address relevant paradigms. Morin says that classic scientific explanation is based on a Simplicity paradigm, prescribing that complexity in the world of phenomena should be sorted out by the establishment of simple principles and general laws. Thus, in this view, complexity is perceived as the basic mode of appearance and simplicity the underlying true essence. Not surprisingly, these considerations are exemplified by the Newtonian physics of gravity and planetary movements. The content of the Simplicity paradigm is outlined as a set of various principles which govern sound scientific endeavour: science must concern universal matters and reveal invariance. Objects are separated, but deterministic laws can be discovered which explain their behaviour. Predictability thus becomes a characterising feature. Moreover, a distance exists between the perceiving subject and the objects being perceived, so that the objects are not affected or changed in any way during the examination process. The picture coming out of this is that of an automaton with linear causality. The language of the Simplicity paradigm is one of objectivity and quantity.

It is well known—as is also the case of the recent advances in systems science and its use of analogies from non-equilibrium physics—that physics and cosmological thinking are, and have always been, major suppliers of ideas to other branches of science. It is therefore quite interesting that Morin sees the insufficiency of the Simplicity paradigm as revealed in the field of subnuclear physics, where newly discovered ephemeral particles cannot be satisfactorily described. Against this background, he argues for a Complexity paradigm to be formulated with the purpose of enriching not only natural science but also social science and the humanities. He formulates the Complexity paradigm as a set of principles to complement those in the Simplicity paradigm.

In the Complexity paradigm, focus is set upon local and unique matters instead of invariant forms of universal validity. Emphasis is given to organisation, autonomy and possibility, instead of determinism, dependence and necessity. Relating to physics, the Complexity paradigm recognises asymmetric time irreversibility as an integrated part of nature's multiplicity. Other concerns are that prediction, separation and identity have to be complemented with surprise, wholeness and individuality. Instead of subject-object relations between perceiver and an object element, subject–subject relations need to be given attention. The picture is no longer that of the automaton, but one of an organism in its broadest sense, in a context of self-organising multi-causality. The language of the

Table 3.1 The two paradigms concerning Simplicity and Complexity. Adapted from (Morin 1985, p. 19)

Simplicity paradigm	Complexity paradigm
Universality	Multiplicity
Determinism	Organisation
Dependence	Autonomy
Necessity	Possibility
Lawfulness	Self-organisation
Prediction	Surprise
Separation	Wholeness
Identity	Individuality
The general	The particular
Objects	Subject
Elements	Interactions
Matter	Life
Quantity	Quality
Linear causality	Multi-causality
The automaton	Time
Objectivity	Culture

Complexity paradigm is not objectivity and quantity, but cultural interpretation and quality. Table 3.1 shows the two paradigms as formulated by Morin.

One point being made by Morin of great relevance for our understanding of the meaning of systemic is that neither the Simplicity nor the Complexity paradigm is right per se to underpin our deliberations in a concrete decision situation, with this seen as a choice between two competing approaches—or better, meta-approaches—for validating our concepts, procedures and models.

Therefore the paradigms should not be thought of in the way that one should be adopted and not the other or vice versa; on the contrary, Morin argues that the paradigms should *complement* each other. They thus become remedies for each other: uncertainties invoked by making use of just one of these can be dealt with by adopting additional strategies for examination based on the other one.

3.2.1 The Complementarity of Simplicity and Complexity

The concepts of uncertainty and complementarity were worked upon by the physicists Werner Heisenberg and Niels Bohr in the mid-1920s. Fritjof Capra—known for his *Tao of Physics* from 1975 and also educated as a physicist—later on turned to systems science to formulate viewpoints on society and ecology in his book *The Turning Point* from 1982. Here he gives a really broad sweep of the societal aspects of putting more emphasis on wholeness and holistic approaches in medicine, energy and other sectors of society. Of particular interest in this context is the way he recalls the achievements of Heisenberg and Bohr concerning the notion of complementarity:

It was Heisenberg's great achievement to express the limitations of classical concepts in a precise mathematical form, which is known as the uncertainty principle. It consists of a set of mathematical relations that determine the extent to which classical concepts can be applied to atomic phenomena; these relations stake out the limits of human imagination in the atomic world. Whenever we use classical terms—particle, wave, position, velocity—to describe atomic phenomena, we find that there are pairs of concepts, or aspects, which are interrelated and cannot be defined simultaneously in a precise way. The more we emphasize one aspect in our description, the more the other aspect becomes uncertain, and the precise relation between the two is given by the uncertainty principle.

For a better understanding of this relation between pairs of classical concepts, Niels Bohr introduced the notion of complementarity. He considered the particle picture and the wave picture two complementary descriptions of the same reality, each of them only partly correct and having a limited range of application. Both pictures are needed to give a full account of the atomic reality, and both are to be applied within the limitations set by the uncertainty principle. The notion of complementarity has become an essential part of the way physicists think about nature, and Bohr has suggested that it might also be a useful concept outside the field of physics (Capra 1982, p. 68).

3.2.2 Systemic Thinking Further Defined

I have adopted the ideas of the Simplicity and Complexity paradigms and their complementarity as issues relevant for a first and most basic orientation towards a given complex strategic decision situation.

In the introductory Chap. 1 the concept 'systemic' was introduced as being more comprehensive and inclusive in contrast to 'systematic' described to be schematic and based on a given prefixed procedure. From the paradigm theory of Morin it becomes possible to attach a more full-fledged meaning to systematic vs. systemic, namely by seeing systemic thinking generally as rooted in the Complexity paradigm and systematic thinking—exemplifying in this respect the way that many topics are taught in the various subject curricula at universities or vocational schools—as rooted in the Simplicity paradigm. Consequently in our context, we will not see systemic thinking as isolated from systematic thinking but as unfolding from an interplay with more systematic considerations for each particular decision situation.

As a consequence systemic exploration related to strategic decision making can take on rather broad interpretations. With wholeness as just one of the constituting concepts of the Complexity paradigm—see Table 3.1—we obtain a wide basis for the explorations to be carried out relating to concepts, methods, processes, etc. This wide basis we will carry on as *two basic epistemic lenses*, each of which can frame our deliberations in a particular way.

3.3 Combining Simplicity and Complexity Thinking

A fundamental characteristic of the systemic approach is that we draw deliberately on both a simplification orientation and a complexity orientation; this means that we apply the two epistemic lenses in combination. Earlier on we stated that with

regard to complex strategic choices the decision space cannot be defined exhaustively. We therefore seek to build insight and understanding through an interaction of the two paradigms. In this context one can ask the crucial question whether such an effort can be worthwhile.

3.3.1 Towards Interaction of the 'Whole' and the 'Parts'

The answer to this question was begun in the previous chapter with the description of Luhmann's theory and the herein described complexity reduction as necessary but in principle impossible. Morin explores the meaning of complexity in the following way by stating that complexity is not just a 'surface noise of the real' making it necessary to take precautions about explanations based on 'simplification'. Necessarily these are insights to bear in mind with regard to providing decision support for complex strategic choices. In Morin's own words it is stated as follows:

> *… we must question the adequacy of all explanations based on simplification of principles. Complexity is not a surface noise of the real, but is the very principle of the real … Uncertainty, indeterminism, randomness, and contradictions occur, not as residues to be eliminated by explanation, but as non-eliminable ingredients of our cognition/perception of the real.* (Morin 1992, p. 130).

Later on he describes more closely how an interaction between the 'whole' and the 'parts' can take place:

> *… we can make a higher level of understanding based on the constructive circularity of the explanation of the whole by the parts and the parts by the whole, in which the two explanations become complementary in the movement associating them without losing their simultaneous and opposing characteristics …* (Morin 1992, p. 131).

3.3.2 Reflection-in-Action

Focusing on a practical application of theoretical insights from Luhmann and Morin, we can draw on the American organisation theorist Donald Schön, who developed a reflection-in-action inquiry that deals with learning processes at individual and group level (Schön 1983). In Chap. 4 we will explore the role learning processes can play within the systemic approach by making use of the brothers Hubert and Stuart Dreyfus's five-step learning model.

It is a striking feature that the insights contained in the theory elements from Luhmann, Morin, Schön, and Dreyfus and Dreyfus in many ways resemble each other. In this respect Schön's work seems to constitute a good and practical bridge between the general theoretical insights of Luhmann and Morin to the concrete model of learning by Dreyfus and Dreyfus, who like Schön focus on individuals' learning processes.

A fundamental idea in Schön's work is that problem understanding can successively be built-up using reassessments and new hypotheses within an interaction between what he refers to as 'reframing' and 'back-talk'. In his work reframing means the establishment of an interim framework of understanding, while back-talk relates to the specific feedback that is obtained using the actual framework of understanding (applied to either a problem area through practical investigation or in conversation with a person). Hansen and Kolmos (1998, p. 4) give the following understanding of Schön's reframing/back-talk schema:

> *Any formulation of a problem is a result of what the observer of the problem can 'see', what intentionality is behind the way that the problem is understood. An engineer will focus on other parts of the same problem than a sociologist. Reflection-in-action involves reflecting on how your problem understanding affects the problem itself. A good understanding of a problem is a broad problem understanding based on past experience, whether it's your own or that of others. Reflection-in-action is mainly concerned with first formulating the problem and then through the back-talk of the problem reflecting on the consequences of the chosen formulation. Are all aspects taken into consideration? Is there perhaps still a significant difference to the present problem and those it was originally related to? What values lie behind the chosen assumptions and choice of analysis theory and method?* (Hansen and Kolmos 1998, p. 4 in transl.).

Problem formulations are necessarily biased by methods, objectives, perceptions, etc. As stated above, we do not expect an engineer and a sociologist to approach a problem in the same way. Rather schematically, we may expect the engineer's approach to be closer to the Simplification paradigm than the approach taken by the sociologist and vice versa as concerns the Complexity paradigm. With a systemic approach we have, however, paved the way for a combination of the two basic epistemic lenses represented by the paradigms of simplicity and complexity.

As already noted above, learning takes on a particular role when engaging in complementing conventional thinking—referred to as being systematic by nature—with a type of thinking referred to as being systemic by nature. These ways of thinking about a complex strategic issue are our first level of the systemic framework introduced as four interconnected levels in Sect. 1.1. By means of the two basic epistemic lenses of simplicity and complexity we have established ways of seeing, which will link complexity and simplicity represented later on by learning in association with quantitative modelling. Chapter 4 will address learning processes.

Main points and findings of this chapter

- According to Edgar Morin the exploration of reality makes two basic epistemic lenses necessary. By referring to the epistemic lenses as paradigms these are the Simplicity paradigm and the Complexity paradigm.
- The Simplicity paradigm and the Complexity paradigm are not meant to replace each other but should be made use of in a complementary way.

- Furthermore Morin states that complexity is not a surface noise of the real, but is the very principle of the real.
- A fundamental principle is set out by Morin as *constructive circularity*, where the explanation of the whole by the parts and the parts by the whole constitutes our cognition of the real.
- The considerations about the epistemic lenses lead to the finding that systemic planning should make balanced use of simplicity and complexity thinking and adopt constructive circularity as stepping stones in formulating the SP framework.

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