



# Anxious relationships: The unmarked futures for post-normal scenarios in anticipatory systems



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## ABSTRACT

This article explores organisational anticipation in uncertain times. 'Anticipation' is interpreted as a mediating process between knowledge and action, where 'feed-forward' is causal. The context for examining organisational anticipation is one of ontological insecurity; raising issues of epistemological and therefore methodological uncertainty. The paper draws on re-emerging areas of study in the futures literature especially with respect to anticipatory systems and post-normal science. Rosen's 1985 theory of anticipatory systems is not well known, though has received recent attention as part of a growing discourse on Anticipation, for example as a possible discipline and as a form of governance. For Rosen, causality is mediated through a modelling relationship between actor and environment which entails causality, not by the direct effect of the environment on the actor. The paper discusses the implications of this perspective on the role of scenario planning in organisations, which is but one of multiple anticipatory systems at work in the organisation and hence often weak in power. The argument is further developed by considering 'modelling relations' which are inherent to active anticipatory systems. The conclusion is that in human social systems in uncertain environments require approaches to anticipation that recognise the multiplicity of modelling relations. One approach to this has been set out in earlier work by Funtowicz and Ravetz (1993), which they called post-normal science. The paper concludes by suggesting that the epistemology of anticipatory systems and methodology developed from PNS might be used to reduce Cartesian anxiety with respect to ontological insecurities of uncertain times. This has radical implications for scenario planning as it is currently conceived.

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## 1. Introduction

### 1.1. Cartesian anxiety

This paper starts from an understanding that, in an organisational context, scenario planning is a strategic planning process that attempts to explore alternative states of being, separated from the present by some temporal movement and from each other alternative by a turn in logic or reasoning. Various scenario methods are used in the strategic planning processes. The direction of the gaze is towards the future as a purposeful looking ahead. The purpose of undertaking such a forward view is, in a general sense, to inform actions that continue the existence of the organisation.

What prompts such explicit forward-looking exploration is a recognition of uncertainty; that future events are not all predictable. Uncertainty is a strong motive force and cause of anxiety. Frank Knight elaborated this kind of uncertainty as "that higher form of uncertainty

not susceptible to measurement and hence to elimination. It is this true uncertainty which by preventing the theoretically perfect outworking of the tendencies of competition gives the characteristic form of "enterprise" to economic organization as a whole and accounts for the peculiar income of the entrepreneur" (Knight, 1923, pp. III.VII.48). In other words, he is saying that entrepreneurship thrives in domains that are unpredictable, or even that unmeasurable uncertainty provides necessary or initial conditions for entrepreneurship. This paper is not about entrepreneurship, but the agential nature of entrepreneurship has resonance with the reflexive nature of society where people organisation have degrees of freedom for independent action and in so doing, create uncertainty.

In a Knightian uncertainty sense (and after Mintzberg (1994)), scenario planning is an oxymoron, a self-contradicting notion. If futures are uncertain then they cannot be planned, as planning requires certainty or measurable uncertainty. Planning seeks efficiency via the temporal co-ordination of activities and resources. Scenarios as used in scenario planning do not reflect uncertainties in the sense of unknowns. Scenarios are multiple variations of relations, varying as a result of varied explicit circumstances and hence within knowable parameters of what is taken as a predictable, materially certain state, such as an attractor

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pattern. The ‘what if’ counterfactual approach to elaborating these states and their consequences requires considerable expertise, both analytical and creative. The approach employs theorising and evaluations of risk, which as Knight pointed out, being measurable is categorically different from unmeasurable uncertainty.

Of course, scenario methods are used in a wider range of activities than co-ordination planning. In particular they are used as a process of orientation or re-orientation, i.e. reassessing what is salient and how such salience might be framed. For example, evaluating from new perspectives the contexts in which a particular agent exists in order to develop strategic awareness, to re-assess the relationship of (say) an organisation with its environment. This is not planning in a co-ordination sense, but in a sense of *re-perceiving* as Wack put it (Wack, 1996), in order to give shape and meaning to observations that don't fit with the dominant mental model. Thus, scenario work, whether as planning, analysis or thinking, can offer a calming value to what Bernstein called Cartesian Anxiety, which is the desire “to find some fixed point, some stable rock upon which we can secure our lives against the vicissitudes that constantly threaten us.” (Bernstein, 1983, p. 18). A contemporary interpretation of this would be our anxiety of “unknown unknowns” and their relationship to emergence, articulated by Taleb (2007) as “we do not know what we will know”, as Goodwin and Wright point out (Wright and Goodwin, 2009).

The Cartesian approach (after René Descartes) is familiarly embodied in the system of rationalism and deductive reasoning. This is not to say that all scenario work comprises rationalism. However, the related ontological security arising from rationalism is at the very least implicit in scenario practices. For instance, in the articulation and selection of what is ‘risky’ or ‘important’. This belief in ontological security and related anxiety reduction is amplified by a growing literature on causation in the field of scenario methods. The possibility of identifying causality is consistent with rationality and increases the sense of ontological security. The realisation that causation is difficult to assert, or that causal processes are complex, increases anxiety. The quest to understand the dynamics of causal relationships in the context of scenario methods is unlikely to be abandoned, nor should it be. The issue with regard to improving scenario methodology is the degree to which the limitations of our knowledge of causality are inherent in the methodology.

The application of systems as an underlying paradigm for scenario work is well established in the scenario literature. The work emerged in an era where General Systems Theory (Bertalanffy, 1968) influenced management and policy theory, mainly prior to interpretative paradigms. Cybernetics brought the promise of control over ‘systems’ and was attractive to the management of organisations, including strategic management. Niklas Luhmann's adoption of General Systems Theory into the social sciences focussed on autopoiesis and (very specific forms of) communication as explaining social dynamics. C. West Churchman, author of ‘Design of Enquiring Systems’ was highly influential in establishing operations research and management science. Kees van der Heijden notes that scenario planning in the oil company Shell International was influenced by a variety of systems theorists, including Emery and Trist (e.g. system in environment), Darwin (e.g. evolution), Maruyama (e.g. neo-Confucianism), Bateson (e.g. cybernetics, relationships) and Varela (e.g. autopoiesis) (van der Heijden, 1996, pp. ix–xx). This is not to say that all scenario work is based on management science. It is not. The approaches to making forward conjectures via scenarios are partly systemic and partly interpretative, e.g., intuitive logics (Jungermann and Thuring, 1987). The metaphors of scenarios are frequently systemic (for example the “driving force” of thermodynamic systems), not least because the work of producing scenarios involves a contemplation of many interacting features with multiple possible outcomes. The paradigm of systems fits this ontology. Wack (Chermack and Coons, 2015) for example referred to scenario planning being an “organisational nervous system”.

It is from this point of departure: of uncertainty or indeterminacy and systems, that the work of Robert Rosen is presented. As discussed

below, Rosen expressed the need for some sense of order to what he called the anarchic processes of planning. He believed that planning should be rational. However, informed by his theories of anticipatory systems drawn from relational biology, he demonstrated that Newtonian logic was insufficient for this purpose, mainly because the basic presumptions of Newtonian mechanics is to “never allow future states of the system to affect the present changes of state”. His claim was that the theory of anticipatory systems and its mathematics embraces the idea that the future, or ideas about the future, affect the present.

Having established Rosen's thesis in relation to planning, the paper continues by linking this to the underlying theories of scenario planning that take different approaches to the link between a system and its environment. The works of Luhmann, Spencer-Brown and Emery and Trist, amongst others, are linked to Rosen's anticipatory systems approach hence bringing it to realm of scenarios. The paper is further developed by presenting reflexivity as a central modelling relation between agent and environment and then moves to discuss some recent approaches to the effects of this. In particular, the contribution of post-normal science to conceiving the problem of uncertainty in policy making is discussed as is the contribution of its follow-ons to understanding and addressing uncertainty and indeterminacy. The paper concludes by suggesting that a radical refiguring of the service of scenario planning is required.

## 2. Anticipatory Systems

### 2.1. The epistemology of Anticipatory Systems

#### 2.1.1. Anticipatory paradigm

The anticipatory paradigm is Rosen's theorisation of forward-looking behaviour. In conceptualising ‘life itself’ – or what makes living things different from non-living things, Rosen, a theoretical biologist, produced the idea that living systems are anticipatory systems. This is not a mere descriptive characteristic, it is existential. Rosen considered that “all sensory mechanisms are anticipatory in effect; the present behavior of an organism is modified as a function of a future state implied, in some sense, by present sensory data” (Rosen, 1974, p. 250).

In his useful description of Rosen's work, Louie (2010) proposes that the theory underlying a “technology of policy generation” (his description of foresight) is the theory of anticipatory systems.

“An anticipatory system is a natural system that contains an internal predictive model of itself and of its environment, which allows it to change state at an instant in accord with the model's predictions pertaining to a later instant.”

[(Rosen et al., 2012, p. 313).]

In effect Rosen is saying two things, that the intervention of a ‘model’ is present in the interpretation by an agent of its environment and that some *percept* (a mental image for example) of a future state of being is causal upon actions in the present. Rosen claims that the development of a theory of anticipatory systems would “lay the foundations for what may be called an *anticipatory paradigm* (original italics) for the treatment of such biological phenomena as adaptation, learning, evolution and other basic organic behaviors” (Rosen et al., 2012, p. 319).

Rosen's parsimonious theory explains the dynamics of an anticipatory system. Fig. 1 offers the basic concept in graphical form (sources Louie (2010) and Rosen (1985, p. 13)). Within the overall system is a subsystem model that predicts the state of the overall system in relation to its environment. The system also contains an “effector” that can act on the system, the model and the environmental inputs. The effector acts to align the whole system with the predictive model.

#### 2.1.2. Modelling relations

Rosen's position was that “the basic theory which must underlie the technologies of policy making in all the diverse disciplines is the theory

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