

Mapping anticipation

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Futures Studies is the field that lies between the unknowability of the future and the effort to use the future for decision- and strategy-making in the present.

During the past fifty years, Futures Studies has assumed an increasingly explicit professional nature. Practices have become more tailored to the needs of customers, and methods have become more robust. On the other hand, theories able to support and guide practice have remained somewhat underdeveloped. Here I shall sketch the most systematic theoretical framework for Futures Studies so far developed.

I shall organize my presentation around the following items:

1. Anticipation comes in different guises. As a *lay term* it refers to all forward-looking attitudes and activities. As a *technical* term, anticipation is generally used in two different ways, as a component of Futures Studies and as the qualifier ‘anticipatory’ in the expression ‘anticipatory systems’. As different as these frameworks are, I treat these two understandings of anticipation as identical, in order to facilitate their mutual translation. In the following, I shall primarily focus on the Futures Studies component.
2. An anticipatory behavior is a behavior that ‘uses’ the future in its actual decision process. Anticipation as here understood includes two mandatory components: a forward-looking attitude, and the use of the former’s result for action. A weather forecast in itself is not anticipatory in my sense. Watching a weather forecast and as a consequence taking an umbrella before going to work is instead an anticipatory behavior. Anticipation’s two components are coherent with Rosen’s definition: An anticipatory system is a system containing a predictive model of itself and/or its environment which allows the system to change state at one instant in accord with the model’s predictions pertaining to a later instant.
3. The table below summarizes the overall architecture of Futures Studies:

Level 4	Complicated	Complex	Anticipatory
Level 3	Risk	Uncertainty	Anticipation
Level 2	Megatrend	Exploration	Anticipation

Level 1	Forecast	Foresight	Anticipation
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4. For each level, the first two columns refer to (models of) possible futures, while the third column refers to the effort of using the former in actual decision processes.
5. The models listed in the first column are very different from the models listed in the second column. They pertain to two different types: A model is either of the first or the second type and no smooth transition exists between them. For each level, the difference between the listed models includes a critical step. The transition from forecast to foresight (and then, in parallel, from megatrend to exploration, from risk to uncertainty and from complicated to complex) is like throwing a ball on a hill: if the throw is not strong enough, the ball goes back and does not climb over the hill. Many attempts to go 'beyond' forecasts, megatrends, risks and complications fail because the launch is not strong enough. To exemplify: to move from forecasts to foresights, the difference between 'future' and 'futures' is widely insufficient; one should assure that the new futures include real novelties and surprises and are not limited to repetitions of past schemata. Likewise, the passage from megatrend to exploration is not limited to the difference between one and many, but requires the presence of genuinely open variables, capable of generating different outcomes. The passage from risks to uncertainties is not based on different probability distributions, but requires the absence of a probability distribution. And a complex system is far from being only a bewilderingly complicated system. Each of these cases exemplifies the irreducible openness of the future.
6. The model employed to project a possible future may be either internal or external to the decision system. Watching a weather forecast and behaving accordingly is to use an external model; decisions taken according to positive or negative expectations use internal models. Internal models are particularly important for understanding the anticipatory behavior of people, groups, organizations and institutions. A major issue concerning internal models is their origin: where do internal models come from? This apparently minor problem acts as a watershed between radically different theoretical perspectives.
7. Anticipations can be either explicit or implicit. Explicit anticipations are those of which the system is aware. Implicit anticipations, by contrast, work below the threshold of consciousness. They may be active within the system without the system itself being aware of them. Implicit anticipations are properties of the system, intrinsic to its functioning. Consider an organism's *schemata*. By determining the ways in which the organism looks at its environment, *schemata* are anticipatory. Schemata construct anticipations of what to

expect, and thus enable the organism to *actually perceive* the expected information.

8. Most anticipations work as acquired habits either through evolution (as in biological anticipation) or learning (as in most cases of psychological and social anticipation). Evolution-based anticipations are difficult to change, for obvious reasons. However, as difficult as they are to change, they may evolve, and this raises the question as to whether we can eventually contribute to bending evolution.
9. Models enabling anticipations work on many different time scales, ranging from milliseconds (as in perception) to days, months, years and decades (as for many social and technological issues) and even centuries (as for climate change models).
10. Summing up, so far I have touched upon three main distinctions, namely the difference between internal and external models, between explicit and implicit models, and the depth of the relevant time window.