Agent Based Modeling

Communication and Expectation - on Luhmanns autopoetic social systems

"Building on the speech theories of Karl Bühler (1934), Luhmann conceives of communication as a combination of three components: (1) information, (2) utterance and (3) understanding, each of which Luhmann conceptualised as selection.

In accordance with Shannon and Weaver (1949) he defined information as a selection from a repertoire of possibilities. Every communication selects what is being communicated from everything that could have been communicated. With utterance Luhmann refers to the form of and reason for a communication: how and why something is being said. One can say, the utterance is the selection of a particular form and reason from all possible forms and reasons. Understanding is conceptualised as the distinction between information and utterance. For a communication to be understood the information has to be distinguished from the utterance: what is being communicated must be distinguished from how and why it is communicated."

"This retrospective determination of the communication through ensuing communications is connected with a fourth type of selection. With understanding, a communicative event as the synthesis of the three selections (utterance, information and understanding) is complete. However, if the social system is not discontinued a fourth type of selection will take place: acceptance or rejection of the meaning of the communication. This fourth selection is already part of the next communication."

"Luhmann conceptualises social structures as expectations(Luhmann 1995a). In every situation certain communications are expected and not others. For example, a question about one's wellbeing is expected to be followed by an answer on this issue and not by a statement about the latest weather forecast. The expectation to a certain extent pre-selects the possibilities for further communications: it makes certain communications more likely than others (it does not however exclude any possibilities completely). These expectations are recursively reproduced through the communications. Whenever a specific expectation is met by an adequate communication the expectation is confirmed and thus likely to continue to function as a structure. However, if the expectation is repeatedly not met the expectation might be changed."

"Ultimately we could say, a person is nothing other than a complex of expectations that a system has vis-à-vis a specific conglomerate of organic and psychic systems. Luhmann in this sense defines 'person' as the 'social identification of a complex of expectations directed toward an individual human being' (Luhmann 1995a: 210)"

Autopoetic systems and OOP

-Luhmann's theory of self replicating systems draws from the tradition of object orientated ontology
-Object orientated programing allows us to encapsulate the communicative and operative closure of an autopoetic system.

Process and abductive reasoning

"Cederman describes the 'process theorist's' alternative as based on abduction, not induction. Recall that 'abduction' was Peirce's term for 'inference to the best explanation'. The goal is to take an observed sociological phenomenon and explain its generation by accounting for how it is socially produced. The preference for generative explanation, in Simmel, comes in part from a pessimism about isolating regularities in complex social systems. Through this theorization, knowledge is gained; the knowledge gained is a theoretical advance that makes a social phenomenon less 'puzzling'.

> *"The construction of generative explanations based on abductive inference is an inherently theoretical endeavor (McMullin, 1964). Instead of subsuming observations under laws, the main explanatory goal is to make a puzzling phenomenon less puzzling, something that inevitably requires the introduction of new knowledge through theoretical innovation."*

The specifics of the associated method are less clear than the motivation for this epistemology. Many early process theorists resorted to metaphors. But where all this is going is into the construction of models, and especially computational models, as a way of presenting and testing generative theories. Models generate forms through logical operations based on a number of parameters. A comparison between the logical form and the empirical form is made. If it favorable, then the empirical form can be characterized as the result of a process described by the variables and model. (Barth, 1981)"

Decisions - On Luhmann

"For a decision to be made information is needed on the basis of which one alternative can be chosen over the others. An investment decision, for example, is based on information on availability of financial resources, on current interest rates, on current market demand etc. Formulated the other way around one can say, a decision is 'inferred' from the given information. Yet, the important point is that no decision can rely on complete information; some uncertainty inevitably remains. In our example, there is uncertainty concerning future market demand, investment projects of competing firms, future inflation figures etc. All this uncertainty, however, is absorbed by the decision: all given information and all remaining uncertainty is transformed into the selection of one alternative over the other ones. Uncertainty absorption now takes place in the connection between decisions. As decisions do not inform about the uncertainties involved in making the decision – they merely inform about selected and excluded alternatives – ensuing decisions connecting to them cannot 'see' the uncertainties. That is to say, from the perspective of the connecting decisions orienting themselves toward the first decision the

uncertainty of the first decision is absorbed. Based on such a processual understanding of decision, we can distinguish between two 'states' of a decision: before and after subsequent decisions have connected to it. A decision is only completed, when subsequent decisions connect to it. Before that, the decision is merely virtual (Baecker 1993). The decision is virtual because the realisation of the decision in subsequent decisions is expected, but it is not realised, yet. For example, the organisation decides to manufacture a particular new product - in contrast to producing another new product or not producing anything new at all. This decision is only virtual until subsequent decisions have completed it as decision by orienting themselves according to it."

Actor-Network Theory