

**Global Systems Science:  
Territorial versus Functional Patterns**

A workshop at Arizona State University,

February 25/26

Humankind is currently faced with unprecedented global challenges – climate policy, financial regulation, nuclear disarmament, avoiding pandemics, and more. There are good reasons to see these challenges as different facets of an underlying problem, namely the difficulty to achieve a transition towards a sustainable world society.

To achieve such a sustainability transition will not be easy, especially because it requires greatly enhanced capacities for global coordination. Such coordination will require strengthening existing institutions or developing new ones, or both. Most debates about these issues simply take it for granted that suitable institutions for global governance – be it the UN, the IMF, the WTO or institutions yet to be formed - should be built around nation states, i.e. territorial structures. **This global system science workshop addresses the question whether the building blocks provided by nations are sufficient to develop the global coordination required for a sustainability transition.**

The question is best framed in terms of cultural evolution. The first structure of global governance was the Spain-based empire of Charles V in the 16<sup>th</sup> century. It built on a pattern of social networks known from older empires, like Ancient Rome, Imperial China and others, but for the first time expanded it so as to span the whole globe. The corresponding social networks form an administrative and territorial hierarchy structured by urban settlements. Central government is based in a capital city, provincial governments in subordinate cities, with still lower administrative levels dealing with finer partitions of the different provinces. The territory as a whole is then characterized by nested centre-periphery structures. While this pattern was always subjected to internal turbulences and external shocks, and never really consolidated in a pure form, it was the blueprint that solved the coordination problem arising if large numbers of people are to engage in endeavors like building cities, roads, aqueducts, ports, temples and much more.

Networks structured as territorially based hierarchies emerged out of a long-lasting process that began with the neolithic revolution. The period before that transition makes up over 90% of our species' history, and was marked by a very different pattern of coordination: humans formed complex networks combining stable relations of kinship and friendship enacted in daily cooperation. These relations led to small groups of cooperating individuals with strong links (especially through marriage) between such groups. No other primates are known to form networks of similar complexity. In fact, since the stone age these networks of kinship and friendship have been transformed (up to the point of relying on digital infrastructures like facebook or Qzone), but never became irrelevant. Remarkably, when larger hierarchical networks emerged, they did not displace this older network structure, but formed a second layer of social networks.

Many networks of kinship and friendship have achieved remarkable stability, as shown by the persistence of particular variants. E.g., in central Italy specific network structures absent both in North and South Italy can be tracked from the days of the Etruscans to the present, despite the Etruscans being defeated by the Romans, the Romans by germanic tribes, and so on over dozens of generations. In comparison, nations and empires are much less resilient, with most of them lasting only a few generations. Still, some managed to last for centuries, a few for millennia.

As for networks of global governance, stability has remained more elusive. The reign of Charles V lasted just about one generation (technically, from 1519 to 1556). After a century of wars, the British Empire emerged as the new network of global governance, lasting until the end of World War II. Then, as the result of two World Wars, the US became the new hegemonic power. A whole range of challengers – including Austria, France, Germany, Russia – failed, each time with a struggle that involved a whole series of wars.

Few people believe that the US will still be the hegemon of global governance by the end of this century. Many believe that China is becoming the main challenger, without thereby becoming the heir of American hegemony. One must hope that history will not repeat itself here, because otherwise the gathering storm of war will override whatever tendencies towards a sustainability transition may be in the making.

Amartya Sen has forcefully argued that a key condition to keep organized violence, in particular war, at bay is a social structure where people have multiple identities, i.e. belong to distinct social networks that cut across each other. In the present situation, this lends particular importance to networks that cut across nation states and that are sufficiently important for global society to actually modify the historical dynamics of those states.

Long ago one of the founding fathers of sociology, Émile Durkheim, identified occupational groups as essential building blocks of the division of labor in modern societies and suggested that they should play a vital role in collective decision making. He was still thinking in terms of a simple polarity of traditional versus modern society, however. In his comment on Durkheim and in his work in general, the German sociologist Niklas Luhmann stressed that the emergence of hierarchical networks was in fact a very different step of cultural evolution than the emergence of occupational groups. Occupational groups are functional, not territorial social networks.

Of course occupational networks exist since a very long time. But it is only in the global economy whose seeds were planted in the days of Charles V that they became an important element in worldwide social organization. The global flows of matter, energy and information that are presently structured by humankind would be impossible without a critical mass of people whose personal identity is closely, but not exclusively, tied to their occupation. These people spend at least a decade of their life at becoming skilled in a particular occupational field, so as to be able to run sophisticated global structures like the internet, container traffic, and many more. Each one of these structures requires a complex division of labor combining increasingly differentiated skills. What sociologists like Luhmann describe as the increasing functional differentiation of society is investigated by economists like Xiaokai Yang as the endogenous economic growth in which expanding markets and increasing division of labor go hand in hand.

Presently, however, global occupational networks lie beyond the control of nearly all individuals involved. A remarkably tight control structure has emerged in these networks around a relatively small number of large companies, especially in the financial sector. The tension between territorial and functional networks in the present world system has become dramatically visible in the financial crisis of 2007.

The workshop will explore possibilities for creative answers to this tension. They will include new territorial patterns, e.g. of urban systems, as well as new functional patterns, e.g. of education, and new patterns of combinations between the two.

The workshop program will be flexible, inputs by participants are presently collated. Questions to be addressed include:

- Do we know enough about global systems to be able to sketch a theory of such systems?
- Can a theory of global systems be developed as a special case of a theory of socio-ecological systems?
- Is a combination of territorial and functional elements essential for global governance in the perspective of a sustainability transition?
- How might such a combination look like, e.g. in view of global risk governance or the governance of global financial flows?

Looking forward to meeting you all here in Tempe!

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