A Reflexive Theory for the Study of Socio-Technical Systems

Working Paper

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Abstract

Introduction

The structural misunderstandings between Social Sciences and Humanities on one side, and so-called Exact Sciences on the other side, far from being a generality, seems to have however a significant impact on the structure of scientific knowledge [Hidalgo, 2015]. In particular, the place of theory (and indeed the signification of this term itself) in the elaboration of knowledge has a totally different place, partly because of the different *perceived complexities*[1] of studied objects : for example, mathematical constructions and by extent theoretical physics are *simple* in the sense that they are mostly entierely analytically solvable, whereas Social Science subjects such as humans or society (to give a *cliché* exemple) are *complex* in the sense of complex systems[2], thus a stronger need of a constructed theoretical (generally empirically based) framework to identify and define the objects of research that are necessarily more arbitrary in the framing of their boundaries, relations and processes. These differences in backgrounds are naturally desirable in the caleidogram of science, but things can get nasty when playing on "common" terrains, typically complex systems problematics as already detailed, as the exemple of geographical urban systems has recently shown [Dupuy and Benguigui, 2015].

[1] We used the term *perceived* as most of systems studied by physics might be described as simple whereas they are intrinsically complex and indeed not well understood [Laughlin, 2006].

[2] for which no unified definition exists but of which fields of application range broadly from neuroscience to quantitative finance, incuding e.g. quantitative sociology, quantitative geography, integrative biology, etc. [Newman, 2011], and for which study various complementary approaches may be applied, such as Dynamical Systems, Agent-based Modeling, Random Matrix Theory

Objectives

Construction of the theory

Application : co-evolution of subsystems

Discussion

Conclusion

References

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