

The MAGIC-Post-Normal Science Nexus

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1 Insights of PNS in MAGIC

Innovative conceptual aspects of MAGIC have complemented an understanding of Post-Normal Science (PNS) grounded on complexity [1, 2, 3] that proved useful to achieve practical results during the 4 years of the MAGIC research journey.

1.1 The impossibility of decoupling passion from reason in sustainability analysis

MAGIC has developed a set of narratives found in policy discussions offering a new interpretation of the PNS insights: (1) justification narratives (about concerns to be addressed, resulting from the political management of feelings and emotions); (2) normative narratives (about actions to be taken, based on power relations and knowledge claims); and (3) explanation narratives (about scientific evidence for the selection of the first two narratives) [4].

The three types of narratives, as will be illustrated below, are not independent, interacting in an impredicative loop.

1.2 Quality control, in sustainability science, requires an extended peer community

Fig. 1 shows why *rigor* is not a robust quality criterion in governance-related research for the scientific analysis generating the evidence. Before arriving to a specific framing of the problem at hand (in the center of Fig. 1), priorities about relevant concerns must be addressed to select narratives to be used as justification narratives.

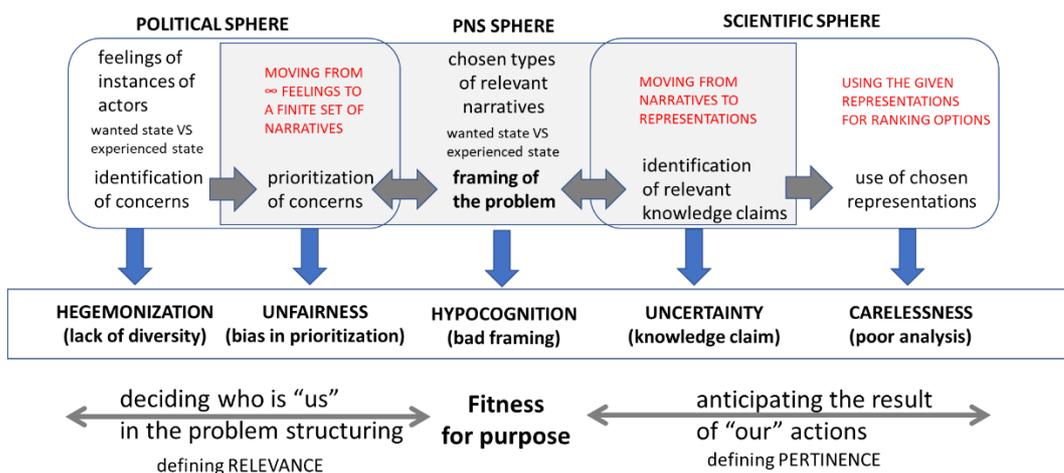


Fig. 1 The sources of concern for the quality of knowledge inputs for governance

At the same time, information from existing knowledge claims is used to provide relevant insights about "the best" framing of the relevant problem. Therefore, the interaction of these two different inputs, and their impredicative relation, implies that in sustainability science, "optimal solutions" based only on a scientific evidence are a mirage.

Thus, Fig. 1 is a conceptual interpretation of the PNS insight about the need to integrate the scientific and value inputs in the problem-solving practice, which was confirmed by research in MAGIC when assessing the quality of EU policies in different policy domains and innovations. The consistency among justification, normative and explanation narratives, in the MAGIC case studies clearly indicated the need for extended peer communities [5, 6]. An additional result has been the identification of five sources of concern about quality in the steps needed to use and produce scientific evidence for policy. These five are represented in the horizontal strip in the middle of Fig. 1.

1.3 Sustainability is about learning how to deal with the tragedy of change (update the identity of the society while remaining functional) something requiring managing passion and feelings

The definition of the identity of a society can be related to two sets of constraints: (1) the expression of social practices must match what is expected by the rules, institutions and validated knowledge claims endorsed by society (to be verified at the level of the society), and (2) the affective interactions, when expressing societal practices, must be compatible with the fears, hopes, feelings and emotions of individual. This implies that, as suggested by Luhmann [7], we could assume the existence of a psychic structure of the society in which, the aggregated effect of personal emotions, when scaled-up to the level of the whole society, affect and are affected by the expression of social practices. This process of definition of the identity of social systems, is at the core of issues addressed by PNS.

2. Main messages of MAGIC

2.1 In relation to the quality of the narratives used for deliberating sustainability

* MAGIC has illustrated that the main institutional narratives used to address the sustainability crises are based on legends, a strategy that is unlikely to provide sound policies to face the challenges [8].

The claims that with the green deal, moving to a circular bio-economy, in the next 30 years, the EU will be able to substitute fossil fuel with biofuels, decarbonize the electricity sector, make its agriculture competitive, environmentally friendly, and capable of guaranteeing food security no longer depending on imports, show a remarkable lack of scientific and political understanding of these issues. Implausible narratives are impossible to implement, risking of delegitimizing the institutions proposing them. It is becoming ostensibly clear that the current pattern of economic growth is incapable to solve growing concerns about inequity, environmental protection, dangerous dependence on disappearing resources and on the exploitation of less powerful social-ecological systems. To avoid the risk of a collapse in the credibility of the EU system, it is the right time to move from the present class of “yes we can” narratives to the class of narratives “Houston we have a problem”. A growing proportion of EU citizens can feel the seriousness of the sustainability crises, opting, however, not to acknowledge its deep implications, including the loss of their urban privileged lifestyles. But for how long can this situation last? For how long can we keep abusing natural processes and disrupting social-ecological systems?

* MAGIC has illustrated that it is possible (and urgent) to abandon the illusion of simplistic economic narratives to explain the sustainability predicament [9].

The existing reliance on received economic narratives led to a simple problem structuring – i.e. decisions can be taken using only scientific evidence. However, it is obvious that the assumptions that we will always have prices – i.e. that we will never experience absolute

scarcity - entails the impossibility of unsustainability. Obviously, narratives that cannot see the possibility of experiencing absolute scarcity cannot be useful to study the sustainability predicament. It is time to move to alternative methods of analysis and alternative methods of decision making based on the acknowledgment of complexity and the need of reflexivity. Sustainability research must avoid the silo-governance attractor by integrating in a coherent way different inputs of relevant information referring to different levels and dimensions of analysis. This is essential in order to be able to reflect the existence of a variety of legitimate but non-equivalent concerns found in society. This cannot be done by relying on "Frankenstein models" (e.g. Integrated Assessment Models) in which a basic framework of analysis developed within economic narratives is fed with simplistic "ad hoc" models studying "water", "energy", "food", "emissions" linked to a variety of non-equivalent descriptive domains impossible to integrate. In the era of big data, we still use quantitative analysis based on differential equations: an inferential system that requires the adoption of a scale and a dimension at the time.

* The COVID-19 has clearly shown the possibility that large-scale perturbations can impose sudden radical changes in society, and the futility of searching for a Laplacian demon that will restore prediction and control. We do not have (or we do not recognize) the quality evidence required for a fair and robust deliberation about radical re-adjustments of social practices. History tells us that the legitimacy (and stability) of the institutions of a society depends on their ability of reducing the stress (associated with the fears and hopes experienced daily) of its population. We are now living in a "full" and over-connected world in which it is becoming more and more likely to experience large scale perturbations coming either from nature, political turmoil, or financial collapses. A discussion over the possibility of quick adjustments of society to forced change should start from a shared understanding of actual societal practices and their relation to feelings. The COVID-19 has shown that we can change our social practices overnight, something that cannot be done by technological silver-bullets. So rather than working on more and more complicated technological fixes (that would require decades to become operational) we should explore the remarkable capability of adaptation of human societies.

Why are we using resources? To do what? How are resources used? Which resources are more essential? How are they affecting the quality of social practices? These are some of the questions needed to explore and deliberate over a transition to alternative lifestyles, institutions, and ways of developing and deploying technology.

This is the information that MAGIC has generated, and that is systematically ignored by convention. Unfortunately, rather than understanding the deep challenges in order to be prepared for changes, we bet that technocratic promises, based on shallow innovations and new business models, will be capable of preserving the existing institutions and life styles forever.

2.2 In relation to epistemological reflections

* MAGIC has illustrated the complexity of the Nexus. We have to accept that error and failure are inevitable parts of the policy-making ecosystem; it is urgent to develop a culture of experimentation and resilience in a context in which the mainstream narrative has always been one of efficiency and control.

* MAGIC has shown that there is untapped useful knowledge beyond accredited expertise and institutional boundaries. Some of these types of knowledge are not utilized because of bureaucratic and disciplinary constraints, and other types of relevant knowledge becomes

invisible because it can perturb a perceive fragile status-quo. It is urgent to develop democratic processes for the seamless deployment of uncomfortable knowledge.

* MAGIC has shown that many institutional goals reflect a nostalgic view of the past, including the privileged role of expert evidence as an input to policy-making. What constitutes quality evidence is not sculpted in stone but modulated by power, tradition, culture and other contextual and contingent considerations. It is urgent to democratize evidence, developing or enhancing robustness by inclusion, diversity, and plurality.

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