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Governance by infrastructures: Reverse-engineering the knowledge/institutionalization nexus

Following the 1990s 'governance turn,' 'governance by infrastructures' has emerged as a powerful formulation to account for the shift in decision-making from government bodies to distributed networks made of sociotechnical actors. First, it implies a shift from 'government' to 'governance,' that is, from a restricted set of policy-makers belonging to the formal political system to a blurrier network made of actors intervening with diverse interests, goals and epistemologies. Second, it often comes with a savor of 'automation,' thus implying that eventually it is machines which (who?) have taken over decision-making, and accountability. Think at privacy by design: the implementation of a key human right is delegated to protocols and internet architectures, as if it is too crucial to be left to the clumsy and unpredictable humans. When it comes to automation, artificial intelligence constitutes the epitome of what in the old days of actor-network theory Latour (1992) would have called 'shifting down:' the delegation to machines of tasks up to then conducted by humans.
And yet there is more to 'governance by infrastructures.' This 'more' can be identified in an intimate relationship between knowledge shaped by practices and made durable in the artefacts used to produce, legitimize and circulate it, and the long-term outcomes of such crystallization. I see the formulation of 'governance by infrastructures' as an attempt to reverse-engineer the relationship between knowledge and institutionalization. In lay discourse, knowledge infrastructures must support decision-makers by producing reliable data. This relationship has characterized, for example, most early discourses on e-government and the digitization of 'the state' or 'the public sector,' with technological solutionism being mobilized to support lagging-behind institutions. Differently, new forms of institutionalization may constitute the outcome of knowledge practices made durable in data, protocols, servers and databases. Governance actors can be shaped by knowledge made durable in infrastructures.

This is at least what history tells us when it comes to infrastructures for the production, legitimization and circulation of knowledge about population and territory, the two main assets of the modern nation-state. Not being an historian, I am particularly fascinated by those historical studies that have analyzed state formation in early modernity as the outcome of infrastructures for ordering people and/or territory. A common reference is the work by the late Foucault. Foucault pointed out the methods of enumerating, regulating and managing population and territory as governing practices that brought to the establishment of the modern state. In his words:

"Is not the method of analysing localized powers in terms of procedures, technologies, tactics, and strategies just a way of passing from one level to another, from the micro to the macro?" (2009: 119, footnote).

This reverse engineering of the nexus between governance actors and knowledge technologies has been empirically validated by historians of science and technology. Mitchell, for instance, has seen the foundations of the bureaucratic and military strength of the French state in the 'methods of enclosing and partitioning space, systematizing surveillance and inspection, breaking down complex tasks in factories, the army, schools, hospitals, and government offices' (1991: 92). Territorial measurement and ordering technologies were also used by Great Britain in establishing a vast project of calculation in colonial Egypt (Mitchell 2002):

To reorganize the tax revenues and pay the country's debts to European banking houses […], the colonial power set out to determine, for every square meter of the country's agricultural land, the owner, the cultivator, the quality of the soil, and the proper rate of tax. To collect, organize, and represent this information, the authorities decided to produce something never achieved before, a 'great land map of Egypt.' The map was intended not just as an instrument of administrative control or geographical knowledge, but as a means of recording complex statistical information in a centralized, miniaturized, and visual form. It was to provide not just a diagram of reality, but a mechanism for collecting, storing, and manipulating multiple levels of information.

In this landscape I would also like to recall studies on contemporary state formation, for example the seminal work by Madeline Akrich in Ivory Coast (1992). Akrich showed that the modern foundational distinction between 'public' and 'private' in villages in Ivory Cost became thinkable thanks to

electricity infrastructures that re-articulated a previously undifferentiated community space. It was with national authorities subordinating electrification to a more stable land allocation that a divide between what was public and what was private was introduced.

These and other studies showcase forms of governance by infrastructures that go way back the governance turn, internet architectures, politics of code and artificial intelligence. Infrastructures can exert normative power because they produce peculiar forms of knowledge (e.g., the public/private classification), legitimate it (e.g., by optimizing tax revenues) and circulate it (e.g., through standardized maps). In so doing, they shaped the modern form of the state as a governance actor.

The pioneering work by Chandra Mukerij provides textbook examples. She described how in 17th France Jean Baptise Colbert hired low-rank experts with the task of reaching the remotest areas on the country, conducting territorial measurements, reporting them on paperwork dossier and returning them to the central administration. Mukerji argues that the production and circulation of paperwork files on territorial measurements contributed to reduce the influence of the nobility. At the same time, those documents constituted a new type of administrative capacity, built at the central level: they brought the nation state into existence by representing its territory and borders. It was thanks to maps, dossiers and paperwork measurements that centralization dynamics could take place:

The new administrative practices of power were not formed around a rational bureaucracy, but rather by the circulation of papers and contracted expertise. The new knowledge regime created a novel political capacity in the state, but surprisingly, did not entail a revolution in the fundamental system of power/knowledge in France (nobility remained the foundation of officialdom). (Mukerji 2011: 225)

Mukerji fascinating accounts highlight the reverse-engineering of the nexus between institutionalization and knowledge technologies: data infrastructures were not introduced to make decision-making more efficient and reliable. Rather, it was the modern state that emerged as a response to information handling needs and to the consequent introduction of data infrastructures. A similar point was moved also by British historian of technology Jon Agar (2003), who argued that the organization of XIX century government came to mimic the architecture of information machines like Charles Babbage's Analytical Engine.

In light of these historical studies, it's difficult not to hypothesize that contemporary digital infrastructures entail some form of reverse-engineering, as well. If historically knowledge infrastructures have contributed to the formation of the most powerful techno-social assemblage for knowledge handling – the nation-state, how do contemporary data infrastructures for managing populations and territory shape emerging polities? With this question we update historians' original argument about infrastructures and state formation to current developments, we the caveat that we must keep the reference open. The original question posed by historians of technology (i.e., how did infrastructures for information circulation shape state formation?) turns indeterminate: "how do data infrastructures shape yet unknown orders of governance?"

My work in the last ten years has tried to answer this question. I have initially labelled this trajectory 'Vectorial Glance' (Pelizza 2016a). The Vectorial Glance is a research framework that conceives of government digitization as an entry point to detect incipient transformations in the order of governance. It draws on a graphical metaphor: just as vector graphics are based on paths that lead through control points without being bound to underlying pixels, so the vectorial glance runs across governance boundaries without implicitly assuming that they are immutable and/or a priori relevant for the analysis. For example, I described the de facto shifts in institutional national/local boundaries entailed by interoperability programs (Pelizza 2016a, b). Or, I discussed the creation of knowledge asymmetries between civil service and contractors, thus along the public/private divide (Pelizza 2021). Finally, I have extended this reverse-engineered approach to the management of non-resident populations and the articulation of multi-level European orders (Pelizza 2020).

I see similar dynamics as marking invisible transformations in the nation state, in a similar way as the circulation of Colbert's dossiers performed transformations in the feudal system. We might, for example, be tempted to see a parallelism between the paper map in 17 century France, that brought the nation-state into existence, and contemporary digital infrastructures that bring a multi-level, trans-national entity called 'Europe' into existence. And indeed, historians of technology studying European integration have shown that Europe building went hand in hand with the development of infrastructures (for transport, communication, landscape and water resources, financial flows) (Schipper and Schot 2011).

To conclude, I suggest that 'governance by infrastructures' might not only be a powerful formulation to account for the shift in decision-making from government to governance combined with a delegation of normative power from humans to code, data and artificial intelligence. Rather, it marks a reverse-engineering in the relationship between knowledge and institutionalization. We do not know yet which actors will stabilize as an outcome of infrastructuring knowledge practices in the long-term, but we know that following data infrastructures is definitely a meaningful and tested method to track invisible processes of institutionalization.

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