The Layers of the Invisible. Information infrastructures and social action

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Reflection note

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Ole Hanseth is among the few key figures that have made the study of information infrastructures a regular and, in a sense, persistent research concern in Information systems (IS). His work impacted as well upon selected areas of other social science fields that are concerned with the ways by which technologies frame the pursuits of social actors and shape the operations of economy and society. These achievements may seem modest, even trivial, now but they were not a little while ago when the notion of standalone systems reigned supreme. While some of his empirical work has entailed the study of large company- or industry-based infrastructures in fields such as energy (Norsk Hydro), telecommunications (Telenor) or maritime (ongoing), much of Ole's work has evolved around health care and the complex operational and socio-political fabric which information and communication technologies have over the years spun around heath care (see Hanseth, 2022). This comes as no surprise, granted the fact that health care is a complex and fascinating field upon which central professional and organizational battles of our times are fought.

I have had the good luck to work with or close to Ole on several occasions since I first met him in person in a small workshop at the London School of Economics (LSE) in March 2001, organized by Claudio Ciborra who had since 1999 become the head of the Department of Information Systems at LSE which I joined August 2001. I conjecture, that different people may mantain their own perception of Ole's work and, eventually, opt to carve out different things from Ole's extensive and diversified intellectual achievements over the years. In what follows, I briefly describe a few things that have mattered to me, and which recount my own professional and personal relationship to him.

One of the great insights I myself derive from Ole's research outlook and writings entails the invisible (infra) fabric of constraints (e.g., installed base and path dependencies, standards, lock-ins) and opportunities (i.e., new domains of action and areas of reality intervention) that technologies build around institutions and social action. I take this to mean that the study of the social impact of technologies can never be exhausted at the point of contact with social actors. It requires insights into how different systems and technologies are fashioned to larger infrastructures that feature complex interdependencies across several layers that often develop over time. This should not mean to imply that the study of local realities is insignificant. It only asserts that a fuller understanding of what is going on in a particular context may considerably be enriched by looking at the broader dynamic of interdependencies (e.g., the narrative of Norsk Hydro) which complex technological infrastructures spin around it. A certain system often calls for another system that supports, extends or complements it, a commitment to deploy a particular technology stems from other antecedent choices and carries implications for present and future courses of action (see his chapters in Ciborra and Associates 2000) and so forth.

Much of the earlier work of Ole's on these fascinating matters have been shaped by the standardization literature in sociology and the work of Susan Leigh Star, Geoff Bowker, Stefan Timmermans and Marcus Berg among others (see Bowker and Star, 1999; Timmermans and Berg, 1997) with whom Ole has maintained contacts at that time and occasionally collaborated. The interest with standards has remained at the centre of Ole's work, understandably enough since the concept of information infrastructure is, to some extent, coextensive with that of standards. Yet, early in this century, Ole structured much of his research on the dynamics of infrastructures drawing from the ideas of reflexive modernization, linked to the work of Antony Giddens and Ulrich Beck (see e.g., Beck et al., 1994). Concepts such as those of risk and side effects along with the unpredictable dynamics they instigate feature prominently during that period (see, e.g., the billing history of Telenor and also Hanseth et al., 2006). These pursuits have, among other things, led to the publication of a book that Ole basically edited on his own, due partly to the sad and premature death in February 2005 of unforgettable Claudio Ciborra with whom this work was carried out (see Hanseth and Ciborra, 2007 where the article on Telenor billing history is contained). I am happy I have been part of the effort myself. I still feel my own theoretical peregrinations on risk, time and information technology that were eventually summarized in the book "Information Technology, Contingency and Risk" (2007; sparsely cited) is one of the most imaginative papers I have written.

The idea that the study of information infrastructures cannot be exhaustively conducted at the human interface can also be associated with the realist distinction between the real, on the one hand, and the actual/empirical, on the other (Sayer, 1992). What is shown and manifested at a single point in time is usually part of a bigger and often invisible furniture of the world that is not empirically or phenomenally manifested. In other words, the real is bigger than the actual or empirical and access to it requires relfexive imagination and conceptual work. Ole has not been realist by confession but the idea of information infrastructures conforms well to this ontological insight. It is perhaps passing to mention that some of Ole's more recent work has been inspired by the work of De Landa (a realist philosopher) and the concept of assemblage which De Landa appropriated from Deleuze but gave it particular outlines. Similar to information infrastructures, the concept of assemblage offers dividends to empirical research by pulling forward the backstage articulations (e.g., intrinsic vs extrinsic) that often govern social reality and its dynamics. Some of these ideas are explored in the more recent work Ole has published on health care regimes and infrastructures (see Hanseth, 2022; Hanseth and Modol, 2021).

Ole and I are of the same age and have had rather distinct intellectual trajectories. I came to IS through the study of technologies and the ways they are involved in organizations and the shaping of expert fields. Ole is a computer scientist by training and has worked together with some of the greatest computer scientists of our time such as Kristen Nyggard. We met through our joint work with Claudio Ciborra early, as I said, in 2001. I have ever since maintained a close contact with Ole marked by reciprocal respect, worked occasionally together, and had innumerable debates (some with vivid arguments) about the conundrums that inexorably inhabit social science and its practice. Has my own work and research outlook been influenced by him? Hard to say, but I believe it has in some way or another. Ole is a man of massive learning and erudition, a living testament to the fundamental fact that there is no way to make contributions to social science and IS unless one is deeply immersed in the concepts, debates and research practices that define these fields. Apart from the many references to other people's work which he has made to me over the years, I definitely learned from Ole that the prevailing impression of the smooth character of many information infrastructures (including the Internet) is a just a deceptive appearance of the hard work going underneath, through which they are maintained and evolve. There are and will always be broken links, intractable interdependencies, conflicting standards, incompatible standpoints along with the marvellous achievements of information infrastructures and their inexorable grip on social actors and institutions. Information infrastructures are always

in motion, driven partly by the grandiose ambitions they foster and the inevitable frictions and incompatibilities that underlie them. This is no meagre lesson.

My recent work with Cristina Alaimo on data and their effects on organizations and institutional orders (Alaimo and Kallinikos, 2021, 2022, 2024) may seem the least connected with the concerns on information infrastructures that have over the years animated Ole's work. At first sight, data may seem at a remove from the hardwired connections of systems, devices but also the social practices that make up information infrastructures. But they aren't. In some sense, information infrastructures are data infrastructures. If anything, the word data more thoroughly reflect the backstage character of technical and social operations, the communities of provision through which data are produced and maintained and the communities of use (see Swanson 2021, 2022) that grant data their social functions and purposes. Data thus constitute infrastructures in the sense of being embedded in interconnected systems, devices and practices through which they are produced, maintained, made sense of, used and commercialized. Part of the answer to the unprecedented diffusion of data in our times and the crucial role they play across the various settings of economy and society is to be found in the standardized character of digital data and the ways they are forged by digital machines (Alaimo and Kallinikos, 2024). As the aforementioned observations indicate, data infrastructures are related to the social and functional requirements of the systems that host them (the data) and the communicability of the practices by which they are transmitted across contexts and made the object and medium of transactions and social encounters (Bowker and Star, 1999). In this regard, the study of data is the study of the sociotechnical infrastructures of the current age. In this regard, Ole's work and scientific outlook have shaped much of my (and I should perhaps add Cristina's) work over the last decade.

It has been a great pleasure to have Ole visiting us in Rome, where we moved upon the Brexit, several times in recent years. We had the opportunity to carry out numerable discussions over the developments of the field and update each other about our scholarly endeavours. I recall him (in an excursion we had together with Eric Monteiro and Cristina Alaimo in Umbria and its wineries), talking about geology as an overarching metaphor for studying information or data infrastructures and their time-ridden sedimentation of layers. At some earlier times, he tried to use the metaphor of metal corrosion to study how infrastructures shift, decline and fade out. I find both metaphor germane and I very much have liked to see him pursuing them seriously, as an antidote to the work on platforms (much of it superficial) that seem now to torment all of us. I know he plans to visit Rome next year and I would very much welcome the outlines of his geological theory of infrastructures.

Finally, one last word about the person Ole Hanseth. Over the many years that I have been active in modern academia, I have seldom seen such a genuinely kind and generous person as Ole. It is such a pleasure and relaxation to be in his company. I hope that I was able to give him something back for all those years of companionship and intellectual encounters.

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