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# REFLECTIONS ON THE CHANGING PROFILE OF SCIENCE AND KNOWLEDGE

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**Abstract**. *This paper constitutes a theoretical reflection on the gradually changing profile of science and knowledge, from a reflexive sociological and epistemological standpoint. The first part draws upon some relevant debates on the university, science, knowledge, and their so-called "reflexive turn". The analytic attention here is mainly focused on the sociological and epistemological significance of "knowledge of knowledge", the "naturalization" or "socialization" of epistemology and the multiple effects of social complexity. The second part seeks to comprehensively describe and critically discuss the two central phases of the radical wave of social scientific studies of science and technology. The first "descriptivist" phase is reflexively reconstructed in terms of a social theory of knowledge (social epistemology). The second "postmodern" phase is reflexively reconstructed in terms of a new sense of "knowledge politics". This new sense eventually gives technoscience the unique historical opportunity to creatively accomplish and boost its autonomy, within an ethics of epistemological weakness.*

**Key words**: *Knowledge Society and Knowledge Politics, Social Epistemology, Science-Technology-Society, Autonomy and Reflexivity.*

## 1. INTRODUCTION

During the early modern era, science and technology were clearly separated from the social structure. The "enlightenment" teleological conceptions of Reason, positive Truth and cumulative Progress (as normative ends in their own right) strategically posed the "heroic" or "ascetic" individual scientist and the "isolated" scientific community as a whole *above* everydayness and the larger audience of non-scientists or non-experts.

Expertise's primary professional and moral task was to rationally address *"public deficit"* by assertively conveying suitably-fashioned knowledge to the recipients, who allegedly *either* possessed no knowledge on the relevant subject *or* lived with "prenotions" (Emile Durkheim) that the new knowledge aimed to *supplement and correct*. In this line,

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science and technology were the well-entrenched and well-demarcated field that practically applied or used cognitive innovation, *against ignorance and ideological defensiveness*[1].

During the twentieth century, however, technoscience, as a *"seamless web"* (B. Latour), rapidly took over a leading role *within* the wider context of "knowledge society", effectively overshadowing industry, labour and capital (Kreibich 1986). A vivid and practical demonstration of this leading role was the reflexive emergence of *"Big Science"* as a self-organizing/self-evolving or "autopoietic system" (Luhmann 1992).

## 2. SOCIOLOGICAL DEBATES ON SCIENCE AND KNOWLEDGE

In general, the overwhelming centrality of technoscience (as well as this very mutual and osmotic relationship between science and technology) has naturally led mainstream social scientists to perceptively characterize late twentieth century society as the *"science society"* (Kreibich 1986) or the *"science civilisation"* (Schelsky 1961).

Although, this sharp and highly contested characterization, while not absurd, meaningless or incorrect, was not entirely adequate, since the biggest issue here has always been the role of knowledge (and not science alone) as *constitutive* of social forms, networks, structures and relations. In other words, *knowledge is societally essential*. The theoretical concept of "knowledge society", as originally coined and sophisticatedly developed by the American sociologist Daniel Bell (1974), has systematically been very influential among social scientists[2].

From a reflexive sociological viewpoint, however, this well-established and well-respected concept is arguably accompanied by serious shortcomings. Most importantly, it gradually and obviously proves to be *too descriptive and linear*. Even if Bell's (modern) theory went further by denoting the spontaneous emergence of a society which organises, learns and evolves itself (through constant flows of information, knowledge and communication), the analytic focus on knowledge undoubtedly requires *systematic intensification and critical-reflexive deepening*.

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[1] According to the old positivistic "social engineering" approach, ordinary citizens are to be made scientifically literate by filling the aforementioned "deficit" in their knowledge and appreciation of the scientific project. As the postmodern age struggles to effectively make the transition out of the technocratic heritage of the 20th century, the project of undoing any arrogant "deficit attitude" is increasingly appearing as an everyday practical task. Only if we can concretize the issues on the technical and ethical terrain will that transition succeed. Then, we will find out what it really means to live and create in a technological society (see Feenberg 1999). But science has also to be communicated in a way that, in the last instance, recognizes and acknowledges the relevant individual and social contexts. So, alongside the well-established modern confidence that science had the answers to almost everything (50 years or so ago, there was indeed a great deal of certainty, confidence and optimism that science and technology could provide ready solutions to solve all social problems), came a much more sceptical turn: relations between some elements of the scientific community and those they considered to be part of an "anti-science movement" reached the level of open warfare.

[2] In his famous book *The Coming of Post-Industrial Society* (Bell 1974) Bell vividly underlined the central role of information/knowledge for his emergent social system. The book "seemed to fit quite beautifully with the explosive technological changes that hit advanced societies in the late 1970s. Impacted by the sudden arrival, apparently out of the blue, of staggering microelectronic technologies which rapidly permeated offices, industrial processes, schools and the home – computers soon seemed to be everywhere – there was an understandable and urgent search to discover where all these changing were leading" (Webster 1995: 30).

Regarding this strong theoretical requirement, the interdisciplinary scholar Gerard Delanty comprehensively sums up some relevant sociological debates (Delanty 2001: 149-150):

(1) *The entrenched liberal critique*, which can be easily characterized as a *cultural critique* "since it is primarily concerned with the university as a medium of cultural reproduction. The liberal idea of the university … on the whole looks backwards to the golden age of an earlier university. Despite the different positions within this broad stance that derives from the neo-humanist tradition, the tendency is to see the university in crisis because of the decline of the autonomy of culture, be it the culture of critique or, in its more conservative version, the traditional culture of the canon".

(2) *The postmodern thesis*, closely associated with the intellectual works of J.-F. Lyotard and B. Readings, openly declares "the end of the university along with the end of the nation-state. It is claimed that knowledge has lost its emancipatory role and the very notion of universality, or even the very idea of a curriculum, is now impossible, given the fragmentation of knowledge, as in, for instance, the separation of teaching and research".

(3) *The reflexivity thesis*, closely associated with intellectual claims that there is "a new mode of knowledge based on a more reflexive relationship between user and producer, offers a less dramatic theory … As a Mode 2 paradigm around applied knowledge emerges, the university, which is caught up in the more hierarchical and disciplinary-based Mode 1 knowledge production, becomes, it is claimed, increasingly irrelevant to the postfordist economy".

(4) *The globalization thesis* mainly focuses on the continuing instrumentalization of knowledge and the university as "it embraces market values and information technology … the university is far from irrelevant to capitalism, as the previous thesis would claim, but is in fact fully integrated into it and, as a new manageralism takes over the university, there is a resulting loss of academic freedom … This thesis suggests that the university has become a major player in the global market and in information-based capitalism".

Of utmost importance all over here is not merely the university, science and knowledge as crucial factors in society and societal organization and development, but rather "knowledge of knowledge" (see Wilden 1972). Indeed, *no knowledge exists without knowledge of knowledge* (E. Morin). Of course, this involves knowledge of the multiple bases of knowledge, knowledge of knowledge production (including scientific, technological and cultural production), knowledge of knowledge applications and implications, consequences and side-effects, etc. What does matter here (in sociological terms), is not technoscientific knowledge as such, but the very fact that technoscientific knowledge makes sense *only* within the context of society *as a whole*.

Because of this innovative *reflexive turn*, the so-called "naturalization" or "socialization" of epistemology increasingly mixed description, interpretation and explanation, and started to prevail over the various rationalistic and positivistic philosophies of science, which monolithically depicted science as a peculiar (or unique) idealised universal culture with a neutral, normative and transcontextually-applicable methodology.

Science and scientific rationality themselves were gradually recognised as a particular "language game" (L. Wittgenstein), a "cultural practice" (A. Pickering), or a "social practice" (P. Bourdieu) – that is, an everyday performative practice among many others. As the Dutch sociologist Dick Pels puts it, science has come to be theorized as "bad shorthand for a vast plurality of practices which are fragmented across many disciplines,

niches, paradigms, and approaches. More dramatically, science has come to be viewed as just one culture of rationality among others, 'just another story', one among a plurality of perspectives, information bases, and interpretive communities, none of which can lay claim to an overarching or foundational status" (Pels 2003a: 210).

This epistemological naturalization/socialization/contextualization explicitly showed that science, like any other ordinary social activity, conveys values, assumptions, presuppositions, implications and consequences which we could never ignore or bypass[3]. In particular, the reflexive awareness of the *mutual dependency* of sociological categories (e.g. risk, citizenship, space, time, modernity, morality) and social practice has been increasingly brought right at the forefront of various hot epistemological debates.

In the general case of science, a model of social complexity has overwhelmingly emerged[4]. This made clear how the establishment or institutionalization of "scientific knowledge" is directly followed by its technological "application" which self-consciously leads to a critical reflection on the unintended, unanticipated and unforeseen consequences (Van Peursen 1970). The inherent unpredictability of knowledge production could be further elaborated through the empirical demonstration of its unavoidable *Janus-faced character*. That is, the impact of science and technology is both positive and negative: they are a "collective good" and a "collective bad" at one and the same time.

## 3. "SCIENCE, TECHNOLOGY AND SOCIETY" STUDIES

The significant relativity of technoscience is particularly acknowledged and highlighted by a radical wave of social scientific studies of science. This wave, variously referred to as "social studies of science", the "new sociology of knowledge", the "sociology of scientific knowledge" (SSK), or "science, technology and society" studies, can be possibly separated into two distinct phases.

### 3.1. The first phase

The first phase was generally characterized by a heterogeneous array of empirical, interpretative, phenomenological, ethnomethodological, ethnographic, discourse analytical and related approaches. These diverse approaches sought to give a close and detailed de-

[3] No doubt, technoscience and its products are promiscuously intersecting with historically relevant, socially constructed and culture-bound human beliefs and values. As technoscience encroaches more closely on heavily value-laden issues, members of the wider public are arguably claiming a stronger role in both the regulation of science and the shaping of the research agenda. Hence, it is generally acknowledged that technoscience, society and culture are essentially intertwined (and only analytically separated).

[4] Complexity, performativity, pluralism and context-dependency are basic characteristics of the contemporary condition of knowledge. These characteristics are increasingly leading to a dynamic blurring of actor identities. According to Alan Irwin and Mike Michael, the wider public is already "highly knowledgeable in ways that could fruitfully inform scientific assessment … there is a blurring of expert and lay knowledge … both 'public' and 'science' no longer stand as discrete entities…" (Irwin & Michael 2003: 111). It is also no longer self-evident and universally accepted that the general public trusts and follows the conclusions of science and technology. The public is thus becoming more and more critical and suspicious; it therefore actively demands a substantial role in the democratic development of science and technology. Public acceptance is always needed, especially when scientific debates concern issues of health and food.

scriptive account of the multiple language games, sociocultural practices and communications in which scientists engage (e.g., see Knorr-Cetina & Mulkay 1983).

However, this detailed descriptivism can be critically seen as providing a very poor and insufficient *social-theoretical account* of the modern forces of science and technology. This is accompanied with a completely de-socialized conception of action and interaction, as well as with the total eclipse the indispensable "normative dimension" (Andrew Sayer). The unbridled naturalism of the empiricist and descriptivist "turn towards practice and networks" offers an extremely narrow framework for meta-technoscientific analysis, which obviously leaves out of perspective any relevant organisational or disciplinary level.

In direct contrast to the "shift" towards scientific practice and the actor-network approach (ANT), which *in principle* keeps the detailed constructivist analysis "sufficiently free from theory" (Knorr-Cetina), a new *socialized* conception of science and technology studies should get tied to important moral, political and policy questions, far beyond Latour's myopic "war metaphors". Instead of naively reducing the social to "performative" inter-personal linguistic negotiations (Lynch 1985) and everyday individual-behavioral matters (Latour and Woolgar 1979), we should rather move "from reflexivity within actions, to reflexivity upon actions" (Tim May), with a concurrent focus on *the content, the context and the social consequences* (or the "social dynamics") of technoscience.

Of course, the technoscientific production of society does not take place "in situ" (Michael Lynch); it is always power-ridden, community-grounded, historically relevant and culturally bound. In addition, technoscientific actions, interactions and decisions are never absolutely free, strategic, manipulative, rationalistic or voluntaristic; they always depend on pre-structured and time-depending social contexts, underlying "generative mechanisms" (Roy Bhaskar) and (*both enabling and constraining*) symbolic backgrounds or "habituses" (Pierre Bourdieu).

We thus have to take seriously into account a fruitful opening of the recent science and technology studies towards modern social theory or a more broadly conceived *social theory* of *knowledge* or *social epistemology* (Fuller 1988). This also implies a radical shift from the micro-oriented ethnographies of laboratory life and scientific controversies towards a comprehensive *macro-social* theory of knowledge (as characteristically outlined in the works of Marx, Mannheim, Bourdieu, Beck, Lash, Castells, Berger and Luckmann), which reincorporates science and technology studies in the more general concerns of cultural studies and social and political theory (Pels 2003b).

It additionally extends our scope of study from academic beliefs toward the hotly debated Mannheimian problem of *ideology* and *ideology critique*, as well as toward contemporary debates on the *public role* of intellectuals, experts, professionals, epistemocrats or cultural capitalists. We could therefore restore the symmetrical interdependency among *epistemology, sociology, and ethics*, thus counteracting the tendency of any sort of disciplinary imperialism, or "disciplinary chauvinism" (Steve Fuller).

### 3.2. The second phase

The second phase was generally characterized by a wide array of arguments and approaches which, sometimes in a quite obsessive and naïve manner, focused on unmasking (or demasking) science (see Shapin 1995, Ashmore & Richards 1996). This was often performed by subversively regarding science as ideological and hegemonic, as highly reducible to power and politics, or as androcentric and gendered.

For example, the case of feminist "standpoint epistemology", which has drawn fire from Marxism as well as from postmodernist philosophy, started from the radical position that all knowledge and all social and cultural identities are precariously constructed and performed from a specific social location. Mannheim's sociological "holy trinity" (class, race, gender) is overwhelmingly influential to any form of cultural production. The sovereign, totalizing Eurocentric view from "nowhere" (or "everywhere") is forever impossible. There is no universal, context-free, or "innocent knowledge" (Flax 1992). In other words, perspectivism is always inescapable (cf. Pels 1997, 2000). What is actually important here is *"who needs truth?"* (Harding 1992: 585)[5].

But this profoundly calls for a *critical sociology of science and technology* (W. Rehg) – that is, a critical broadening of contemporary science and technology studies, beyond the selective ontological focus on "substantive findings" and the limiting questions about "public participation and engagement".

What is really needed here is to always keep a sharp reflexive eye to the diverse social phenomena between technoscience and other parts of society, as well as to the wider financial, political and historical contexts and dynamics of science and technology, so that we can possibly apply new emancipative policies and move out from today's dominant debilitating discourses, in a largely uncaring "world risk society" (Ulrich Beck).

For example, the risks and potentialities of the rapid developments on artificial life/intelligence, genetics and nano-, bio-, or info-technologies cannot be fully grasped without thinking *more globally*, in the crucial direction of new areas of study and forms of radical egalitarian action. Hence, more sociological emphasis should be carefully put on the *global implications* of science and technology, as well as on the new emerging alliances between technoscience, the public and the state, towards an alternative *Wissenpolitik* (Stehr 2005).

Therefore, more sociological emphasis should be carefully put on the global implications of science and technology, as well as on the new emerging alliances between technoscience, the public and the state, in order to effectively orientate the rapidly increasing volume of new knowledge towards societal and human betterment. The urgent necessity to "act collectively" ultimately entails that technopolitics enters the complex socio-political terrain of the 21st century, as an agonistic intersection of politics and technology, or as a self-conscious "strategic practice of designing or using technology to constitute, embody, or enact political goals" (Hecht 1998: 15).

In the context of contemporary infosociety and cyberculture, technopolitics as a technologically mediated form of political engagement and action is a radical tool potentially available to oppositional, oppressed or excluded, social groups and communities (see Kellner 1997). It is thus an important means of consciousness-raising and empowerment.

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[5] In a parallel line, "feminist post-structuralism", which in principle disavowed the realist (Western) concepts of "representation", "false consciousness" and "distortion", comprehensively stressed that epistemic judgments about truth and falsity are themselves always performatively constructed and negotiated, because they are inescapably partisan in character and necessarily informed by moral, political and cultural concerns. It also interconnected "womanhood" and "motherhood" (and even "race") with social and interpretative processes and looked for meanings that are taken for granted, hidden and suppressed, strategically privileging quality over quantity, culture over nature, relations over substances, and constructions over essences (see Henwood 1993).

In this analytic setting, social scientists look beyond the postmodern egoistic battle over prestige, authority and power, towards the promising future of technoscience and society. Such a bold step imaginatively reconstructs "the fundamental notion of knowledge politics (which erases some traditional distinctions) as a point of departure for making new distinctions which yield an alternative description of the idea of scientific autonomy … scientific autonomy can be reinvented within this new framework of graded distinctions and permeable boundaries by attending to the specific effect of *deceleration* or *unhastening* which gradually distinguishes science from 'faster' practices such as politics, journalism, or economic management" (Pels 2003a: 210).

## 4. Concluding Remarks

As a meaningful part of society, technoscience is inextricably attached to various relations of knowledge politics. But this ultimately gives technoscience the unique historical opportunity to creatively accomplish and reflexively boost its autonomy. In this new constellation, epistemological humility, modesty, weakness and imperfection "could be the typical contributions of (social) science to the shape of the world. It could say things that are interestingly feeble, shaky, risky, and weird. Political and entrepreneurial metaphors, work-styles, output indicators and leadership models wreak havoc when they are too diligently pursued in science" (Pels 2003b: 219).

The social researchers, always keeping in mind "both how little the single scientist knows in relation to the total community of inquirers, and a respect for the complexity of reality" (Kalleberg 2007: 141), need to fruitfully capitalize on *both* their experience of uncertainty (and unpredictability) *and* their sense of personal and collective moral responsibility. And modern social science in general, as an open, emancipatory human project, needs to decelerate a bit in order to effectively reflect upon its own history and perspectives, where it has been and where it is going.

## References


1. Ashmore, M. and Richards, E. (eds) (1996) "The Politics of SSK; Neutrality, Commitment, and Beyond" *Social Studies of Science* 26: 219-418.
2. Bell, D. (1974) *The Coming of Post-Industrial Society*. London: Heinemann.
3. Delanty, G. (2001) "The University in the Knowledge Society" *Organization* 8(2): 149-153.
4. Feenberg, A. (1999) *Questioning Technology*. Routledge: New York.
5. Flax, J. (1992) "The end of innocence" in J. Butler and J. W. Scott (eds) *Feminists theorise the political*. London: Routledge.
6. Fuller, S. (1988) *Social Epistemology*. Bloomington: Indiana University Press.
7. Harding, S. (1992) "After the Neutrality Ideal: Science, Politics, and «Strong Objectivity»" *Social Research* 59(3): 567–87.
8. Hecht, G. (1998) *The Radiance of France: Nuclear Power and National Identity after World War II*. Cambridge: MIT Press.
9. Henwood, K.L. (1993) "Women and later life: The discursive construction of identities within family relationships" *Journal of Ageing Studies* 7: 303-319.
10. Irwin, A. and M. Michael (2003) *Science, Theory and Public Knowledge*. Maidenhead: Oxford University Press.
11. Kalleberg, R. (2007) "A Reconstruction of the Ethos of Science" *Journal of Classical Sociology* 7(2): 137-160.

12. Kellner, D. (1997) "Intellectuals, the New Public Spheres, and Technopolitics" *New Political Science* 41-42: 169-188.
13. Knorr-Cetina, K. and Mulkay, M. (eds) (1983) *Science Observed*. London: Sage.
14. Kreibich, R. (1986) *Die Wissenschaftsgesellschaft*. Frankfurt: Suhrkamp.
15. Latour, B. and S. Woolgar (1979) *Laboratory Life. The Social Construction of Scientific Facts*. Beverly Hills: Sage.
16. Luhmann, N. (1992) *Die Wissenschaft der Gesellschaft*. Frankfurt: Suhrkamp.
17. Lynch, M. (1985) *Art and Artefact in Laboratory Science. A Study of Shop Work and Shop Talk in a Research Laboratory*. London: Routledge and Kegan Paul.
18. Pels, D. (1997) "Strange Standpoints, or: How to Define the Situation for Situated Knowledge" *Telos* 108: 65-91.
19. Pels, D. (2000) "Reflexivity: One Step Up" *Theory, Culture & Society* 17(3): 1–25.
20. Pels, D. (2003a) "Unhastening Science: Temporal Demarcations in the Social Triangle" *European Journal of Social Theory* 6(2): 209-31.
21. Pels, D. (2003b) *Unhastening Science*. Liverpool: Liverpool University Press.
22. Schelsky, H. (1961) *Der Mensch in der wissenschaftlichen Zivilisation*. Cologne/Opladen: Westdeutscher Verlag.
23. Shapin, S. (1995) "Here and Everywhere: Sociology of Scientific Knowledge" *Annual Review of Sociology* 21: 289-321.
24. Stehr, N. (2005) *Knowledge Politics: Governing the Consequences of Science and Technology*. Boulder, CO: Paradigm Publishers.
25. Van Peursen, C. A. (1970) *Strategie van de Cultuur*. Amsterdam: Elsevier.
26. Webster, F. (1995) *Theories of the Information Society*. London: Routledge.
27. Wilden, A. (1972) *System and Structure: Essays in Communication and Exchange*. London: Tavistock Publications.

# RAZMIŠLJANJA O PROMENI PROFILA NAUKE I ZNANJA

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*Rad sažeto predstavlja teoretska razmišljanja o postepenoj promeni profila nauke i znanja sa refleksivnog sociološkog i epistemološkog stanovišta. Prvi deo predstavlja relevantne debate o univerzitetu, nauci, znanju i takozvanom "refleksivnom zaokretu". Analitička pažnja posvećuje se ovde sociološkom i epistemološkom "znanju znanja", "naturalizaciji" ili "socijalizaciji" epistemologijije i višestrukim efektima socijalne složenosti. Drugi deo razumljivo opisuje i kritički razmatra dve centralne faze radikalnog talasa socijalnih i naučnih proučavanja nauke i tehnologije. Prva "opisna" faza refleksivno se rekonstruiše kroz pojmove društvene teorije znanja (socijalna epistemologija). Druga "postmoderna" faza refleksivno se rekonstruiše kroz pojmove novog smisla "znanja politike". Ovaj novi smisao eventualno pruža tehnonauci jedinstvenu istorijsku mogućnost da kreativno ostvari i da se ponosi svojom autonomijom unutar etike epistemološke slabosti.*

Ključne reči: *Znanje društva i znanje politike, socijana epistemologija, nauka-tehnologija-nauka, autonomija i refleksivnost*