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"SOCIAL SHAPING ON THE MOVE?  
on the policy relevance of the social  
shaping of technology perspective

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## **SOCIAL SHAPING ON THE MOVE? ON THE POLICY RELEVANCE OF THE SOCIAL SHAPING OF TECHNOLOGY PERSPECTIVE**

### **1. Introduction<sup>1</sup>**

In retrospect, it is probably by accident that the COST social science project A4 concerned with social studies of technology came to be called "Social shaping of technology". More so because the initial title was a different one; "The impact of the social environment upon the creation and diffusion of technologies". The so-called memorandum of understanding, which outlined the proposed activities, had few if any references to concepts from the more "established" form of technology studies. With different people participating in the project, another name might have been chosen (even if the title would probably have been changed anyhow due to its rather cryptic sound).

Nevertheless, the renaming of the programme, to "Social shaping of technology" was a conscious move to signal a programmatic connection to a non-determinist, nonlinear understanding of technology as a social process. In this respect, the concept of social shaping gave the right connotations. It was meant to give room for several approaches within a rather broad set of concerns. The agenda was of course meant to be focussed, but not to be narrow in terms of applicable theories and concepts. Thus, in principle, the programme could just as well have been called something different, like 'social studies of technology', 'constructivist studies of technology', or simply 'technology studies'.

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<sup>1</sup>This paper was presented at the COSTA4/TSER conference "The Promise of Technology", Copenhagen 2-3 October 1997. It has grown out of the work of COST A4 and represent an effort to take stock of some of the achievements. However, it is not meant as a summary of the many workshops and publications that has emerged, but rather to pursue a theoretical ambition related to clarifying policy implications of the social shaping of technology perspective. This was the explicit aim of a workshop held in Enschede in 1994 and further pursued in a workshop in Trondheim, March 1997, but it has been on the agenda for as long as COST A4 has been active.

A main difficulty could have been to "isolate" the effect of COST A4, in relation to other projects, efforts, and occasions of technology studies on the international scene. However, I do not think that would be a meaningful exercise since the intention with the paper is to contribute substantively to the issue, not to evaluate the work of COST A4.

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The first lesson to be drawn from this is that one should be careful not to look upon "social shaping of technology" as a well-defined theory of technology. Some boundaries are drawn, of course, and the title of "Social shaping of technology" means that the concerns and methods are different from those of traditional approaches like impact studies or neoclassical economics. Still, it is used in an inclusive manner that in reality covers most of the approaches that currently are used in the academic field usually called "Technology studies" (Williams & Edge 1996, Cronberg & Sørensen 1995).

However, outside the field of technology studies, the phrase "Social shaping of technology" seems to have caught on and given a distinction that is greater than the one it carries in the academic community. This is probably because it is a verbal image of a central tenet of the new social studies of technology; the need to study technology in the making and in context. Rather than arguing whether "social shaping of technology" is an appropriate name, this paper is based on the pragmatic view that exploring the underlying substantive issues is more interesting. In this paper, this exploration is marked by a particular concern for the policy implications of thinking about technology in terms of social shaping. However, to do so, it is necessary also to discuss three topics or sets of problems that are important and influential in technology studies generally (and also in the work of COST A4):

- the social theory problem
- the national contingency problem
- the problem of generalising from case-studies.

The first topic emerges from the concern that ideas from social shaping of technology should be juxtaposed and linked to efforts to develop social theory to cope with issues like knowledge and materiality. As I will argue later, the problematic understanding of these issues has very practical implications.

The second topic is important because it helps to situate concepts of social shaping of technology in a larger context of institutional, economical and cultural matrixes of nation states. In particular, as I will try to demonstrate, there are interactions between what heuristically may be called "national styles of technology studies" on the one hand, and economic and political features of the nation state on the other. When exploiting social shaping of technology research as a resource of technology policy, this interaction needs to be reflected upon.

The third topic arises from a common critique of social shaping of technology research: Since it largely is based on case-studies, with the emphasis on local co-constructions of technology and culture, how can there be any form of generaliseable knowledge coming out of such efforts?

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## 2. Social shaping versus social construction of technology - convergence and extensions

The phrase "Social shaping of technology" has, as far as I have been able to trace it, an Edinburgh origin and was launched in the title of the MacKenzie/Wajcman collection (MacKenzie & Wajcman, 1985). It was related to the so-called strong programme of science studies, but loosely and indirectly. The social shaping of technology programme, as it was outlined in the introduction, was above all to criticise and transcend technological determinism - the assumption that technology had an asocial origin and definite, well-defined and predictable outcomes.

The initiative coincided with other efforts to develop new approaches to technology studies (see, e.g. Hughes 1983, Bijker, Pinch & Hughes 1987, Latour 1987). While these contributions displayed a variety of concepts and methods, nevertheless they shared the aim of transcending technological determinism and provided a new basis for making anthropological, historical and sociological analyses of technology. Another common feature was the emphasis placed upon the study of technology during its inception, by analysing research, invention, innovation and design of new artifacts and systems. Compared with previous efforts to study technology, this was a move "upstream", from the analysis of "impacts" to the investigation of how technologies were constructed.

Initially, there were some differences of emphasis between the social shaping approach of MacKenzie and Wajcman on the one hand, and the social construction programme outlined by Bijker, Hughes, & Pinch (1987). To analyse social shaping meant to analyse the influence of particular political, economic and cultural interests and values, while the social construction programme was characterised by a more explicit agnosticism in terms of what should be meant by mapping the "social". Social shaping meant an interest in identifying different options present in the development of a given technology, asking how come some options were preferred to others. How did the refrigerator get its hum?, to cite the title of a paper by Ruth Schwarz Cowan (1985). The answer was expected to be given with reference to established social categories, like class and gender. The social constructivists had the same ambition with respect to choice of options (in their vocabulary, closure), but argued the need to keep an open mind on how closure was achieved, and by whom.

In my opinion, the paradigmatic demonstrations of social shaping were David Noble's work on NC machinery (Noble 1979, 1984) and Langdon Winner's paper "Do artefacts have politics?" (Winner 1986). Noble argued that NC technology was the outcome of coinciding interests of industry, defence and professional engineers, an amalgam of interests that he perceived as characteristic of modern capitalism. Winner provided more examples of how technologies had been fashioned according to well-defined social interests, implying that this

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would be typical of the development of new technologies. Artifacts were essentially politically shaped.

The last decade has made the nuances between social shaping and social construction of technology smaller and less meaningful. Both parties have modified their positions. Social shaping has become more open to the possibility that the choice between options cannot be attributed to predefined social interests (like gender, class and ethnicity), while social constructivists have become more sensitive to the importance of established powers, networks and institutions (Callon 1991, Bijker 1993, Williams & Edge 1996). Essentialism has become an invective to both camps, an addition to technological determinism and linear models.

Of course, there are still important disagreements and differences within technology studies, but they can no longer be attributed to the difference between social shaping and social construction of technology. This is why we now can use the label of social shaping of technology to designate a generic approach to the study of technology that remains anti-determinist and anti-linear, but less concerned with the issue of “materialisation” of social interests. The term signifies a set of approaches that share the following set of assumptions and concerns:

- It explores the social processes related to technological change.
- Negotiations between different social groups and actors is a focal point, emphasising concepts like flexible interpretation of technology and technological controversy.
- It highlights the choices between different technical options potentially available at every stage in the generation and implementation of new technologies.

To study the social shaping of technology is thus to analyse the construction of sociotechnical entities (Cronberg & Sørensen 1995, Williams & Edge 1996).

Another set of changes is related to the spaces under scrutiny. While both the social shaping and the social construction perspective meant a focus on the genesis of technologies, this is now changing. The distinction between design, implementation and use is no longer perceived as clear-cut, and the field has definitely broken with the previous tendency to assume that laboratories and other sites of design and development should be privileged locations of analysis. Increasingly, technology (or, rather, sociotechnical entities) is seen as shaped in all kinds of localities. The shaping that takes place so-to-speak outside development and design, is still consequential for the outcomes in terms of social practices and cultural meanings. Development and design are important, but not decisive (Sørensen 1994, Williams & Edge 1996, Lie & Sørensen 1996).

The importance of this development in terms of the potential usefulness of the social shaping perspective should not be underestimated. First, this means that technology policy itself becomes more central as an object of social shaping research. Second, and most important, the “consequences” of technology policies

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may be studied, not only in terms of invention and innovation, but also with reference to social change and social stability. This means that the vocabulary of social shaping research and of technology policy potentially has been enriched by new concepts, in particular *catalyst*, *domestication* and *entrenchment*. Let me briefly outline what this means.

The understanding of technology as having catalytic properties rather than being a force of change is not just a change of the stock of metaphors from classical mechanics to chemistry. It is a main ingredient in the development of a non-determinist conceptualisation of technology that retains the idea that technology plays an important role in processes of social change. The challenge has been how to avoid reductionist moves, like the attribution of particular social changes to particular qualities of technologies, while also escaping the sociological trap where one is bound to explain social changes only in social terms. When technology is perceived as a catalyst, it is seen as an agent that facilitates or makes possible a destabilization of a given social order by other actors and thus enables the opening of new options. Whether the social order is changed or not depends on the presence of actors and efficient strategies to make use of the destabilised situation. Thus, social change is neither made through new technologies nor through new social strategies or juxtapositions of structures, but rather through new sociotechnical constellations. Neither technology nor culture suffices, the result is achieved through interaction and the weaving together of material and nonmaterial elements.

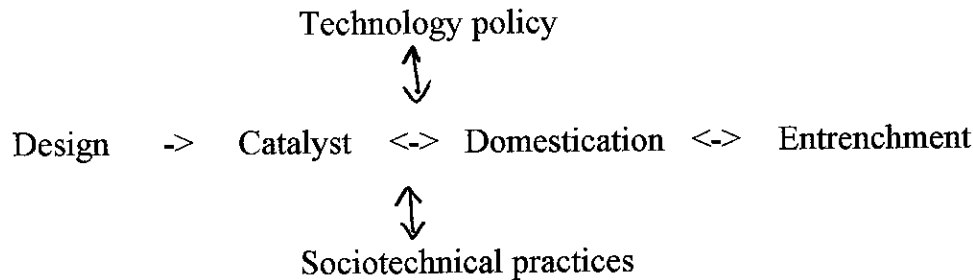
This weaving together is captured in the concept of domestication of technology. Nothing happens unless technology is put to work, unless it is appropriated by social actors. It has to be transformed from being an outside, alien element to a familiar one, embedded in social and symbolic practices. Technology has to be acquired, put to use and given meaning, it has to become a part of the relevant practical, symbolic and cognitive spaces of the actors involved (Silverstone & Hirsch 1992, Lie & Sørensen 1996, Sørensen, Aune & Hatling 1996).

The outcome of a collective process of domestication of a technology may be that it becomes *entrenched*. This means that the technology is made part of a stable sociotechnical arrangement in a way that makes it increasingly difficult to do away with it. A prime example of this is of course the motorcar that has been transformed from a novelty that was a luxury and a sports good of the few, to become an artifact perceived as a natural constituent of modern life. Entrenched technologies pose a particular challenge to technology policy because very often, dis-entrenchment seems very difficult to achieve. Thus, the space of regulation becomes quite limited and difficult to extend.

Entrenched technologies still need to be domesticated by users because new versions are made available to new people. In principle, domestication may be a source of destabilisation in the sense that new meanings or new practices may be constructed, but this possibility is not very well understood. Thus, the current

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understanding of sociotechnical change may be illustrated, albeit crudely, by figure 1.



*Figure 1. Basic elements of the universe of sociotechnical change.*

### 3. Theory into practice?

There are no well-established criteria to evaluate the policy relevance of knowledge. Both “policy” and “relevance” are ambiguous concepts,<sup>2</sup> and there is no simple recipe that allows the translation from research into practice. We have to be careful to avoid technocratic fallacies.

An additional problem is that studies of technology policy have tended to be descriptive. The topic is undertheorised and under-conceptualised. This is even the case with technology assessment, with the notable exception of constructive technology assessment (CTA). Here we find a concerted effort to apply insights from social shaping of technology research that itself is an example of how social shaping may provide policy input (Rip, Misa & Schot 1996).

However, there is a long tradition of analysing more generally how social science knowledge is made use of in policy work. The literature suggests at least two important findings. First, the social science knowledge very often does not carry over into policy. Second, policy makers use social science knowledge for a host of different purposes, not just as input to problemsolving and decisionmaking (Weiss 1979). The instrumental model of knowledge utilisation, where research results are supposed to be a basis from which policy may be rationally deduced, is clearly flawed. These findings are also in concert with one of the basic tenets of social shaping of technology research, namely that is a mistake to assume that we often find linear transformations from science to innovation.

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<sup>2</sup>This is fairly evident from studies of the use of social science research in public administration, see, e.g., Weiss & Bucuvalas (1980).



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What social shaping research, in line with other social science efforts, can hope to contribute is to help develop a knowledge base for policy. The formulation of policy is creative work, negotiating different points of views and different bodies of knowledge. However, new research-based knowledge may make a difference, to the way problems are formulated and to the tools available to suggest strategies to cope with them.

Terms like knowledge creep and knowledge acquisition have been used to describe this process. On the basis of the more recent work of Beck (1992) and Giddens (1990), one could alternatively suggest that the interaction should be understood in terms of a *reflexive* model. Knowledge is made use of as input to the reflexive process that leads to policy formulations. While this may sound rather weak and defensive, that is really not the case. Decisionmaking is an exercise in the combination of deductive and inductive reasoning. Knowledge, formalised as well as non-formalised, transformed, compartmentalised, etc., is a resource in this process, in two major ways. First, it helps to structure the problem and the discourse about the problem. Second, it helps understanding the problem and the available solutions. Both these aspects of knowledge are important to see its potential policy relevance. In the case of social shaping of technology research, a basic issue becomes its ability either to change the perception of the objects of technology policy or to improve the understanding of challenges, or both.

This may sound overly academic and abstract, and in clear need of exemplification. To begin with, let us take the car. All western countries display a similar pattern in the way cars have become entrenched as the major instrument of transport of people. The now common acknowledgement that cars represent a major environmental problem in terms of pollution, noise, resources, land use, and visual qualities, has yet proved unable to destabilise this entrenchment. On the contrary, the number of cars and the average length of driving are still increasing.

Public regulation of car use has been dominated by financial instruments. One has assumed that increased taxes would reduce the use of cars, either generally or within a particular local context. However, minimation of costs of transport does not seem to be a central concern of the public. Over and over again, the car is established as having as much expressive as instrumental qualities. Driving is not just an act of optimised moves. It is embedded in a larger system of meaning and comfort as well as a demand for flexible mobility (Sørensen & Sørgaard 1994). Thus, taxes may have an effect, but it is rather limited. People continue to drive because it is perceived as more comfortable, and because they can afford it.

Of course, taxes may be raised to a level where the burden gets too heavy. However, the economic and social side-effects of such increases (e.g. on the price of houses and land, on the distribution of real income, and regional dynamics) make this move unlikely. Therefore, technical solutions like improvements of the

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gasoline-based car (greater fuel efficiency, use of catalysts, lighter bodies) or alternative cars (LEVs, fuel cells, LNG cars, etc.) are attractive, but they leave important problems, for example related to land use, unsolved.

Social shaping research on cars suggests different approaches to the problem of regulating car ownership and use. Since the car is such important part of the symbolic practices in everyday life as a carrier of meaning and expression of identity, one cannot regulate it successfully by instrumental means. The problems do not reside with the car as an artefact. They emerge from the different set of practices where the car is involved.

Thus, the key concept appears to be *mobility* rather than the car. The issue that confronts modern industrialised societies is how come the levels of mobility have increased so much, and why mobility in terms of individually controlled vehicles is valued so highly. The so-called car problem is basically a mobility problem. This does not make the policy challenges less pressing, but it opens different sets of arenas and tools. For example, the social construction of cities appears to be a very pertinent problem. Why are they commonly made to demand a high level of mobility?

Similarly, a social shaping inspired analysis of energy consumption in Norwegian household ends up by redefining the policy issue of sustainable consumption of energy. When studied in this manner, it turns out that most people do not consciously consume energy. Energy is an invisible good, the consumption of which is generated indirectly through other activities and acts of consumption. When people construct their residences, transforming houses to homes, what they do are very consequential for their use of energy, but these consequences remain backstage (Aune 1997). Thus, to treat energy as any other good is misleading, and to use energy prices as the prime policy tool is only efficient under very particular circumstances.

A third example may be taken from ongoing research on social learning in multimedia. One striking aspect of the multimedia situation is the large number of initiatives taken by a host of actors related to newspapers, banks, governmental agencies, small media companies, consulting firms, etc. to explore the potentials of this new technology through sustained trials to find potentially interesting and/or profitable applications. Even if the efforts to organise the supply of access services are large, the - in traditional terms - strictly technological actions do not tell much what will be gained in the future. This will be much more dependant on content providers and users (Brosveet & Sørensen 1997). If technology policy in the multimedia field ignores the latter efforts, it will be much less efficient in the promotion of multimedia technologies in the information society that is envisioned.

Many other examples could be added. To summarise what they amount to, one can identify the following policy inputs that could be extracted from social shaping of technology research:

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- a. *an extension of the space of technology policy.* This is because social shaping helps to move away from a singular focus on research, development and design, and to put much more emphasis on what is happening through implementation and use and the learning associated with these activities. Given the role of technology in relation to the conceptual triangle of catalyst, domestication and entrenchment, technology policy would be concerned with most areas of policy making.
  - b. *redefinitions of problems and concerns,* away from individual artifacts and technologies, towards techno-cultural clusters of practices. To some extent, this means that problems are perceived in broader terms, like suggested in the multimedia example above. But redefinition can also be a real move of focus, for example for the car to mobility.
  - c. *a different view of the tools potentially available,* with increased emphasis on the need to combine policy instruments more creatively. The social shaping insistence to perceive technologies as encultured means a much greater concern for cultural aspects. This is not a rejection of economic instruments, but rather a critique of simplistic beliefs in the efficiency of such tools.

In addition, since the social shaping tradition values reflexivity as constitutive of the performance of research, it is probably also able to engage productively in reflexive exchanges with policy-makers.<sup>3</sup>

Having said this, one has to note that “relevance” clearly is not a simple property of knowledge or research that can be claimed. Nor is it something that can easily be reconstructed with hindsight. “Relevance” is a negotiated quality, and there may be different reasons to accept or dismiss the labelling of a given piece of knowledge as relevant. A first-order approximation could be that “relevance” is related on the one hand to *availability*, and on the other hand to *applicability*, whether or not a given policy problem can be related to it or not. In addition, properties like *robustness* and *acceptability/assumed reliability* seems important.

The issue of availability, which really is a knowledge transfer challenge, is of course important. Social shaping of technology researchers have not on the whole felt a need to make their work accessible to policy people, but some have. Probably, in this respect, social shapers are like most social scientists.

I have tried to make a case for the applicability of social shaping research above, and I think that in theory, this tradition has more to offer than most of the traditional approaches to the study of technology. To take the argument further, I will now return to the three challenges that I announced in the beginning of the paper: social theory, national contingencies, and case studies, because they have

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<sup>3</sup>Perhaps ironically, one could foresee the possibility of an organised example of Giddens double hermeneutic circle: social shaping researchers interpreting technology policy people, and vice versa.

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a bearing on the issue of reflexivity and the issue of robustness/acceptability/reliability.

#### **4. Challenges of/to policy**

One of the paradoxes of technology is in the contradictory perception of its importance. In the popular discourse, new technologies with their seemingly magical properties, are seen as the major motor of change. Society is transformed, mainly because of technological development. Catchwords like Information society are typical of this belief. In policy as well as in academic discourses, however, technology is a backstage phenomenon. Technology is not an acknowledged part of the policy instrumentarium, and it is definitely not seriously integrated in social theory and similar academic efforts to understand social order as well as social change.

It is no accident that the backstage nature of technology is found both in policy and in social theory. These two discourses are related, although the relationship is distant and mediated. Intellectuals have never been really happy with technological issues (Latour 1996), they are somehow suppressed. When social shaping research claims policy relevance, at the same time it has to engage with social theory in order to support this claim.

This challenge can be understood in terms of the need to conceptualise the material nature of social action. How may we integrate the material (nature, technology, bodies) into the analysis of human societies? What is the role of technology as part of human action? How may we transcend the immanent fear of the material that we find within the social and human sciences?

Even if much effort has been put into the conceptualisation of the social nature of materiality, there is still a lot of work to do. In fact, even such a basic notion as negotiation has seldom been dissected in technology studies to provide a more detailed insight into who negotiates what under which circumstance and with what outcomes (for an exception that indicates where this may lead us, see Bucciarelli (1994)).

There are presently at least two streams within a broader social shaping community that can be said to work with the social theory challenge. Even if they are related, they work with different conceptual strategies. The most established is actor network theory that in this respect pursues a semiotic inroad, exploring concepts like inscription, delegation, and network (Akrich 1992, Latour 1992). Partly from the same tradition, but also drawing upon other positions, is the effort to explore the use of metaphors like hybrids, cyborgs, and monsters to describe and analyse the ambiguous, but also promising, welding together of technology and culture (Latour 1991, Law 1991, Haraway 1991, 1997).

A second stream emerges from gender studies where feminists have coined the concept of mutual shaping of gender and technology, or in general terms, of

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culture and technology (Berg 1996). Some of the achievements are definitely inspired by Haraway's cyborg metaphor, but the analysis of 'mutual shaping' comes closer to show us the dynamics of the construction processes in question.

This list could have been expanded, e.g. to include efforts of anthropologists like Emily Martin (1989, 1994). Her analysis of how knowledge from scientific communities is mediated, reproduced and transformed, adds important insights about the symbolic role of discourses in relation to both material and nonmaterial practices. However, the main point is already made, namely the fact that there are sufficient efforts under way to guarantee that the social theory challenge can be addressed.

Another important paradox of technology is the reproduction of a dynamic relationship between universal development and local appropriation. Even if the same technologies are made available everywhere, and in spite of large engineering efforts of standardization, there is no definite evidence of cultural convergence. In fact, as is demonstrated in the classical work of Thomas Hughes (1983), national, regional and even local structures may contribute to specific configurations of sociotechnical systems. This is also a basic tenet of social shaping research.

However, if sociotechnical configurations have distinct local features, this must somehow be reflected in the technology policy discourse. We could call it the national contingency problem because of its open-ended nature. We know that there is a re-embedding dynamic, to use Anthony Giddens' (1990) concept, that may introduce distinct local features, but the relationship between the universal and the local, between the disembedding and the reembedding, cannot be determined. There is contingency at work, but no determination.

Interestingly, we can observe a similar situation when we compare social shaping research from different countries. Even if we can see similarities in the concerns and research agendas that develop, there are quite distinct national "styles" in the way research is performed (Cronberg & Sørensen 1995). There are dissimilarities of research that in principle is performed on the same set of objects and drawing from the same theoretical source of inspiration. Usually, such dissimilarities would be outlined in terms of lag, misunderstandings, quality, or relative dominance of different schools of research. The underlying assumption is that, over time, convergence will take place.

However, the Cronberg & Sørensen collection points in a somewhat different direction. There is some convergence to be observed, most evidently from the fact that the field of technology studies becomes established with quite similar concerns related to the definition of what are important issues, but also through engagement with the same "international" research traditions. On the other hand, national contingencies work to modify and diversify. The research problems, when we look at them in greater detail, is partly defined through political concerns that reflect different political cultures and different industrial and technological structures. They are also shaped by academic traditions.

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Similarly, the “international” research traditions are translated in order to be domesticated on the existing academic terrain. Even if this terrain changes, translation is important and produces a national “flavour” to the intellectual practice of social shaping research.

I believe the social shaping approach is the only effort in the study of technology that has begun to integrate this reflexive point in its own self-understanding. This should definitely be an advantage. Since there are national contingencies of technological development as well as of technology policy, the knowledge base of technology policy needs to be sensitive to such contingencies.

This does not mean that social shaping research needs to be or should be local in scope and ambition. The point is to be able to continue a dynamic relationship between “universal” and “local” efforts of understanding, since they enrich each other, while at the same time be aware that such a dynamic is played out.

A similar insight should be teased out of the third challenge mentioned in the introduction, that of case studies. It has been a characteristic of social shaping research that has mainly been based on detailed analysis of single cases. Thus, one has been careful not to make universal statements from these case-studies, but rather to develop theoretical agendas and conceptual frameworks that transcend the individual case.

On occasion, this dominance of case-studies has been used to criticise social shaping research for lack of ability to provide more general insights into the nature of technological development. To be useful to technology policy work, the argument goes, such lack of generaliseable arguments is a serious deficiency. Consequently, one would need social shaping research without the bond to case studies.

Fortunately, there are two serious fallacies in the critique. First, the need for generalised knowledge is related to the instrumental model of policy relevance. If one should deduct policy from knowledge, it needs to be robust in this manner. However, such deductions are not possible, and there are critical things to be said about the validity of claims about general knowledge in the social sciences. But since we have to work from the reflexive model, the requirements placed on knowledge to be relevant are different.

Second, the critique confuses statistical generalisation and synthesis or analytical generalisation (see Yin 1984). As indicted earlier in this paper, social shaping research has been able to, through case studies, of identifying features of technological development that are expected to be common, not to say dominant qualities. The conceptual work, leading to the suggested triangle of catalyst, domestication, and entrenchment, is an example - there are many others that could be brought forward. Social shaping research cannot predict, but it can identify processes and phenomena that need to be observed and taken into consideration, there are regularities one may look for, etc.

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Having said that, the social shaping community may nevertheless be criticized for paying insufficient attention to synthetic work that cuts across the various case studies. Empirical work has been held in greater regard, even if theoretical concerns and interests have high visibility. Also, perhaps part of the critique about the case study orientation has been generated by a somewhat careless use of that label to designate one's research. When compared with standard case study methodology (Yin 1984), many social shaping "cases" are really something more. Many historians are weary of the case study label. They perceive of case studies as example studies and claim that their historical analyses of particular situations transcend such categories because they provide a deeper and wider insight than single cases usually are thought to give. Maybe the historical stance should be adopted also by others?

### **5. What is in a name? Transformation or dilution of the social shaping of technology approach?**

The social shaping of technology research presented in MacKenzie & Wajcman (1985) carried radical connotations. One could observe a definite neo-Marxist and feminist influence, and the point that technology was shaped by particular social interest, was a radical one. Ideally, technology should not be socially shaped, and if it were, the shaping process should be more democratic.

However, the political message was not singular and well-defined. What do we know when we know that artifacts have politics, and what do we do about it? Possible responses ranged from participation strategies and beliefs in the capacities of social movements to neo-Luddite arguments. Generally, I think it is fair to say, the analysis was far better than the prescriptions, and the latter were usually missing anyway.

The wider transfer of the concept of social shaping of technology has also been a set of translations in terms of aims, problems, and concepts. One could argue that at least some of the basic original intentions have been "betrayed", and there is some substance to that. A clear and dominant aim of early social shaping research was to show or, rather, expose the influence of dominant social interest in the assumed value-neutral area of development of technology. This is no longer at the forefront of the research interest. The notions of social interests are more nuanced, but also more diffuse. One is more concerned with the way interests are juxtaposed, negotiated and transformed, rather than the fact that there may be fundamental differences in terms of the power bases of these interests. Greater care is exercised in avoiding essentialist assumptions, regarding the character of social interests as well as the ability of technology to carry social interests in an unambiguous manner.

There are at least two influences that have shaped this outcome. One is the development within constructivist technology studies. They have demonstrated

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the need to be more careful in working from a priori assumptions about technology and social interests, but also what may be gained in this way. We have now a better idea of the process through which indeterminisms of technical change are produced: We have a fragile basis of predicting "impacts" because the interpretations of technologies are dynamic and situated, and thus inherently flexible. Not because technologies are flexible in a material sense, but because it is of great importance what the people that relate to a given technology, make out of it. Meaning and praxis is not predetermined at any stage. They are produced through controversies, negotiations, and truces, although in a contingent manner.

Given the critique from some quarters that constructivism is apolitical (Winner 1993), it may be paradoxical to argue that the second influence to transform the social shaping perspective is in fact coming out of efforts to apply that perspective to technology policy. Given that the concepts of the political may be rather different, it is still interesting to note that the social shaping perspective has made a slow, but definite impact in technology policy communities. In some sense, this is probably related to the reduced tendency to declare political partisanship, but there has also been a more sustained effort to explore and develop the political implication of the social shaping perspective.

This has meant an effort to clarify the political implications of a non-determinist, non-essentialist analysis of technology and technological change. The work has brought forward interesting, but also uncomfortable issues. What do we know when we know that technology is socially shaped, and who are able to make use of that knowledge? The eventual "betrayal" of the original social shaping perspective is probably to be found in the answer to the latter question. What follows from non-essentialist assumptions is a loss of faith in the possibility of privileging some groups of users over others. The 1985 version of social shaping represented a belief that women and/or workers could be the ones to find a social shaping perspective most useful because it would provide them with strategically useful knowledge. The 1997 version even tries to enroll powerful groups as users, based on the belief that this means - potentially - a general form of progress. A more sensible technology policy or improved tools of technology assessment are arguably in everybody's interest, even if the interests to be pursued are different.<sup>4</sup>

What is happening is not a loss of political argument in the social shaping perspective (or within constructivism, for that matter), but rather a loss of political innocence. The discovery of potential political usefulness is not necessarily beneficial or benign. Clearly, it represents a temptation to go pragmatic in order to gain consequence. However, it is not clear that one needs a principled rejection of such temptations. In pragmatic terms, the policy

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<sup>4</sup>There is no agreement on these issues. An interesting point of departure to evaluate the debate is found in *Social Studies of Science*, Special issue on 'The politics of SSK', vol 26, no 2, 1996.



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relevance is related mainly to three aspects of the social shaping approach. First, the insistence that technology is shaped in many different localities and that technology should be perceived as a process, rather than an artifact, extends the span of technology policy very considerably. While this of course complicates technology policy, it means that a lot more policy instruments may prove relevant than those traditionally directed towards the management of RTD-activities.

Second, the emphasis on users and the importance of users' activities in domesticating (or not domesticating) technologies, is in principle an agenda of empowerment of users. It may also, in combination with the first point, provide the basis for an argument for a broader conception of technology policy. Third, and in sense more traditionally academic, we have the argument that we provide resources of reflection and supports a more "enlightened" technology policy.

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