

*Randi Markussen & Finn Olesen*

# Information Technology and Politics of Incorporation

– The Electronic Trading Zone as coordination  
of Beliefs and Actions

## Summary

Information technologies (IT) have become a politically important issue over the last ten years. Governmental reports promote the idea of a new information society, or network society, where ITs are a prerequisite for the economic and social development. The discourse and the rhetoric about technology and its relation to society are dominated by modern, rational and macrosocial understandings of technology. In this paper we challenge dominant rational discourses on technology and present alternative views to bring new perspectives to the subject in order to complicate and enrich our understanding of technology and how it relates to society. Our aim is to develop a theoretical framework that can account for a dynamic and microsocal approach to studying the implementation of an Electronic Patient Record (EPR) at a Danish hospital. The key notions in the framework are 'trading zone', 'cooperation' and 'technological translations'.

## Introduction

Information technologies (IT) have become a politically important issue over the last ten years. Governmental reports, such as Information Society Year 2000 (Dybkjær & Christensen 1994), or the more recent Digital Denmark (Dybkjær & Lindegaard 1999), promote the idea of a new soci-

ety, an information society, knowledge society or network society, where these technologies are a prerequisite for the economic and social development. Advanced ITs are considered a necessary investment in order for society to survive in international competition.

The message is that technology can reform and revolutionize every sector of society. The discourse and the rhetoric about technology and its relation to society are dominated by modern, rational and macrosocial understandings of technology. The preoccupation with learning, knowledge and information as key elements in the economy and in society points to the spreading of cognitivist and cybernetic discourses and imageries.

In this paper we want to challenge dominant rational discourses on technology and present alternative views. The idea is to bring new perspectives to the subject in order to complicate and enrich our understanding of technology and how it relates to society. Our aim is to develop a theoretical framework that can account for a dynamic and microsocal approach to studying technology. More precisely we want to develop an approach by

which to study the implementation of an Electronic Patient Record (EPR) at a Danish hospital.

Instead of addressing these questions at macrosocial or macropolitical levels, we prefer to focus on the mundane processes involved in implementing or domesticating technologies locally. We draw on methods and insights coming out of the Humanities and newer research fields such as ‘Sociology of Scientific Knowledge’ (SSK) and ‘Science and Technology Studies’ (STS) and not least on some of the controversies within these fields, especially concerning agency and materiality (Olesen 1996, Markussen 2000, Lykke 2000). Before we dig deeper into the theoretical framework that guides our fieldwork, we will map out the terrain by introducing two different perspectives on power and technology.

### Spreading the work – Modern and amodern perspectives on technology

It is quite common to see a technology such as the EPR as a tool by which to apply national (or global) standards to local health care practices. It is not surprising, then, that the EPR is often taken to be an instrument of *power*; a political, economic or technical power building on macrosocial ideals of rational or efficient health care work to enforce specific improvements to the quality of health care. But this does not need to be the only way of understanding the circulation and incorporation of EPR in the practices of health care. In ‘The Powers of Association’, the French sociologist, Bruno Latour, has suggested a distinction between two models of understanding the circulation of facts and artefacts: ‘the diffusion model’ and ‘the translation model’ (Latour 1986).

Latour points out three key elements in the diffusion model of the circulation of facts

and artefacts through time and space: 1) There is an *initial power* or energy that starts the circulation; 2) There is a certain *inertia* that preserves this energy; and 3) There is a *medium* through which the fact or artefact circulates. (Latour 1986:266f). The one who initiated the circulation, is thus in a very powerful position according to this model. The great advantage is that one can explain everything by pointing to the person or the party with the initial power, or by pointing out the degree of resistance in the medium.

In the diffusion model it is not the displacement of the artefact or fact that need to be explained, but the speed by which it is distributed; and that depends on other people’s actions and reactions. The circulation of an EPR, for instance, is fairly easy to explain within the diffusion model. The EPR has some initial qualities which pretty much guarantees its success as a rationalising tool, and when it does not succeed it is due to the reactions by reluctant people or organisational barriers. Such (groups of) people slow down the speed of the EPR’s diffusion – while proponents will attempt to speed up the process.

In contrast to this rationalistic model Latour suggests another one in which it is assumed that the fate of a fact or an artefact is in the hands of later users. Each of them will react to it in many different ways: by throwing it away, neglecting it, bending it, betraying it, modifying it, etc. They *translate* it in accordance with their own interests and projects. An order is for instance rarely transmitted faithfully through many links in a chain of people – and “if it occurs it requires explanation.” (Latour 1986:267).

It means that if no one takes over a certain fact or artefact, nothing more will happen! Power is not something you have or are able to accumulate. You may have power in practice, but then *you* do not have it; or you may have power in theory, and then you have no

power. This model of circulation is similar to a game of football in that the initial kick-off is no more important than the 10th or the 324th kick at the ball. The 'diffusion' of an EPR is persistent work. This also means that one should *not* look at users as passive 'mail men' whose sole spectrum of behaviour has to do with slowing down or speeding up the process of circulation. Rather, they are 'actors' who contribute equally to the circulation of the EPR by translating it to fit with their own projects and (perhaps) by bringing it on to new actors.

In short, if we follow Latours suggestion, we may, on the one hand, choose to look for the forces and people who initiated the EPR, and for the subsequent effects in the health systems that make the process of diffusion slow down or speed up. On the other hand, we may study how each separate actor, taking over the EPR, will translate it in accordance with her own projects. In the former model the fact or artefact is assumed to be *transmitted* through the medium. In the latter it is taken to be *transformed* by the actors. In the former it is the derivation from the original EPR that needs to be explained; in the latter it is the invariant qualities that should be accounted for.

As the Dutch sociologist, Marc Berg, has shown (Berg 1998, 2000), a formalism (e.g. an EPR), and the reality domain, covered by that formalism (e.g. a local oncology ward) are simultaneously transformed in processes of implementation and use. Hence, formalism is not *above* reality. It is itself a working element in a practical context with the possibility of being incorporated into local idioms and practices, while the local context is simultaneously being transformed in certain respects by the work of the formalism. This dual aspect of bringing formalisms into play with a reality domain may be expressed by the term 'local universality', emphasising that universals, or standards always are in-

corporated – reflexively – in a local setting. Here 'local setting' can be anything from a ward at a hospital to a department at the Ministry of Health.

In this paper we will take over Latours translation model and use it to kick off our own project. By doing that we renounce the macrosocial belief in transparent transmissions of technology through time and space. Instead, we will assume that 'successful circulation' of technological systems is the *effect* of local processes of translation.

In what follows we will first discuss some aspects of the diffusion model, which is still at the heart of political discourses on rationalising the health services. Second, we suggest an analytic tool to understand and describe the local transformations involving the EPR, and third, we return to Latour to discuss some shortcomings of the – modernist – distinctions between facts and fictions, and text and materiality. If we assume that such separations are ontologically given, we will not be able to understand the boring, but persistent border-crossings between texts and materiality, the unmentioned commonplaces in everyday work practices that abjure dichotomies between signs and things.

## Standards of Work and making standards work

**O**n a macropolitical level, the Danish Public Health Services are challenged by political decisions to boost computer based information technology in health work on a national scale. The practical extent of the challenge is becoming more and more lucid through the ambitious plans to develop and implement a national EPR. It is an explicit objective in contemporary governmental or other political programmes to make basic functions and activities in the national health services more rational and efficient, and hence more economical in order to

improve the treatments of patients and upgrade the organisation of health care work.

For such ambitions to be fulfilled, the governmental agencies aim to secure a shared set of *standards*. These standards are of different kinds. There must be common or interchangeable standards for database structure, search hierarchies, programming languages, and hardware capacity. These standards are all taken to be of a 'purely' technical or semi-technical sort. There will furthermore have to be a focus on the use of professional language and terminology; for instance classification and definition of key words, and how to structure processes of communication; this is about semantic standards (Sundhedsstyrelsen 2000). User interface is yet another domain, in which there have to be considerations about shared standards. Moreover, job performance will have to be coordinated by the various groups of health professionals, both internally and in accordance with other groups and domains. Without tending to all levels of the standardisation work, it will probably not be possible to achieve the desired computer supported health services on a national scale.

The coordinated work of *standardisation* is thus crucial for a successful implementation of the electronic patient record to happen. We believe, however, that this immense undertaking will not come out well if the task of articulating standards is understood in a too rigid sense, which *excludes* ambiguous interaction and a certain recognition of what we term an electronic 'trading zone'. Standardisation will also have to encompass axiological, communicative, material and organisational aspects of the health services. But these aspects can not be conceived as anything but independent tasks of standardisation.

When for example Danish nurses partake in an assignment to explicate their professional terminology to bring it in accordance

with the International Classification of Nursing Practice, ICNP, they also contribute to a redefinition of nursing practice as such. The subtitle to the first Danish ICNP report (Mortensen 1996) is, in our translation: *A Common Professional Language in Nursing*<sup>1</sup>. We think those words express rather well the wish of the proponents to promote – one version of – an improved, shared reality in nursing to overcome geographic and communicative barriers. But if only a limited number of very general concepts are included in the master classification, that work is not likely to overcome the unwanted barriers. While a new standardised classification may provoke a number of changes among nurses in local hospital wards, that does not necessarily mean that their communication has become easier. One may characterise all the different kinds of standardisation work as *politics of incorporation* to stress that such heterogeneous kinds of action are non-exclusive dimensions of health care work, and any other enterprise involving coordinated actions.

### The Trading Zone

The basic assumption guiding our approach to investigating the incorporation of an EPR is that processes of change have to be described within a frame of description which encompasses both formal and informal, both symbolic and material, and theoretical and practical aspects of EPR implementation. In an attempt to establish such an approach we suggest the concept of a *trading zone* as the key term to signify a broad but still vigorous frame of analysis. By introducing this term we wish to explore whether the multiple processes of EPR implementation in the health care services can be understood analytically as 'trading within a demarcated area'.

1 Mortensen: "Et fælles fagsprog i sygeplejen."

The concept of a trading zone, as suggested here, has been developed by the historian of science, Peter Galison, as an analytic tool to encompass collaboration and coordination in large-scale, high-energy physical experiments (Galison 1997). The core question Galison wishes to answer is: What makes theorists, experimentalists, instrumentalists and participants from other advanced professions able to cooperate for an extensive period of time on a high-end physical experiment – *in spite of* vast differences in outlook, methodology, skills, and grasp of the problems involved? How might a historian of science best be able to grasp the involved processes and relations avoiding both the “Scylla of exaggerated homogeneity and the Charybdis of mere aggregation”? (Galison 1997:46). – Galison’s stimulating suggestion is that the experimenters succeeded because they engaged in ‘trade in a limited zone’. The concept emphasises local coordination without reference to some external standard, and that a trading zone should be seen as “a social, material, and intellectual mortar binding together the disunified traditions (.)” (Galison 1997:803).

In this and the following sections we will elaborate on the concept of trading zone, to make these ideas clearer. We do not pretend to remain loyal to Galison’s conception, because our target is different from his. He wishes to explore texts and machines of past events, and we want to investigate what, following Latour, we term: ‘naturally occurring experiments’ in real time settings. Hence, while Galison uses the trading zone to sort out historical material about highly profiled events of the past, we look for concepts that can sort out ethnographic material about mundane and taken for granted events of the present.

In a first approximation a trading zone is a place you can ‘enter’ and ‘leave’ again. This point is important, because it makes it

possible to describe how various actors can take part in some coordinated work and leave it again. Not least in the domain of EPR we think this dimension is relevant. Designers, who are engaged in developing such systems all day, may easily forget that their customers are not computer literate like themselves; rather they are professionals of various kinds who – on some occasions during work – might engage in EPR related tasks. Hence, we do not believe that most health professionals will regard the EPR as some sort of omnipresent work environment; rather it will be used in measured doses alongside other means of work. By using the trading zone as a reminder of the demarcation between inside and outside the zone, it is possible to see the incorporation as a number of processes *on level with* other tasks involved in health care work. This understanding goes against macrosocial ideas of the electronic medical record as something hovering above various work practices and functions in the hospital ward.

The term ‘trade’ should be understood in the broadest sense as sale, exchange, transfer or bartering of everything from goods and services, over methods and tricks, to knowledge and beliefs. In the zone the traders can reach agreement about the specifics in an exchange in spite of vast differences in how to conceive of the goods, or what meaning to assign to the trading activity. Hence, trading is not an activity involving participants on an equal footing; some of them may only participate from necessity and small capital, while others bring great enthusiasm and fortune to the trading zone.

Most likely, some health professionals will meet the introduction of an EPR in a local medical ward with great enthusiasm and others with utter dislike. Some of the former may be involved in deciding to implement the system in the first place; some may already be proficient computer users, or they

are keen to learn more. Other health professionals might not want to use computers at all for various reasons, for fear that they make fatal mistakes, or because they do not feel up to the task of handling technical systems, or perhaps based on different ideas about genuine medical work. In between these two poles there will be a whole range of attitudes and coping strategies. But the point is that most of these actors, who enter the zone of EPR-handling, will expect certain coordinated actions and assumptions about patients and electronic registration etc. from themselves and other 'traders'. And because of these expectations they will be able to do the trading in spite of other differences.

To us, the important thing is to develop an analytic framework that captures the processes through which individuals and groups become able to reach agreement, processes that make them succeed in coordinating their behaviour inside the local borders of the zone, even though they may disagree on a large scale outside this domain. This emphasises the need to understand *local coordination* of material, symbolic and cultural systems. The subcultures, to use Galison's terminology, or groups involved in trade may disagree about the equivalencies they have established, or about the information they have exchanged in the process. But none the less, if the EPR works satisfactorily, they have reached a *stable* level of exchange for the time being. They restrict, as Galison suggests, their beliefs and actions to receive some ends. This points to another feature of the trading zone, which also concerns its level of stability.

### Zone language

It might be tempting to think of the zone as some sort of fixed place or territory, neutral to the exchanges that take place within the area. This is not the idea. In some

cases a zone of trading can be unstable because of its infrequent nature. The annual fair in the local town can be an example of this, just as pilot projects and provisional experiments with user involvement in computer systems development. Probably most trading under such circumstances will be based on already established values, like the typical price of a soft drink at the fair, or former work experiences with computers. In short, it is not such a big deal, and trading is predominantly non-committing to the parties involved.

Trading zones of a more committing nature are characterised not only by specific meeting places, but also by a *contact language* that ensures stable contact. The capacity of the contact language will vary from practical *jargon*, over functional *pidgin*, to fully developed *Creole*. Let us say a bit more about this linguistic aspect of trading to hint at the potential, analytic richness of understanding EPR incorporation in such terms. (Galison 1997, chapter 1 & 9, Todd 1990)

*Practical jargon* is contact language of a very rudimentary kind, like the English phrase: 'how much?'. Such phrases seem to be universally valid in economical exchange, however large the linguistic barrier may otherwise be. *Pidgin* is a hybrid language used in exchanges between e.g. European and East Asian traders. *Pidgin* was adopted to Chinese, and contains English, as well as various Asian words and phrases. A *Pidgin* is only used as a contact language, and although it may develop into a fairly stable means of contact, it is not spoken on a daily basis outside the zone.

*Creole* was the language spoken by the original slave population in the West Indies and parts of South- and Central- America. 'Creole' has become the common term for all such languages with simplified grammar and strong phonetic changes of the original languages, e.g. French, Spanish or Portu-

guese. As a pidgin expands to cover a wider variety of events and objects, it starts to play a larger role in people's life. When children are brought up in a zone of *expanded pidgin*, this language will have to serve a much wider set of needs. And it may now be called a Creole, to signify this change of status.

Both pidgin and Creole are linguistic concepts that refer to language at the boundaries between distinct groups of people. Pidgin describes the contact language people develop to engage in trade, and which they tend to leave behind when departing from the zone. A Creole, by contrast, is a pidgin that has become so complex, that it is able to serve as a fairly independent and stable, native language to 'inhabitants' in a zone of extended common practices.

In her outline of a pragmatic theory of language, Barbara Herrnstein Smith suggests that pidgins, or contact languages, can be seen as a good model of how linguistic norms emerge through ad hoc pragmatic coordination. She describes communication as a *language loop*, a "circuit or system of reciprocal effectivity, that is, a dynamic process that works – has appropriate effects, but not the same effects – for both those who act and those who re-act". (Smith 1997:54). Language should be seen as a 'slice of social life' without clear boundaries between the beginning or the end of the realm of the verbal. One can argue that facial expressions, bodily gestures, clothing, material equipment etc. should be in- or excluded in language, thus making the slice thinner or thicker.

Verbal agents do not follow autonomous rules, and verbal forms have no inherent signifying powers. "The relatively *stable* going of that circuit is what makes our behaviour as verbal agents seem rule-governed, and also what makes it seem that particular recurrent verbal forms (words, phrases, inscriptions, inflections, gestures, intonations, pauses, and so on) have particular ostensive, connec-

tive, effective, or evocative powers – "meanings" – within or attached to them." (Smith 1997:55). Her account emphasises that pidgins not only occur at boundaries between cultures or subcultures. From her pragmatic perspective pidgins can also stress the conditions of communication and interaction more generally.

We suggest that zone language may be a beneficial analytic tool when trying to grasp the symbolic and material exchanges that takes place and develops between various professional groups and individuals involved in accommodating an EPR in a practical setting. By studying the literature on EPR, accessible to the relevant professional groups, and by listening to their exchanges while engaged in EPR-related tasks, we hope to be able to map the linguistic resources of these groups to develop a zone language. This analysis of language use may reveal something about the abilities of the various actors to enter the zone; if there are dominant groups; how an improved command of the zone language may change the understanding of the electronic patient record; and how far it makes sense to compare zone languages with profession-based languages in order to study incompatibilities, mingling and transformations.

### Slicing the zone

While the concept of a zone language may show useful as a means to understand some of the symbolic interaction, it should not exclude or be seen as opposed to material or spatial conditions of the trading activity, as suggested by Herrnstein Smith. In Galison's case the idea is explicitly "to expand the notion of contact languages to include structured symbolic systems that would not normally be included within the domain of "natural" language" (Galison 1997:835). Galison stresses that even "natural" languages are

conditioned by intentional interventions that makes it difficult to establish a clear distinction between the natural and the 'artificial' or 'unnatural' such as for instance a computer language or electronic circuit design.

Thus Galison is concerned with specifying the 'slice of social life' that makes up the contact zone for distinct subcultures within physics and the media of exchange they deploy, be it language or material analogues:

"This suggests that the process of "black boxing" can be seen as the precise material analogue of the more linguistic forms of pidginization; just as terms like "electron" can acquire a decontextualised meaning, so items like a local oscillator, a charged coupled device, and a computer memory can function as binding elements between subcultures when stripped from their original contexts and coordinated with new ones." (1997: 836)

Furthermore, Galison suggests that it is the ability to restrict and localise symbolic systems for the purposes of coordinating them at the margins that makes the linking of the subcultures of physics possible. He stresses that it is not a question of translating from one subculture to another, but to work out "a powerful, locally understood language to coordinate their actions." (1997:833).

In a revealing passage Galison makes an explicit comparison between a trading zone and the concept of a 'boundary object' as developed by Leigh Star and Griesemer (1989). Star and Griesemer want to show that certain objects can simultaneously take part in separate group's very different ideas and practices about these objects while upholding a uniform identity across such boundaries at the same time. To Galison the "...notion of cooperation through heterogeneity is key for their project and mine." (Galison 1997:47, note 48). While Star and Griesemer speak about 'translations' between various groups of the objects, Galison

argues that languages are more generous than allowing different groups to exchange nouns designating some objects. Language will allow of "...locally shared *procedures* and *interpretations* as well as objects." (1997:47)

Both parties deal with historical analyses of successful examples of cooperation. The concept of trading fits fairly well within a symbolic interactionist tradition, which Star and Griesemer's approach comes out of. This shows for instance in the explicit use of Anselm Strauss' concept of social worlds. They carry, however, their approach further, when they bring in the concept of translation. By doing so they refer to an understanding of power and materiality as demonstrated by Latour. In our reading, there is a tension between the latter, a modern latourian approach and Galison's modern insistence on the trading zone as a limited zone that relies on a restricted language, a pidgin. Nevertheless, we have chosen to consider this tension a resource within our own approach that needs to be further developed. We will return to this issue further below.

At this point, however, we want to stress that although a computer is a symbol processing machine, it is also a very material piece of equipment, and the surroundings in which all computer related interaction take place possess a number of material qualities. The activities in a trading zone causes certain kinds of material or spatial relations to occur; between human actors, and between humans and non-humans. We want to describe the development and maintenance of these relations by using the term 'zone space'.

#### *Zone space*

The gradual installation, improvement and tuning of the inventory of the zone space contribute to an increased coordination of common actions and beliefs. A study into the



technical and 'carthographic' abilities of the various health professionals will hopefully yield independent information about the trading activity in the zone. Not least their technical understanding, their patterns of movement, spatial conceptions and awareness of inside/outside the zone is worth studying.

These reflections on zone space are not least inspired by ethnographic field studies in scientific laboratories, better known as 'laboratory studies' (Gooding 1989, Hacking 1988, Knorr Cetina 1992, Knorr Cetina 1999). Some of those studies have documented how the actual laboratory as a spatial-material environment contributes to the formation of scientific theories by reconfiguring a particular emerging order of self-other-thing. As Knorr Cetina states in her book *Epistemic Cultures*: "Not only objects but also scientists are malleable with respect to a spectrum of behavioural possibilities. In the laboratory, scientists are methods of inquiry; they are part of a field's research strategy and a technical device in the production of knowledge." (Knorr Cetina 1999:29) Just as scientists may become reconfigured and workable in relation to the interior of the laboratory, so may secretaries, doctors, pharmacists and nurses be malleable components in the gradually emerging order following a successful incorporation of an EPR. Alternatively, the lack of mouldable agents may serve as a resource in trying to understand why some attempts at incorporations failed.

We believe that a focused attention to the unique qualities of the zone space will disclose something important about non-discursive and non-mental components of the coordinated actions to incorporate an EPR in the work practices in a hospital ward.

Let us now return to the tension between the analytic concept of a trading zone as suggested by Galison and the micro-sociological concepts developed by Latour. As stated

earlier, Galison takes the zone to be a kind of common meeting ground, where various already established individuals and groups will develop a shared set of standards to coordinate their actions, beliefs and technologies. But how well does that fit with concepts stemming from Latour's approach in trying to understand the dynamics of zone development in time and space? In an attempt to answer that question, one may try to consider how a new project, plan or undertaking begins, and how it will develop from there, according to the proposals stated above.

Initially there is a firm relation between what is *context and content* in any new project. For instance, a small group of designers and health professionals in a hospital ward, a computer system, a wish to improve on the quality of written documentation, some software, and the space of a meeting room may be the sole context; the incorporation of a new computer system in the ward might be the content. At this stage it is inconsequential, however, to talk about *the* universally given EPR; there is not yet a *locally embedded* (universal) EPR that will improve on the quality of the written documentation. Only if the networks of the content is extended – separated from the initial context – and stabilised will it be possible to speak about the EPR as 'the more effective means of written documentation' – as if it has always existed independent of its original context. Thus, if the computer system, the wish to improve and the initial group of people are able to initiate some new sets of standardised practices and some new sociotechnical competencies at the hospital wards, and if the computer system is malleable enough to reciprocate various styles of clinical practice (Fujimura 1994); only then will the content and context be separated. In other words, only if later actors take over the EPR and use it in their projects, will the 'better, more efficient' system of the EPR become a black box and, conse-

quently, turn into the universally given standard by which to measure the health care work in all hospital wards, etc.

As we saw earlier, Galison spoke about material black boxing as a "...precise material analogue of the more linguistic forms of pidginizations". A first indication of the tension between his position and Latour's shows, we think, in his clear distinction between the material and semiotic dimensions of the zone. The latourians would insist that such dichotomies are transformed and disobeyed in many ways during the evolvement of the zone. Hence, what was taken to be categories of materiality and language in the initial phase of a joint project may not be such distinct categories at a later stage. Galison represent in this respect, then, a modern view of language as separate from its machines (Masten et al. 1997), while Latour would talk about translations and displaced links between material and semiotic agencies.

Furthermore, the human agents seem to be fairly stable participants in the various subcultures of the zone in Galison's perspective. They are the ones who perform certain acts in order to establish a contact language and to coordinate the skills and beliefs within the zone. On the other hand, the Latour-perspective would assume that not just the materialities and textualities, but also the agencies are transformed in the development of a network. Hence, both humans and non-humans are folded in dynamic contextualised, sociotechnical practices. In short, while Galison, as historian of science, is confronted with the written documentations of modern mans endeavors in his laboratory, the latourians are confronted with the messy practices of stabilising the present.

We think the above discussion indicates some part of the tension between the built-in modern approach to the topic of research in Galison's concept of the trading zone, and

the explicit break with modernity in the latourian approach. We wish to emphasise that we also find a high degree of implicit and explicit agreement between the two approaches, but here we want to make the tension productive. In the next section we will elaborate further on that difference between modern and amodern approaches to studying EPR and other technological systems.

### Sociotechnical discourses – and politics of incorporation

In his analysis of technical mediation Bruno Latour suggests that we abandon the subject – object dichotomy and consequently a modern perspective on technology. Instead, he recommends that we talk about humans and nonhumans and how they constantly interact in collectives. He describes technical mediation as a process of *translation* that modifies both the human and the nonhuman components involved in actions. In his symmetrical analysis actions are not a human privilege but involve nonhumans as well, stressing the collective of humans and nonhumans. Actions become a property of associated entities, not a property of humans. Technical artefacts never exist just as objects, they are always embedded in institutions. In Latours words: "Boeing 747s do not fly, airlines fly." (Latour 1999:193)

Furthermore, technical mediation includes a crossing of the boundary between signs and things. Latour uses the example of 'the sleeping policemen,' the speed bumps that prevent you from driving too fast in a much more *literal* manner than a sign indicating 'Don't drive too fast' does. He shows that this is not a question of shifting from discourse to matter, but a complex process of delegations involving several shifts: An 'actorial' shift: The policeman or the sign is replaced by a bump. But the shift is also *spatial*: A new actant has come into existence

that changes what it means to drive there. In addition, the shift is *temporal* as the bump is there all the time while the actors/actants – humans and nonhumans – involved in the construction of the bump, have gone, even though their actions are still active and alive (1999:188f).

The transformative power of an artefact such as a medical record rests on its ability to accumulate inscriptions and coordinate events. It recollects what happened to a patient, so that the doctor is relieved of thinking of it. It affords cooperation between health care workers without a need for personal communication. An actant such as the record involves crossings of the boundary between signs and things, just as well as spatial and temporal shifts. Delegation implies that we are ‘folded into nonhumans’ as Latour puts it. Whenever we confront a technical object, we are never at the beginning, but at the end of a long process of mediators. Latour’s account throws light on recent development in discourses on technology. The interdisciplinary field of health care informatics in Denmark, for instance, does not consider systems development merely a question of programming and design. It does not believe that formal models map the world correctly, and that human interaction is best described within these terms. Organisational questions have come to the fore, and many people find the idea of user involvement rational and a reasonable step in order to construct both solid designs and user support. Thus many initiatives involve pilot projects and local experiments with user involvement at hospitals in Denmark.

One of the early projects took place in the mid 90s at Hvidovre Hospital (DSI rapport 96.05). The aim of the project was to reveal ‘necessary user demands,’ and the report about the experiences stresses the organisational questions in the process. It describes

the task of the new field of medical informatics as *bridging* between information technology and health care work (1996:31). It considers the question of understanding information technology in the ‘traditional sense’ as *secondary* and the health care processes as the *primary* topic and the vantage point from which to understand IT (p.12).

The idea of a primary and a secondary subject establishes a dualism with health care processes at the one pole and technology at the other. It reflects the modern subject – object distinction and suggests that health care work and patient care management can provide a unique base from which one can make demands on the technology. The technology, on the other hand, is considered secondary and neutral, but none the less, something one is free to make demands on, requirements that the technology is supposed to honour.

The idea, that technology is neutral, also shows in the widespread use of the term *support*. IT should, among other things, support that the patients get the best treatment without unnecessary waiting, and support that they feel they are informed the best way, just as it should make administrative work and research more efficient (1996:33). It is unmistakable that the unique features of the work are mixed up with images of the technology and what it can do, even though the report does not recognise this paradox. What is described as the subject, the unique features of the work, is thus replaced with the secondary thing, the object, as technology is regarded as the medium that guarantees the improvements.

This move is also at stake in the discussion of one of the important concepts in the report, the handling of patient trajectories that the EPR should be made to support.

“A trajectory of a patient can be seen from different points of view. For instance a health professional, an administrator, or the patient can each have their own perspective that again might vary depending on where they are situated within the ‘system’. Different levels of details are also at stake. Does a trajectory of a patient consist in a sequence of events (visitations for instance), which can be related to certain states (illness/diseases ex), and actions (nursing for instance)? It is not simple to find an unambiguous definition.” (DSI 1996:44)<sup>2</sup>

The quote demonstrates a subtle move from recognising the heterogeneity in the work to the need for a homogenous and unambiguous definition that a computer can understand. The position is that “design of a usable EPR is not just a task for informatics but mostly a question of understanding health care work practices.” (DSI 1996:44). It recognises that social and organisational aspects of work practices are important in information system development and even states that these aspects are the most important in order produce the best fit between the technology and the work.

The approach can be called a *modern sociotechnical approach* as it builds on a subject – object dichotomy and an a priori distinction between the social and the technical. The idea of the technical is similar to a formal approach, while work and organisational aspects are described as belonging to an

<sup>2</sup> In Danish: Et patientforløb kan ansues ud fra forskellige synsvinkler, fx vil en sundhedsprofessionel, en administrator eller patienten have hver deres perspektiv, som igen vil variere, alt efter hvor de befinder sig i “systemet”. Der er også tale om forskellige detaljeringsgrader. Det enkelte patientforløb, består det af en række begivenheder (fx visitation), der igen kan relateres til tilstande (fx sygdom) og handlinger (fx pleje). Det ligger ikke lige for at finde en entydig definition på patientforløb.

other domain. The metaphor *bridging* depicts a *politics of incorporation* that presupposes two separate domains and still understands technology as neutral. In order to do the bridging, medical informatics needs a broader definition of the EPR-concept than the strictly technical. The report names it a holistic picture that can be broken down in different points of view: patient care management, a problem-oriented approach, ethics, organisation and information technology (DSI 1996:20).

The amodern approach can also be termed sociotechnical, but the politics of incorporation is very different. The principle of symmetry involves giving up on the idea that society and nature a priori belong to two ontologically different domains. Action is no longer a human privilege, and the subject-object dichotomy is replaced by humans and nonhumans that constantly interact in collectives. Metaphors or concepts such as mediation, translation, folding, modification, and transformation emphasise that no one is left untouched by the encounter, and neither is the one reduced to the other.

Both the modern and the amodern approach and not least the tension between them are important in clarifying and developing our frame of description and the idea of the electronic trading zone. By rejecting the idea of translation and the symmetrical approach to humans and non humans, Galison stays within a modern approach. It remains to be seen where our experiences with studying a naturally occurring experiment at a local ward and our experiments with ‘electrifying’ the trading zone will take us.

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