Control at a distance as self-control: the renewal of the myth of control through technology

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This paper draws on socio-institutional research on accounting technology. It underlines the ability of one type of accounting technology (performance measurement technology) to be a base for control at a distance since this technology links together discourse and calculation. Failures in this link are analysed thanks to a case study of the pharmaceutical industry. The sales teams of eleven global pharmaceutical laboratories located in France are investigated. Translation theory is used as an analytical framework to argue that (1) technologies of control at a distance lead to an illusion of external control, (2) control at a distance is nevertheless fostered by the substitution of individual resources, the codification and the integration exerted by technology, and (3) these features, combined with ideal beliefs relating to technology, lead individuals to develop self-control. Therefore, the illusion of external control developed by technology is compensated by the growing self-control of individuals, which is, in fact, the most efficient way of getting people to do things. Technologies of control at a distance thus act as remote control devices that take part in a pervasive programme of governing individuals.

INTRODUCTION

This research paper revisits the articulation between distance and control. This is an age-old issue. The Habsburg Empire, the largest centralised system in the 16th and 17th centuries, already showed signs of the difficulty in maintaining control at a distance. The Emperor of Spain had great difficulty in maintaining control of far-flung territories that stretched as far as California and Argentina. In 1925, Merriman[1] observed that distance prevented the Emperor from applying his laws (Beniger, 1997, p.122). The problem of articulation between distance and control can be found in the contemporary firm too, whether it is in the proliferation of so-called virtual organisations or in the current problem of balancing autonomy and coordination first addressed by Sloan at General Motors and by Du Pont at Du Pont de Nemours (Chandler, 1962; Bouquin, 1997, p.23). Given these situations, control at a distance is made possible through the use of technologies. A closer look at the Latin roots of the verb 'to control' (*controratulare*) shows a sense of testing something "against the rolls", comparing it to the cylinders of paper that served as official records in ancient times (Beniger, 1997, p.8). Technology is therefore the support on which control at a distance leans.

The research question that drives this paper is the following: to what extent do technologies resolve the problems of control at a distance?
To answer this question, we call on the findings of a case study on technologies for measuring the performance of sales forces in the pharmaceutical industry. Action at a distance and/or accounting technologies have been the subject of several studies in the healthcare sector, but almost exclusively in public health-care organizations (Covaleski M. A. *et.al.*, 1993; Chua, 1995; Kurunmäki, 1999; Scott *et al.*, 2000; Kurunmäki 2004). Research papers that study accounting technologies in the context of the private healthcare sector are uncommon. However, accounting technologies deployed in pharmaceutical laboratories, as much as those

[1] Merriman (1925), *The Rise of the Spanish Empire in the Old World and in the New*, vol.3: *The Emperor*, Macmillan, p.659, in Beniger (1997)

in public healthcare organisations, reflect a need for conformity with social, economic and political expectations and an imperative to display a rationality of practices (Dambrin *et al.*, forthcoming). The sales sector in the pharmaceutical industry is particularly affected by the problematics of control at a distance both for structural reasons (drugs are prescribed by doctors who are not the direct purchasers of the goods produced by the pharmaceutical industry) and for legal reasons (persons who visit doctors in France do not have the status of sales representatives but that of medical informers and they cannot, therefore, sign order forms; furthermore, the law forbids any divulging of nominative prescriptions). As a result, the link between a drug representative's visit to a doctor and the prescriptions that this doctor will subsequently write cannot be clearly traced. This entails a series of problems of control at a distance since no laboratory can ever say that a given pharmacy has sold a given drug from the prescription written by a given doctor. Our case study seeks to understand the role that the multiple performance measurement technologies available to pharmaceutical laboratories play in managing these problems of control at a distance.

The traditional view of organisational control (notably the view provided by agency theory and transaction cost theory) does not overlook the importance of technology and the importance of what feeds it (information) to understand control. However, the way in which it envisages the link between information and control most often translates a misunderstanding of the social dimensions of technology. Yet technology is inextricably tied to social relationships since it models them (Miller, 1994, p.1). At the level of the firm, it creates norms and legitimises managerial choices (Boussard & Maugeri, 2003, p.58). At the level of society, it is a constitutive part of the political world and its general instruments of decision-making and power (Sfez, 2002, p.85, 103). Technologies of control, like those of accounting, flow from social and institutional practice. They reflect and reproduce a society's values at a given moment in its history and they reveal processes of social structuring (Miller, 1994). This paper ascribes to research that demonstrates the myth according to which control technologies are fully mastered by their users. It aims to update trends in normalisation and self-control that technologies are able to engender. Works that envisage the socio-institutional dimensions of accounting technologies point to phenomena of self-regulation of behaviours (Miller & O'Leary, 1987, 1994b; Miller & Rose, 1990; Hopwood & Miller, 1994; Loft, 1986; Robson 1992). However, in-depth case studies that empirically uncover the existence and workings of phenomena of individual self-control brought about by the control technologies used in firms are few in number (Knights & Collinson, 1987; Barker, 1993; Perlow, 1998; Deetz, 1998). Our aim is to contribute to the empirical understanding of self-control phenomena brought about by technologies. In addition, by studying the case of a sector, we wish to enrich the theoretical construction of the concepts of translation and control at a distance.

Our paper is structured as follows. In the next section, we highlight the role of technology in control at a distance and the relevance of translation theory in addressing our research question (1). We then present the case study background and describe our research and data-gathering method (2). Section 3 provides our findings regarding the role of technology in control at a distance. It is argued that technologies of control at a distance lead to an illusion of external control (3.1). However, control at a distance is enabled by the substitution of resources, the codification and integration technologies exert, crossed with two ideals imputed on technology (permanent surveillance and truth through quantification) (3.2). These features lead individuals to develop self-control, which is the 'true nature' and aim of control at a distance (3.3). The final section is devoted to a discussion on the interpretations of governing through technology suggested in our results.

1. Theoretical Framework: Control at a Distance through Technology

1.1. Control at a distance

Control at a distance is sometimes defined as the inverse of control through presence. Heading General Motors from 1921 to 1956, Sloan mentions in a concrete manner the difficulties of management that stem from the distance between the firm's managers and its factories, suppliers and dealers. If, during an on-site visit, he discovers malfunctions such as an excessive build-up of stocks at a dealership, he can only take control by going to the control subjects and must rely on other tools (financial reporting, planning, etc.) (Chandler, 1962). Sloan is aware of the risks tied to the field being remote. Like other precursors of commanding at a distance, he sets about finding systems that enable him to supervise from a greater distance whilst having greater control (Bouquin, 1997, p.10, 11-40). Referring to the experiences of the first great corporate directors in the United States, Chandler contrasts control at a distance exercised by senior management over its divisions by means of management control and control through presence that helps to mitigate the insufficiencies of financial and statistical methods in the exercising of control. Therefore, a distinction can be made between "financial and statistical reports" that feed control at a distance and "on-site tours […] to visit factories, to see suppliers, and in particular, to talk with distributors" that exemplify control through presence (Chandler, 1962). Control at a distance is therefore a form of continuous control, impersonal, proceeding in the absence of face-to-face contact with supervisors and management (Robson, 1992, p.700).

However, control at a distance and control through presence are not alternatives, but complements (Cohen, 2002). Control at a distance is not the inverse of control through presence because, even when the source of influence and the control subject are present, elements that are not directly visible to the source of influence remain. Even in the presence of the control subject, the one exerting control does not necessarily possess the know-how, the interpersonal relationships and the information flows required to control the behaviour of the control subject and maintain the unpredictability of his own behaviour. Control at a distance may therefore be required when the control subject and the source of influence are present but are at a distance from relevant resources[2] (Dambrin, 2005, p.33-41). As stipulated by Robson, "action at a distance implies not merely physical space between two points, but the capacity, through 'strong' explanations, to influence many contexts at the same time." (Robson, 1992, p.691). Whether in terms of time-space or relevant resources, distance between representations and their referents is the fundamental problem for action and control.

Control at a distance as envisaged in this paper refers to a social practice since it is a question of using it to give members of an organisation a view of individuals' behaviours at a distance and orientate these behaviours. In this respect, control at a distance does not solely rely on a set of techniques or control tools. Control at a distance deploys through technologies and not techniques, because it instils a non-neutral, structuring language that ascribes to a quest for legitimisation. In this paper, the technologies of control at a distance we study are

[2] A resource is relevant if controlling it conditions the capacity of action of one or another person (Crozier & Friedberg, 1977, p.72). For example, "it is pointless knowing how to play the violin in a mechanic's workshop" (p.80); this is an irrelevant resource in such a context. Crozier and Friedberg discern four types of relevant resources within an organisation: mastery of specific competences, mastery of relationships between the organisation and its environment, the holding of information, and the use of organisational rules (p.83).

performance measurement technologies. They are seen in the light of the French tradition of the sociology of management instruments, meaning as instruments having an invisible and structuring impact (Berry, 1983) or else as systemic articulations between objects and discourses (Boussard & Maugeri, 2003, p.28). These technologies form part of the accounting devices that provide a regular form of surveillance (Loft, 1986) and that operate as numerical inscription devices for long-distance control (Robson, 1992, p.703).

1.2. The role of technology in control at a distance

With the problem of distance arises the issue of the media through which it is possible to influence contexts or situations remote from the actor (Robson, 1992, P.701). Technology is therefore the medium necessary for control at a distance.
Why have we chosen the term 'technology' rather than 'technique' or 'tool'? The etymology of the word 'technology' confirms the fact that technology encompasses the notions of techniques and tools. Technology is the discourse that is made using techniques. The word derives from the Ancient Greek "*teknologia*" meaning "a treatise or essay on an art form, a presentation of the rules of an art". Today, the term 'technology' tends to be used to denote "a cutting-edge technique, modern and complex, otherwise any modern technique, with a connotation of progress, whether in advertising or politics." (Rey, 2000, p.3773). Contemporary usage of the term 'technology' therefore reveals confusion with the term 'technique', whereas the two terms cover different areas. The term technique covers the tools, the practical arts, at the point where technology also touches on their social implications and the language they bring into play. Technology is a series of discourses or stories that legitimise the existing order (Sfez, 2002).

For several scholars, control at a distance equates to control through the use of a particular technology: employing accounting information. McSweeny thus describes the exercising of control at a distance through "management by accounting". Promoted in Great Britain from 1982 by the Financial Management Initiative (FMI), such "management by accounting" sets out to designate individual responsibilities, set goals and evaluate costs and production in order to programme, assess, and manage events (McSweeny, 1994, p.238). Johnson describes how control at a distance (which he names "remote control") functions in the following way: managers start from the principle that they control the activities carried out in the firm using the accounting information that they receive in the similar way to a driver using his rear-view mirror to drive or a tennis player monitoring the score board during a match (Johnson, 1992, p.21). In his view, control at a distance is defined as managing behaviours using accounting information.

The role of technologies in control at a distance is particularly well analysed in historical research focusing on the development of accounting and control technologies in pioneering factories. Hoskin and Macve have identified the birth pains of technologies that enabled control at a distance in the Pennsylvanian railroads developed by Herman Haupt in the early 1850s. By means of a division-based structure combined with a constant use of accounting and calculating techniques, Haupt implemented a control system "which made his presence not indispensable" (Hoskin & Macve, 1994, p.90). Citing the example of the development of time-recording technologies in factories, Loft asserts that technology enables "the shop floor to be brought into the office". Due to time-recording technologies, everything that takes place on the shop floor is, in a manner of speaking, shifted to the managers' offices and the office becomes the powerful calculating centre where all these times are recorded (Loft, 1999, p.11). In a similar vein, Yates describes how the systematic management systems that began to

develop at the end of the 19th century enabled managers to reassert control over production that was, at that time, in the hands of semi-autonomous foremen or skilled workers (Yates, 1989, p.11). Cohen mentions the case of Mattern, a production manager at Peugeot at the end of the 1920s, who, whilst still advocating "command through presence", used graphs to analyse the results of the previous day's work. Cohen also refers to "Du Pont's amazing chart room[3] in which large-format graphs, hanging from rails, can be presented with a simple gesture to members of the board of directors sat in a row of armchairs". He qualifies these rooms as an "architectural innovation of management typical of command at a distance" (Cohen, 2002, p.10-11). Reporting, diagrams and graphs, photographs, and payroll systems are just a small number of the technologies of control at a distance praised by the industrialists who were drawn to the principles of scientific management (Cohen, 2002, p.9). All these technologies aim to make the senior manager indirectly present whenever he cannot be directly present.

Anglo-Saxon research has highlighted many good examples of technologies taking part in governing individuals at a distance in the firm and, more broadly, in society: rating and statistics transferred to calculation and assessment centres (Miller & Rose, 1990, p.5); management control technologies structured into responsibility centres (Miller, 1994, p.2 and 6; Lowe & Machin, 1983); the spatial reorganisation of a factory (Miller & O'Leary, 1994b); accounting technologies such as standard costs and budgetary processes (Miller & O'Leary, 1987; 1994) or, more generally, accounting inscriptions (Robson, 1992); 'personnel management technologies' (Townley, 1995) such as appraisal procedures and standardised training (Miller & Rose, 1990, p.8).

The common feature of these technologies is to link inextricably numbers and words. They encapsulate one part calculation and one part discussion, intertwined one with the other.

1.3. Technology performs a translation to enable control at a distance

Latour provides the link between the various scholars mentioned above to describe the technologies of control at a distance that arise at different eras and are exerted on different control subjects. Indeed, he raises a question that overarches the underlying questions of the aforementioned scholars: How can we act at a distance with regard to events, places and people that are not familiar to us? His answer constitutes a definition of how control at a distance functions: "by bringing these events, these places and these people close to us *by whatever means*." (Latour, 1989, p.534[4]). Using the example of the European cartographers who, through cartography, developed their States' control over distant and unknown lands, Latour describes how "the world comes to the office worker, instead of the office worker going to the world" (Latour, 1989, p.537).

It is through a process of translation that such action at a distance is made possible. Translation refers to the relations that are essentially constructions between the inscription and the events, objects and activities to which it refers (Callon, 1980, p.211; 1986).
In this definition, what is the link with control at a distance? Translation suggests the role of distance; it "signals the notion of movement or displacement from one context to another" (Robson, 1992, p.691). This movement is not solely spatial. Undoubtedly, geographical distance is a convenient historical example to understand how control at a distance functions

[3] For a more detailed description of Du Pont's "chart rooms", see Yates (Yates, 1985; Yates, 1989, pp.266-267).
[4] In italics in the text. Quotes from the French edition. English edition: Latour B. (1987), *Science in action*, Harvard University Press

(see the example of the cartographers used by Latour or Law), but notably in the organisational context, it is clear that this distance equally concerns a difference in terms of power and of interest. Translation therefore steps in as a support for control at a distance in ambiguous situations in which "the actors decide to launch into the production of emerging knowledge": "B can only see utility in the knowledge produced by A if A launches into the task of giving B an incentive. A translates B: he sets out to convince him […] that it is in his interest to go through the competences produced by A. In these incentive strategies, what is negotiated is obviously whatever both A and B really want and whatever their goals and whatever the programmes they undertake to reach these goals are" (Callon, 1999, p.41). Thus, "the operation of translation consists of combining two hitherto different interests […] to form a single composite goal" (Latour, 1999, p.88). The process of translation, defined by Callon and Latour, enables the calculations made in one place to be linked to an action carried out in another place, not through force but through a subtle networking of agents and agencies (Miller & Rose, 1990, p.9-10). It is a matter of 'translation' because the individual "targeted" by the action at a distance is to translate the goals and values of others (the one who seeks to act at a distance) into his own terms (Miller & Rose, 1990, p.10).

In the last decade, a number of accounting scholars have employed the theory of translation to account for the socio-institutional dimensions of accounting. Early adopters, such as Miller (1991), Robson (1991, 1992) and Preston *et al.* (1992) have been followed by Chua (1995), Mouritsen *et al*. (2001), Jeacle (2003) and Ezzamel *et al.* (2004a). Some scholars refer to this process of translation to describe the centralised decentralisation within the firm that arises with action at a distance. They also consider the various formalisations of control in the firm (reporting, financial and accounting statements) as the outcomes of a process of translation (Robson, 1992; Quattrone & Hopper, 2005). In our study, we focus on one particular aspect of the process of translation: the way in which technologies ensure the coherence of inscriptions, in the sense suggested by Robson. Inscription refers to the material and graphical representations that constitute the accounting report: writing, numbers, lists, tables (Robson, 1992, p.685). A lack of correspondence between the inscriptions and the objects to which they refer, between the forms of explanation "here" and the objects to which they refer "out there", between representations and their referents, is a problem for those who wish to act at a distance (Latour, 1989).

Robson recalls that action at a distance is conditioned by the strength of the explanations that we are able to call upon. This strength does not lie in the exact correspondence of our explanations with the reality of the facts that we seek to explain; it lies in the explanation's potential to influence. "To achieve such strong explanations it is necessary to move or *translate* elements from each setting so as to construct powerful explanations via the *inscription*." (Robson, 1992, p.701). Translation therefore relies on persuasion, intrigue, calculation or rhetoric. Language is essential in the process of translation because it is through the sharing of vocabulary, theories and explanations that loose and flexible networks of agents are created (Miller & Rose, 1990, p.10).

In our study, we consider inscriptions to be a production of control technologies. Our aim is to see to what extent control technologies regulate, or not, the situations in which the inscriptions do not correspond to the objects they are meant to represent. Driving this ambition is the desire to revisit the nature of control at a distance. We have previously underlined the importance of technologies in control at a distance. Which features of control technologies enable us to support the process of translation that underlies control at a distance? In a situation of control at a distance, technologies must bring the control subjects

closer to the source of influence "by inventing the means that: a) make them *mobile* so as to be able to move them; b) make them *stable* so as to be able to move them in all directions without distortion, loss or additional corruption, and; c) make them *combinable* so that we may cumulate them, bring them together and shuffle them like a deck of cards, regardless of how they are constituted." (Latour, 1989, p.534[5]). Therefore, there are three major and interrelated qualities that allow forms of inscription to assist action at a distance: mobility, stability and combinability (Robson, 1992, p.692-700). It is the role played by control technologies in these three qualities of inscriptions in the pharmaceutical industry that we will now investigate.

2. Methodology: Translation Theory as an Analytical Device to Study the Role of Technology in Control at a Distance

In the pharmaceutical industry, the translation process is based on networks and information centres. It calls for experts who, alone, can help individuals to translate the interests of an institution or other individuals into their own terms. Networks of alliances with common interests, information centres and their relevant experts, all help individuals to assimilate constraints in their field of activity imposed by an institution or a person. There is one domain in particular where control at a distance raises problems and is embodied in a number of technologies: measuring the performance of the sales force (the drug representatives).
In the translation process underpinning control at a distance, networks, centres and experts use performance measurement technology made up of a calculative part (*tekne*) and a discursive part (*logos*). It is the coherence of the articulation between these two parts that we want to investigate and analyse in this paper since we believe it is the basis of control at a distance.

2.1. Case study background: problems of control at a distance in the pharmaceutical industry

The main problem of control at a distance with regard to the sales force in the pharmaceutical industry lies in the fact that we cannot draw a clear link between a drug representative's visit to a doctor and the prescriptions that the doctor will write subsequently to the visit. No laboratory can state that a given pharmacy sold a given drug due to a prescription from a given doctor. Medicines are prescribed by doctors who are not the direct purchasers of the goods produced by the pharmaceutical industry. Thus, pharmaceutical laboratories lack individual information resulting from invoicing arrangements. Normal client relationship management linked to ordering and invoicing is therefore not applicable. Yet it is not the multiplicity of intermediaries in the sales circuit that is the basic cause of problems of control at a distance. The reasons are of a legal order. In France, due to their status, drug representatives leave their visits without a signed order form or any guarantee of prescriptions on the part of the doctor; at best, they may have a promise of prescriptions[6]. For doctors and

[5] In italics in the text.
[6] Officially, drug representatives are not salespeople. Drug reps are, "persons who provide information or conduct prospecting for medical treatment [and] must possess sufficient scientific knowledge certified by a diploma, title or certificate that is included in a list drawn up by the administrative authority", article L5122-11 of the French public health code. The Public Health Law of 18th January 1994 specifies that the drug

specialists in community healthcare, there exist only roundabout and unverifiable means to find out their level of prescription (market studies, informal discussions with doctors and pharmacists).
The same can be said for measuring the return on investment for promotional operations. The return in terms of medical prescriptions from a Professional Relationship (PR)[7] cannot be measured formally and directly. The drug representatives (DR) of pharmaceutical laboratories talk of "deals", of "moral contracts" between themselves and the doctors invited, but it stays in the realm of what cannot be directly measured. Measuring performance is all the more sensitive when the laboratory monitors data for individual performances. Today, most pharmaceutical laboratories organise their sales forces into networks. A geographical zone of doctors is taken on by three or more DRs who will go and see the same doctors with the underlying assumption that increasing the number of visits raises the probability of prescription. In this type of organisational structure, it is impossible to measure with reliability what share of turnover may be attributed to a given drug representative in the network. It may be argued that the laboratory does not need to know the individual performance of DRs; however, if organising the sales force functions on the basis of a network, the remuneration for performance still hinges on very individual criteria (rankings of DRs, individual bonuses), hence potential problems of control at a distance between collective activity and remuneration of individual performance.

In addition, pharmaceutical laboratories do not have access to prescriptions. The CNIL, the French body regulating privacy rights for electronic information, bans the sharing of nominative medical prescriptions, whether it involves the laboratories or the providers of sales statistics, leading to a second problem of control of sales forces at a distance. The performance of turnover per client (doctor) cannot be ascertained. The sales statistics available on the market cover either prescriptions extrapolated from groups of anonymous doctors or orders from groups of pharmacies. To obtain these statistics, the laboratories must buy them from service providers. These service providers must themselves call on a trusted third party to obtain the data that are made anonymous and consolidated beforehand[8]. Once again, no traceable link can be established between the medical prescription and the turnover of the laboratory. First of all, a medical prescription does not necessarily entail a purchase by the patient. Furthermore, if there is a purchase, it may occur for a product other than the one prescribed (notably, if an equivalent generic exists and if the pharmacist exercises his right to substitute one product for another). The purchase may also take place in a pharmacy that is not in the same geographical zone as the doctor, which then raises the problem of measuring the performances of DRs. Finally, orders from the pharmacy (for which data are available) are not the same as the turnover achieved by the laboratory. Although returns of unsold products are rare, they may nonetheless arise notably in the case of a product sold directly by the laboratory (and not by a wholesale distributor) or of products at the end of their life cycle. Moreover, significant time delays occur between the amount ordered by the pharmacy and the laboratory's real turnover from the pharmacy, notably at the end of business cycles when DRs become more active with pharmacists with whom they have developed cordial relationships in order to maximise their bonuses.

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representative must possess a national diploma for drug representation, a university degree or a medical degree provided by certain faculties of medicine, pharmacy or science.

[7] Professional Relationships are evening or weekend events proposed free-of-charge to a group of doctors with the aim of increasing their potential to prescribe. PRs are paid as overtime to the DR who organises them and participates in them.

[8] Réseau Pharma is the trusted third party for pharmacists in France.

Consequently, the chain of cause and effect that is established between the tasks of a drug representative (the visit, professional relationships) and the essential criterion for measuring his performance (turnover achieved in his geographical zone) is replete with weak links between calculations and discourses. Do sales of a given drug at a pharmacy really correspond to the performance of a drug representative who can only *encourage* doctors in the local area to prescribe it?

The diagram below presents a summary of the problems of control at a distance to which the pharmaceutical laboratories are exposed when faced with articulating calculation and discourse. The rectangles denote what pertains to situations that lead to inscriptions of a discursive order. For instance, a visit leads to the use of a sales pitch and the writing and sending through the reporting line of a report on the visit by the DR. The ovals denote what pertains to calculations. The question marks signpost the problems of linking the two, something the laboratories would like to control but, in fact, cannot or can only marginally control.

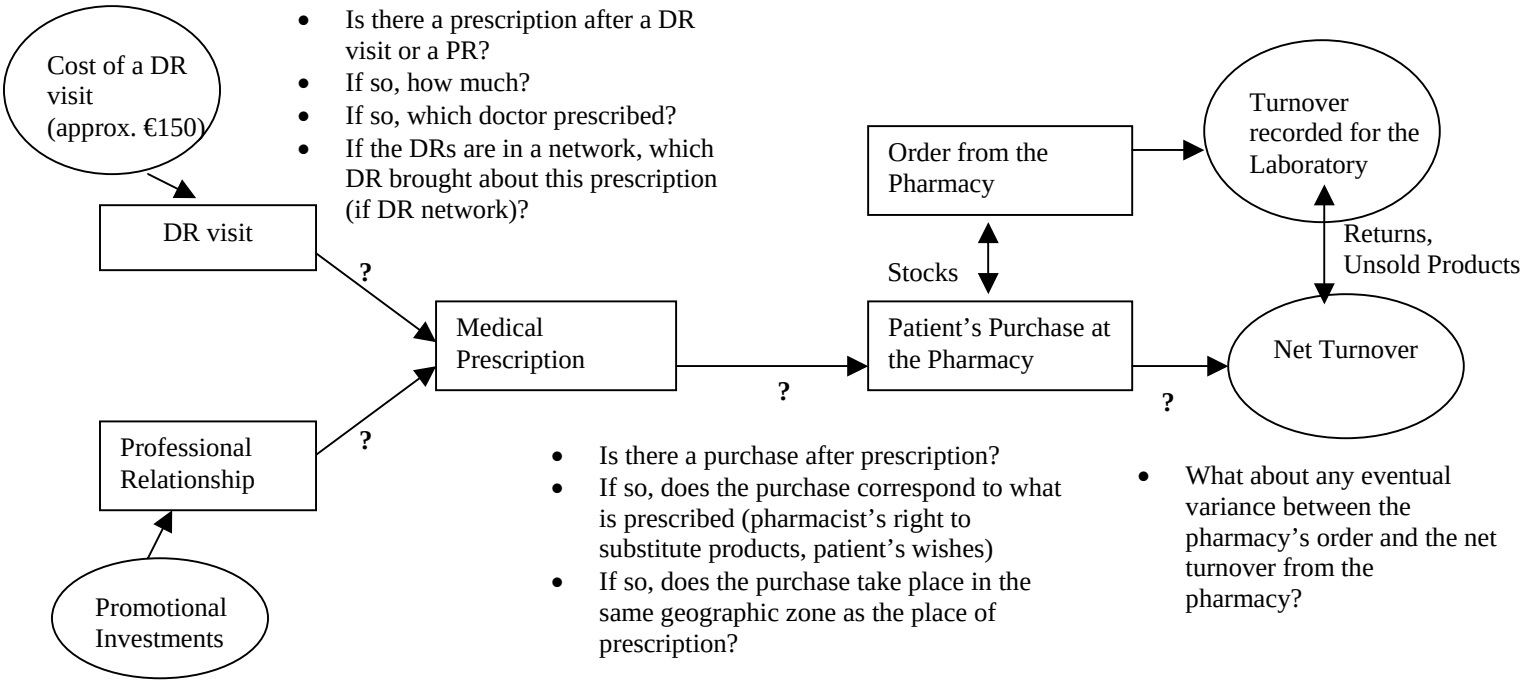

Figure 1 Flawed articulations between control and discourse: a summary of problems of control at a distance of sales forces in the pharmaceutical industry

To mitigate these problems of control at a distance, the pharmaceutical laboratories gamble on the large range of performance measurement technologies on offer.

This range of technologies is based on an ideal of quantification that includes all the actors in the sector, including doctors. In France, each doctor is identified by a code. This code and its corresponding data (coordinates, speciality, etc.) feed the doctor classification files used by the pharmaceutical laboratories. The doctors are the subjects of quantification according to their potential (light, medium, or heavy prescriber). This results in targeting. Consequently, although the law bans the diffusion of medical prescriptions that indicate the name of the doctor and the patient, prescription potential is subject to recurrent calculations. Each DR possesses a targeting of doctors. On this targeting, the standard behaviour of the DR is laid out (the norms of activity in terms of number of contacts) with which compliance is measured using reporting technologies. Everything is subjected to quantifying in the DR's activity. The

competences of DRs are quantified by means of rating scales dealing with elements as diverse and as subjective as "knowledge, know-how-to-do, and know-how-to-be" (at firm A). The activities of members of the sales force are equally quantified in reporting as days of activity. These calculations contribute to governing the individual because they are compared with the goals set with a view to an individual appraisal. For instance, during the annual appraisal, the quantification of competences results in the calculation of an overall rating conditioning the attribution of a pay rise.

2.2. Data collection and analysis

In light of this context (sensitive control at a distance of sales forces and range of technologies to mitigate this difficulty), our case study analyzes the role of accounting technology in control at a distance in the pharmaceutical industry by means of an analysis of sales force performance measurement in eleven pharmaceutical laboratories. In the Appendix 1, a summary table of the laboratories studied provides some information to position these laboratories in relation to each other.

Between March and December 2003, we conducted thirty-six semi-directive interviews in France[9]. Thirty interviews were conducted with people working in one of the eleven pharmaceutical laboratories, more precisely twenty-six members of a sales force, four members of functions involved in the control of sales forces at a distance (marketing function, management control, sales administration) (see Table 1 below[10]). Furthermore, six interviews were conducted with individuals who work in bodies external to the laboratories and who are potentially involved in the measurement of performance of the laboratories' sales forces: pharmacy, Human Resources consulting firms, and technology service providers for the pharmaceutical industry) (see Table 2 below). The aim of these six interviews was to go beyond the limits of the organisation (the laboratory) in order to deepen our understanding of the socio-institutional aspects of control at a distance.

[9] The conditions for conducting the interviews were the following: average duration of 1 hour 30 minutes, recorded on tape. Out of the 36 interviews conducted, eight were carried out by telephone and 28 face-to-face.

[10] Our obligation to respect the interviewees' anonymity notwithstanding, we don't give the name of the laboratory they are working for.

Initial Denoting the Laboratory	Activity	Function of the Interviewee	Area of Activity	Abbreviation Used for the Interview Extracts
A	Sales	Regional Manager of Neuro-Geriatrics Network	Specialists (community or hospital independents)	A1 (RM)
	Sales	Drug Representative		A2 (DR)
B	Sales	Regional Manager Internal Medicine	Community (GPs[11] and Specialists)	B1 (RM)
	Sales	Drug Representative	Community (GPs)	B2 (DR)
	Sales	Drug Representative	Community (GPs and Specialists)	B3 (DR)
D	Sales	Regional Manager Anaemia	Hospital	D1 (RM)
	Sales	Regional Manager Anaemia	Hospital	D2 (RM)
	Sales	Drug Representative Hospital Anaemia	Hospital	D3 (DR)
	Sales	Drug Representative Hospital Anaemia	Hospital	D4 (DR)
F	Sales	Regional Manager Respiratory Unit	Community + 1 Hospital DR	F1 (RM)
	Sales	Drug Representative	Community (GPs and Respirologists)	F2 (DR)
L	Sales	Zone Manager Immunology Network East	Hospital	L1 (ZM)
M	Marketing	Marketing Study Analyst	Hospital	M1 (MKT)
Initial Denoting the Laboratory	**Activity**	**Function of the Interviewee**	**Area of Activity**	**Abbreviation Used for the Interview Extracts**
S	Sales	Regional Manager (BU Cardiology)	Hospital	S1 (RM)
	Sales	Regional Manager (BU Cardiology)	Community	S2 (RM)
	Sales	Hospital Drug Representative	Hospital	S3 (DR)
	Sales	Drug Representative	Community	S4 (DR)
	Sales	Former Regional Manager	Community	S5 (RM)
T	Sales Administration	Director of Administration of Drug Representation	Non-applicable	T1 (SAD)
	Sales Administration	Director of Operational IT Systems	Non-applicable	T2 (SAD)
W	Management control	Management Controller	Non-applicable	W1 (MC)
	Sales	Drug Representation Manager, Northern France	Community	W2 (DRM)
	Sales	Network Manager North Paris	Community	W3 (NM)
	Sales	Regional Manager	Community	W4 (RM)
	Sales	Drug Representative	Community	W5 (DR)
	Sales	Drug Representative	Hospital	W6 (DR)
Z	Sales	Regional Manager	Specialists (community or hospital independents)	Z1 (RM)
	Sales	Drug Representative	Specialists (community or hospital independents)	Z2 (DR)
	Sales	Drug Representative	Community	Z3 (DR)
EF	Sales	Regional Manager	Community	EF (RM Provider)

Table 1 Information about the thirty interviewees working in pharmaceutical laboratories

[11] GP: General Practitioner (*médecin généraliste* in French)

Initial Denoting the Body	Activity	Function of the Interviewee	Abbreviation used for the Interview Extracts
H	Consulting	Consultant	H1 (CONSULT)
	Consulting	Consultant	H2 (CONSULT)
IH	Service Provision	Managing Director	IH (MDP)
TT	Service Provision	Managing Director	TT (MDP)
	Service Provision	Deputy Managing Director	TT (MDP2)
PHARMA	Drug Sales	Pharmacist (Owner)	PHARMA

Table 2 Information about the six interviewees working outside pharmaceutical laboratories and involved in control at a distance of laboratories' sales forces

The data gathered over the course of the 36 interviews were supplemented with the analysis of secondary data provided by interviewees: grading tables, examples of reporting requested by the reporting line, tables of sales statistics received by drug representatives.

According to certain scholars, socio-institutional research neglects the "voice of labour" (Ezzamel *et al.*, 2004b, p.299). For instance, the analysis of Miller and O'Leary (1994b) regarding the technological changes in a Caterpillar factory implicitly presupposes the passive acceptance, even the cooperation, of the employees. Yet it is relevant to study how the organisation (notably, it's production activity) is "contingent upon workers' willingness to behave in particular ways, and their perceptions of the relevance of new manufacturing techniques and accounting techniques for defending the social spaces" they occupy (Ezzamel *et al.*, 2004b, p.300). In our research, we have therefore attempted to account for the "micro" level. The preponderance of dyads n+1/n (with n being a non-manager) in our interview samples is one way of preserving this "voice of labour". Phenomena of resistance and cynicism have been underlined in the interviewees' discourse. Their participation (more or less conscious) in the development of control technologies has also been highlighted.
More broadly, our analysis consisted in finding problems in controlling sales forces at a distance and in identifying the technologies available to laboratories or used by them to measure sales force performance. We also set about qualifying the role played by these technologies in the management of control at a distance. To this end, we have used predefined codes, linked to our initial assumptions, such as the articulation between discourse and calculation. Other codes emerged in the course of our analysis, with translation theory proving to be a relevant analytical framework. The analysis actually relies on Latour's three qualities of inscriptions produced by technology that allow translation (mobility, stability and combinability) as an analytical device to understand the role of technology in control at a distance.

3. The 'true nature of control' at a distance through technology

Our analysis shows that technologies of control at a distance lead to an illusion of external control. Control at a distance does not consist in linking established calculations to a place with actions performed in another place; this link being indeed weak (3.1). However, control at a distance is a matter of keeping this link blurred and inducing the *conviction* that this link

is clear using technologies. Control at a distance is enabled by the substitution of resources, the codification and the integration that technologies exert, combined with two ideals imputed on technology (permanent surveillance and truth through quantification) (3.2). These features lead individuals to develop self-control, which is the 'true nature' and aim of control at a distance (3.3). Therefore, the illusion of external control enabled by technology is compensated by the growing self-control of individuals.

3.1. Technologies of performance measurement and the illusion of control that they entail

Technologies of sales force performance measurement in the pharmaceutical industry

In the sector of the pharmaceutical industry, there are numerous technologies of performance measurement made available by information centres. These technologies are commercialised to pharmaceutical laboratories by external providers that are equivalent to the service agencies described by Clegg. These agencies are specialised in the sale of disciplinary technologies on a consultative, subcontracting or advisory basis (Clegg, 1998, p.39). In the pharmaceutical industry, three main technologies gather, consolidate and provide data on the performances of sales forces to pharmaceutical laboratories: the ETMS (Electronic Territory Management Systems); the GERS (*Groupement pour l'Elaboration et la Réalisation de Statistiques*), unique to French; and panel analyses proposed by two main firms, IMS Health and Cegedim.

With regard to the problems of control at a distance, technologies are implemented that are supposed to resolve these problems, meaning that they should enable a coherent articulation between calculations and discourses for measuring the performance of sales forces. There is a common illusion that technology resolves problems of control and this illusion is conveyed by consultant remuneration specialists.

> H2 (CONSULT): Pharmacy is a particular profession. It is very difficult to set a sales target for a drug representative because he does not sell. However, the pharmaceutical sector has been working a lot on this. There is a very direct correlation between the number of visits that you make and the sales figures that we will find in pharmacies. So they fall back, if you like, not on the sales targets required of a drug rep because that isn't possible, but instead on a number of visits, his attendance at conferences and other events which is supposed to generate, mathematically and statistically, a sales figure. The pharmaceutical sector has very powerful tools at its disposal. It is a particularly advanced sector in the area of measuring sales representatives' performances because they can rely on statistical and analytical tools that are extremely cutting-edge.

The control technologies are presented as infallible by their users, especially when they are the designers of these technologies or people in sales administration. For instance, in the interview T1 simply cannot understand our question regarding any potential flaws in the tools that he has developed throughout his career in sales administration at T. When we refine our question by asking for possible examples of misuse of these tools or erroneous statements input into them, he answers that this is impossible.

> T1 (SAD): No. In the tools there is little opportunity because everything is locked down. There are ceilings everywhere; it is impossible to input things that are not in the norms.

However, his job partly consists in carrying out controls of coherence between the real activity of the DRs and the statements they input into the technologies.

The ETMS: a technology supposed to strengthen the link between a DR visit and a medical prescription

In the pharmaceutical industry, the ETMS are equivalent to Customer Relationship Management (CRM) tools. "Teams", developed by TVF (a firm in the Cegedim Group), is the main ETMS used by the pharmaceutical laboratories studied[12]. It enables a computerised management of the DR visit. Notably, it includes an electronic diary, an electronic message system, a clientele manager, and an activity manager. Like all ETMS, Teams constitutes both a work support for the drug representative and a control support of the regional manager. Its data (coming from Head Office, provider firms, and statements made by each member of the sales force on his activity) feeds both the spreadsheet that is essential to the DR and a reporting of his activity for the managers. The activity statement in the ETMS forms the basis of performance monitoring of the DR's activity by his reporting line with regard to compliance with his targeting and frequency of visits.

> T2 (SAD): In relation to the strategic targeting that is defined, the regional director has a very accurate view of the coverage and the frequency of contacts, which are the two key indicators that we find in the activity. He sees, in the ETMS and using a complementary analysis tool, all the doctors who have been targeted, those who have been seen, how many times and how much pressure each drug rep puts on his targets. He sees if the drug rep has covered his whole target well and the number of visits. [...] We have key indicators, published each month, that have been defined by the senior management and ourselves. Whatever your level, you have the same indicators. [...] It's the rate of fieldwork, the target coverage, the number of visits. The number of off-target contacts too. It's a key indicator that we consult; it should normally be at zero.

In the Appendix 2, the reconstructed structure of an activity reporting in the ETMS can be found, based on statements made by Z2 (DR) and demonstrations made live in the course of the interview. This reporting concretely illustrates the types of information contained in the ETMS[13]. It also shows that ETMS technology deploys a strong visual control that relies on signals and specific colour codes. For instance, when a drug representative declares fewer than four visits a day, this day appears in red, which then alerts the regional manager to go and analyse the activity of the drug representative.

The regional managers use the ETMS in part for this purpose of external control in order to measure the drug representative's compliance with norms of activity.

> L1 (RM): Today, there is precise targeting and a management policy of 100% coverage of the target, which is entirely legitimate. And, especially that there should be a high numbers of visits to those practitioners who produce our sales figure. [...] What I mean by activity is the number of contacts that they go and see. It's true that if I have a drug rep who only goes to see interns, doctors in training, it doesn't suit me. [...] I measure these using Teams [using specific requests:] the average number of contacts, but also, I would add, the quality. How many targeted specialities does [the drug rep] have compared to his overall activity? Is he going to the right establishments?

Such use of the ETMS is based on the assumption that a direct link exists between the number of contacts or compliance with the targeting by the drug representative and prescriptions by doctors. Nothing in the ETMS enables this link to be proved, let alone quantified. This link is

[12] The Cegedim Group enjoys around 80% of the market share in France with its TEAMS offering and asserts that TEAMS is Europe's most-used software platform and service in the fields of management, information and sales force activities (Cegedim Annual Report, 2003). Rival ETMS are used in some laboratories: Siebel and Agoris (developed by Dendrite).

[13] Information on the doctors (name, address, speciality, prescription potential, etc.) but also on the declared activity of the drug representatives: number of doctors seen daily per speciality and per prescription potential, number of pharmacists visited, and number of professional relationships organised.

indirect and assumed. Technologies such as the ETMS, with their activity reporting, thus allow control to be established based solely on variables assumed to correspond to a goal.
The same can be said of Professional Relationships. The ETMS obliges the drug representative to report his Professional Relationship activities with doctors but does not enable the impact of these PRs on the medical prescription to be measured.
Moreover, the technology of ETMS is based on a second hypothesis whereby there is an exact correspondence between the activities of the drug representative and what declarations he makes using the technology.

The GERS: a technology supposed to resolve the flawed control of the drug representation – laboratory's turnover chain.

In France, the *Groupement pour l'Elaboration et la Réalisation de Statistiques* (GERS) was created in 1974 by and for the pharmaceutical industry to publish sales statistics. The data are not gathered from panels, but are real figures collected from wholesalers and laboratories. They reflect wholesale deliveries and direct sales from laboratories to pharmacies[14]. All pharmaceutical laboratories use data from the GERS in order to know their turnover per product, their market shares, or those of competitor products on a weekly or monthly basis. The GERS is accessible to all members of the laboratory's sales force in raw data form or in a summary format generated by systems specific to the laboratories[15].

Below, we observe the link that is made by the drug representative between the sales results given by the GERS and his activity in terms of visits (the underlying assumption is that it is by visiting doctors that the laboratory's turnover will improve, and that it is the sales statistic technology covering pharmacy orders that enables individual activity and regional performance to be correlated).

> **I: Do you use [weekly data from GERS] a lot?**
> B3 (DR): Yes. I use it every week. What I look at is my sector's market share over the week. I look at the UGAs to see if any have dropped. [...] If I see, for example, that the doctors in Giens have let me down, I head over to Giens.

In reality, the GERS provides a vision of the turnover achieved per UGA[16]. Increasingly, the big laboratories have several drug representatives (in threes) working on the same UGA in order to intensify the pressure of drug representation in a sector. This raises the issue of measuring the individual performance of the drug representatives. In addition, the GERS does not allow the link that exists between the activity of the three representatives and the pharmacies' turnovers in their UGA to be either confirmed or analysed.

Equally, the GERS statistics (or, below, the corresponding expert – the wholesale distributor) are sometimes presented as the technology that enables the activity of drug representation in a zone and the medical prescription of potentially another zone to be geographically correlated:

> **I: How can you know that it is your zone that was the source of the prescription?**
> B3 (DR): Well … That should be the GERS … Anyways, my wholesaler is in Orleans. He must know that. Because, in fact, they are orders from pharmacies. My wholesaler knows

[14] Source: www.gie-gers.fr
[15] Recently, the GERS has started to provide laboratories with sales figures on a weekly basis. It is in response to the laboratories' need for responsiveness, since this service enables the activity of the drug representatives to be rapidly adapted, notably during product launch phases.
[16] UGA: unité de gestion administrative. Designates a geographical zone as a reference in the geographical breakdown of France performed by the GERS that provides the pharmaceutical laboratories with the data for drug sales.

which pharmacies have ordered.

However, the GERS does not enable this. This is one of the criticisms levelled at the GERS within the laboratories.

> M1 (MKT): The GERS gives wholesaler sales to pharmacies. They will say that we have sold 200 boxes of C to a given pharmacy. The problem is that it is quite likely that the doctor who prescribed C is in another UGA than the pharmacy that ordered C, especially in the Greater Paris region. All the drug reps complain about this bias.

Geographical panels: a technology supposed to resolve the flawed control of the drug representation – laboratory net turnover chain.

XPonent is a tool created in 1999 by IMS, the leading provider of medical data worldwide. From a panel of 47% of all French pharmacies (10,200 out of the 22,000 pharmacies in France), it performs an extrapolation in order to provide its clients with a detailed account of prescriptions issued by a group of doctors (a minimum of five anonymous doctors per group). Xponent is less powerful that the GERS insofar as the data are not exhaustive, but it has the advantage of informing the laboratories about real pharmacy sales (contrary to the GERS that informs about pharmacy orders). Moreover, compared to the GERS, XPonent centralises the sales figures by medical speciality. Out of a number of boxes sold in pharmacies, this tools enables laboratories to know which percentage of boxes were prescribed by community doctors, for each medical speciality, and which percentage of boxes come from prescriptions written in hospital. It is therefore of particular interest to laboratories' hospital networks because it is the only tool enabling the source effect[17] to be partly measured. For laboratories that possess a hospital network and that can afford to purchase these statistics, Xponent is often considered a information base that complements the GERS.

Other information centres rely on a panel rationale that targets doctors rather than pharmacies. For instance, ICOMED, the Institut de la Communication Médicale implanted in France in 1985 by the Cegedim group, measures doctors' preferences for prescribed products by sending them a speciality-specific self-administered questionnaire.

XPonent is presented by the managing director of the firm that designed it as a technology enabling an insight into DR performance that is more real than that given by the GERS because it measures laboratory turnovers using pharmacy sales rather than their orders.

> IH (MDP): In the GERS, the representative's performance is what the pharmacists order. We say that this is not the most accurate way of measuring a representative's performance. We have therefore opted for a different methodology that captures the information at the pharmacy outcome, meaning the purchasing act of the patient. For the first time, we are able to say for real: "the drug representative's real performance are the products prescribed by the doctors he has visited and that have also subsequently been bought at the pharmacy."

> T2 (SAD): For the activity of hospital representation, we use XPonent because we cannot get the information any other way. [...]
> **I: You use XPonent even though it is a panel?**
> T2 (SAD): Yes. Given the number of pharmacies, if you will, 10,500 pharmacies out of 22,000 pharmacies, it is more than a panel. In terms of extrapolation, it's… at least as reliable as the GERS.

[17] The source effect pertains to the influence of hospital doctors on the prescription made in community medicine and on drug purchases made in the community. XPonent informs on this second influence (prescription in hospital, purchase in the community).

If XPonent effectively provides laboratories with new insight into the type of sale achieved by differentiating medical specialities, it leaves several problems of linking discourse and calculation unresolved. It measures pharmacy sales but still leaves laboratories in the dark about the link between drug representation and pharmacy sales. In fact, this technology does not measure the representative's "real performance" but rather that of the pharmacy. Moreover, beyond the fact that XPonent does not provide exhaustive sales figures, but only those from a panel, Xponent does not measure the performance of hospital networks correctly, as mentioned below:

> S3 (DR): [XPonent] is another problem.
> **I: How is it problematic?**
> S3 (DR): It is also a tool for assessing the performance of the hospital rep. It differentiates prescriptions coming from hospitals from independent practices. But private clinics are independent. So, the prescriptions they write are classed as independent. Moreover, we have special hospitals here in Lorraine that are private and non-for-profit. They are an intermediary between the private and public sectors. For them, it's the same. The prescriptions that come out are coded "community healthcare" by XPonent. And when you have three quarters of your hospitals that are either clinics or these public-private hospitals, you get the regional manager of community jumping for joy, shouting, "Community is up, community is up!" And you find yourself with a bad X-Ponent. There you go.

The managing director of TT, a rival to the firm that developed XPonent, highlights other weaknesses of the tool:

> TT (MDP): [On their panel's pharmacies], they are not exhaustive on prescriptions. They only have prescriptions immediately reimbursed by public health insurance, meaning those recorded on the pharmacy's IT system. So it isn't a true solution. XPonent provides very good data for analysis, but it isn't very good data for management.

Technologies supposed to resolve the flawed control of the link between promotional investment and medical prescription.

A number of technologies are designed to measure the return on investment of promotional operations. This return on investment is measured in terms of medical prescriptions. Among these technologies may be cited Strategy Evaluator (IMS Health) and the product proposed by CAM (Cegedim). Strategy Evaluator (IMS Health) analyses medical prescriptions from cohorts of doctors, meaning groups of dispersed doctors who share one or several specific criteria (for example, having attended a specific professional relationship, a conference, or taken part in a phase IV study). CAM is the leader in the creation of promotional investment databases for the pharmaceutical industry. CAM audits the performance of all media used by pharmaceutical laboratories' marketing teams. It collects data on pharmaceutical products and practitioners' actions through panels of doctors in general and specialized practices and pharmacists[18].

Even though these technologies help to identify medical prescriptions from certain types of doctors more accurately, they all rely on panels and consequently on extrapolations. More fundamentally, these technologies are based on practitioners' perceptions of their prescriptions or their memory of a past conference. They therefore raise the issue of the reliability of the data gathered.

[18] CAM is the sole reference for the world's top fifty laboratories for the annual systematic monitoring of pharmaceutical laboratories' promotional expenses. Its panels of doctors cover over 100,000 general practitioners worldwide (Cegedim Annual Report, 2003)

CAM is a technology that is sometimes diverted from its initial purpose. Indeed, it is used in some laboratories to detect potential problems of disparities between the representative's statements and the representative's real activity. Once again, the use of this technology feeds an illusion of control as we can see below.

To a question of how important the statement is in the drug representatives' reporting on their activity in the ETMS, W2 launches into an argument that spotlights all the technologies used to solve what is, in his opinion, a bogus problem.

> W2 (DRM): Everything is not based on the statement; if that were the case, it would pose a problem for me. There are a certain number of tools at our disposal [...]. For example, we do *recalls* [telephone surveys of doctors]. [...] Through the statement of the number of contacts in a day, we tell the rep that he must do six contacts a day, he says that he has seen six. But there is what we call a bogus visit. Let's say that he has only seen five, and that he barely shook the hand of the fourth. To deal with this, there is communication. There is a body called CAM that gives me the true returns. [...] It's a body that works for the pharmaceutical industry, which does market studies. When, internally, I press the button and I see that I've produced 10,000 visits, the CAM tells me that, over the same period, it only accounts for 8,000, so 2,000 are missing. All that to say that there is a limit to the statement. We cannot believe it. There are, in the end, very few statements made. There is certainly some at the individual level, but on the global level, they are already no longer given. It is all very "screened". We do market studies immediately afterwards [...] each time, I have a parade, at least of all the key parameters, which I follow monthly. It is not making statements, it is controlled statements crossed with x data.

We are at the heart of the technological ideal. Technologies correct, bring out the truth, and do so in an instantaneous way. In reality, the link between discourse and calculation that the technologies construct remains inconsistent. Indeed, we feel the whole illusion of the system when W2 explains that the aggregation generated by the technologies enables him to render the errors that may exist at the individual level insignificant, as if they were erased! Furthermore, the technologies mentioned by W2 replace the statement made by the representative with the statement made by the doctor, which is not a solution, as TT reminds us below:

> TT (MDP): we cannot put a policeman behind each representative. We therefore call on firms that provide *recall tests*. But it isn't more objective than the representative's statement since it involves the doctor's memory… We are still dealing with the human element. So, we mustn't abuse this. If you have a variance in Teams, it's usual; if you have a 25% disparity, then ok, that's a real signal. Once again, the problem is not with the data but with how to analyse these data.

The table below provides a summary of the illusions and realities regarding the capacities of the pharmaceutical industry's performance measuring technologies.

Technology	The Problem of control at a distance supposedly resolved	Service provided by the technology	Weaknesses and problems of the technology
CAM (Cegedim)	Link between promotional investments and medical prescriptions Link between activity statement and real activity of the DR	Measurement of return on investment for promotional operations and other actions	Non-exhaustiveness of data (panels) High entry cost for laboratories with large sales force Data based on doctors' prescriptions
ETMS (e.g. TEAMS, Cegedim)	Link between drug representation and medical prescription	Measurement of DR compliance with norms of activity, targeting, number of contacts	Based on the statement (problem of bogus visits)
GERS	Link between the drug representation and turnover	Gives the sales and market share per product and per geographical zone on the basis of pharmacy orders from the wholesaler-distributors (monthly or weekly frequency)	Measurement of the performance of regions biased by the non-accounting for geographical source of prescriptions. Phenomenon of drug stocking by pharmacies non-identified (potential problem at end of business cycle, during the calculation of bonuses to the sales force) A full month of delay in transmitting data (data for September received at the beginning of November) High cost of the latest improvements (geographical fine-tuning and weekly frequency)
Xponent (IMS Health)	Link between drug representation and turnover	Statistics from pharmacy outcomes through group analysis of prescriptions leading to a purchase	Problems: Non- exhaustiveness of data (panel of pharmacy and no exhaustiveness of prescriptions in these pharmacies) Diversity of types of establishment unaccounted for High cost and geographical panel (requires the attainment of a critical mass in numbers of prescribers)

Table 3 Service provided by the performance measurement technologies in the pharmaceutical industry

The problems of control at a distance encountered by pharmaceutical laboratories all seem to be resolved, in the discourses of the people interviewed, by technologies. The diagram below summarises the problems of control at a distance previously shown (see Figure 1) and brings to light what the technological "solutions" mentioned by the interviewees actually relate to in reality.

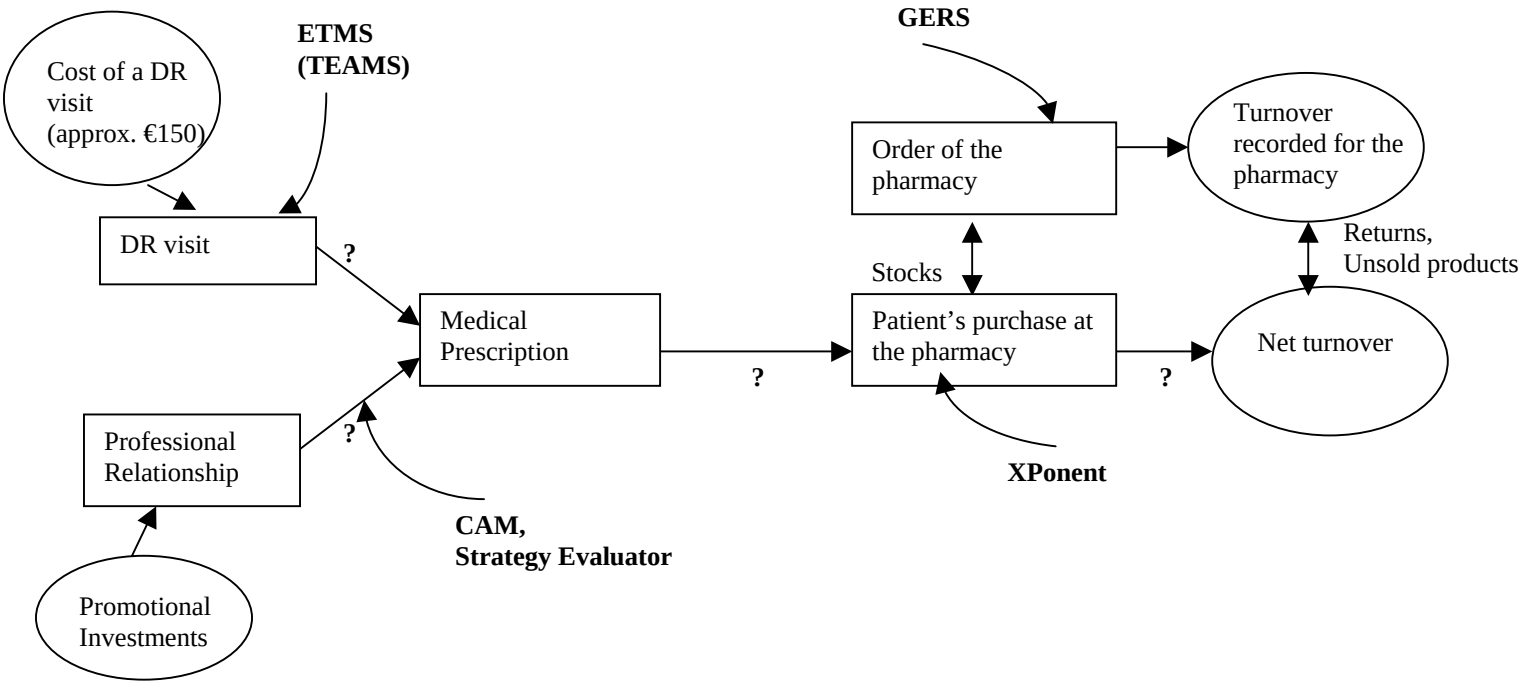

Figure 2 The illusory technological solutions for the problems of control at a distance in measuring the performance of sales forces in the pharmaceutical industry

Above and beyond the intrinsic problems of the technologies mentioned in Table 3, it is noteworthy that most of these technologies (except the CAM) bring to light quantified information on behavioural elements or discourses, but that they do not conduct an analysis of the arrows, meaning understanding the links between discourses, behaviours and calculations. For instance, although XPonent is in effect closer to the reality of sales than the GERS by focusing on pharmacies' products sold rather that products ordered, it does not provide a new answer to explain the link between the drug representative's visit, the doctor's prescription and the patient's purchase.

In the end, the technologies do not solve the problems of control at a distance of sales forces in the pharmaceutical industry. They provide their users with a feeling of control that proves to be unfounded. In particular, the technologies signal good and bad performances but do not give the cause. In the event of bad performances, they serve to justify *ex post* control – a sanction.

> D1 (RM): Currently, I have the case of a drug representative who was working well, who had good results in the second quarter, who is autonomous, very good, etc. All of a sudden, she has poorer results. I look at the analysis. There are always external elements, you know, it's always the fault of something else. It's often true but there also has to be some questions raised. It's not always easy to put your finger on it, on the reps. In this sense, the figures are then a good means of making a decision. They are quite difficult to argue with.
> **I: But they don't give you the cause of the underperformance…**
> D1 (RM): No, that's true, it doesn't give the cause but it gives an opportunity and a legitimacy to go and look for it… with the representative. I look at the figures and I see that things are not going well for this representative. So I turn to her and say: "What have you been doing? Do you think enough has been done?" The figures remain a good indication of someone's performance in the medium and long term. But it is clear that is not enough.

> Anyways, the figures are nonetheless what sanctions.

In the example above, the technology of the GERS indicates a drop in turnover for the geographical zone of a representative. This triggers a series of controls of this representative's activity data in another technology (the ETMS). However, the ETMS will not give the cause of the underperformance because the link between the drug representative's visit and the turnover is too tenuous. In contrast, the combined use of the GERS and ETMS technologies enables the reporting line to justify the *ex-post* control. The data they provide will serve the neutrality and the objectivity of any future sanction. The apparent reduction of ambiguities, by the translation of qualities into quantities, is one of the main appeals of quantification. "Whilst assertions that quantification leads to more precise, objective and rigorous knowledge have undoubtedly served to legitimate the emphasis upon numbers, such arguments are difficult to sustain. In contrast, it is suggested that while accounting 'knowledge' may not 'correspond' to any remote context in terms of truth, this failure of reference may involve reformulating the problem of truth into a problem of power and distance." (Robson, 1992, p.704).

We have just seen how technologies resolve the problems of control at a distance only artificially. However, the articulation that they offer between *tekne* and *logos* appears rational and legitimate in the words of the interviewees. As a result, technologies do take part in the process of translation, in the internalisation of constraints by the actors of the pharmaceutical laboratories who are controlled at a distance. How can it be that these technologies take part in this control at a distance when, in fact, we are unable to justify the sound founding of the articulation that they provide between the calculations and the discourses that underpin them?

3.2. Why do technologies enable control at a distance?

The performance measurement technologies that we have studied enable control at a distance because they take full part in the process of translating mobile, stable and combinable information. These three qualities mentioned by Latour relate to the data diffused by the technologies rather than the technologies themselves. We will see below how technologies act on these three qualities. Moreover, our study shows that performance measurement technologies are underpinned by two ideals that strengthen their potential for control at a distance: an ideal of permanent surveillance and an ideal of truth through quantification.

"What is mine is not yours": mobility through technological substitution

Technologies of control at a distance are supposed to make mobile the objects that one seeks to control at a distance to allow them to come closer together (Latour, 1989, p.534). How does this quality translate with regard to measurement technologies of sales performance in the pharmaceutical industry? Performance measurement technologies make mobile individuals' resources relevant by substituting exclusive ownership of these resources. Thus, centralisation and archiving of the sales activity in the ETMS is part of redistributing of control from the drug representatives to the pharmaceutical laboratories. Through technology, the laboratory hedges risk and reduces the comparative advantage held by the individual by sharing with everyone what constitutes the fundamental asset of the sales representative: the address book.

> B3 (DR): As soon as I have a meeting, I put it into the computer, even if it isn't for some time to come. In the past, when people left the laboratory, they left with their contacts! Now they say, "no, the contacts are not yours but the laboratory's!"

Here we find one of the features of technologies in surveillance societies highlighted by Lyon: databases entail "dissolution of the owner". The content of the database is everyone's and no

one's; at the same time, the database has been acquired by an institution and, as such, belongs to it (Lyon, 2001, p.115). In this respect, technologies of control at a distance enable the creation of a mobility that is permanent: "Writing provides the opportunity to inspect and re-inspect the inscribed elements by being 'out-of-time'; unlike the receipt of oral information, it is mobile in a temporal sense also" (Robson, 1992, p.693).

"It is written in stone": stability through codification

The capacity of accounting inscriptions to enhance mechanisms of long-distance control is contingent upon their stability of form (Robson, 1992, p.695). In our case study, this stability of performance data is based on data codification and archiving by the performance measurement technologies. In this way the technologies enable performance data to be handled while avoiding their distortion by users.

As is stated below, the predefined frameworks for reporting activity in the ETMS and the principle of electronic validation that governs them does not allow for the eventuality of correction.

> A1 (RM): You can also, with this IT system, enter a bogus visit with wanting to. I've typed in the name of a doctor and I enter the validation too quickly, oh no! Yes, but it is in the system. Since the policy is not to get a single visit report modified by the site administrators, once something is done and validated, it's over. So, if you make a mistake, you correct it by sending a mail in which you mention in the next visit report that you made a mistake: "I didn't see that particular doctor".

If the data transmitted by the technologies contain errors, it is for the relevant user to correct them by *ad hoc* messages, but the incorrect data will never be modified.

Performance measurement technologies reinforce the stability of the data transmitted by the drug representatives by creating databases that cannot be modified and are shared by the whole sales force. In the quotation below, the targeting proposed by each representative is integrated into the Intranet and becomes the normative reference that steers the representative's activity and, in part, determines his assessment.

> Z2 (DR): we are constantly judged by our coverage of the target. […] Each year, we do a top 50, we define a top 50 goal. You choose 50 doctors who seem important to you in your targeting [...] we have a deadline to send it. It is set, recorded in Excel and send to the manager. Then, this top 50 is on the Intranet and it is accessible to all representatives to consult. And so, for each doctor in the top 50, we see the number of visits that I have set, how many I have done to date and so my percentage for far in relation to the goal. […] This top 50 constitutes an important point on which I will be assessed during my annual appraisal. It reflects the coverage of the target.

The economic norms put in place through the technologies of control at a distance remain in place and constitute a reference (Miller, 1994, p.2). Technologies enable norms and references to be developed that steer the behaviour of the individual. They have value as objective reference points. As Sfez reminds us, "the calculation rules everything. The science of numbers is a sort of universal tool. Harmonious proportions and justice then follow" (Sfez, 2002, p.165).

Stability is not only enacted through the inflexibility of the technology but also through its capacity to make information recognisable and comparable to their users (Robson, 1992, p.695). The performance measurement technologies we have studied enable this aspect of stability to be achieved through codification. This codification is based on a synthesis and

simplification of the presentation of data so that the user of the coded data may instantly see the levers on which he may or must act.

> F2 (DR): I have the GERS every week, [...] each week I look at the trends. You have the average for France, the regional average and goal attainment. If you are rising and above the French average, you're in green. If you are above the French average, but falling, you're in orange. If you are below the French average and you are also falling, you are in red.

Whether the codes stem from turnover measurement technology (the GERS) or activity measurement technology (the ETMS), the codes simplify the real and are seen by the interviewees as control supports (control by oneself in the previous quotation, control by the manager in the following quotation).

> Z2 (DR): That day for example, I only did three visits. My RM should go and see why. She will see in fact that it was a day of mixed activity because I did training on that day. When you do fewer than four visits, the system automatically colours the day in red.

Codification implies formalisation, schematisation, uniformisation, the possibility for archiving, and systematicity. This enables data analysis and the assessment and correction of the individual on the basis of this analysis. The codification performed by accounting technologies plays a role, as such, in governing the individual. Through the act of inscribing, events are transformed and submitted for examination (Hoskin & Macve, 1994, p.67-68).

"Unity is power": combinability through technological integration

Technologies of control at a distance must enable the control objects to be *combined* so that they may be cumulated and shuffled like a deck of cards whatever the manner in which they are constituted (Latour, 1989). In our study, this combinability is enabled by integrating diverse performance measurement technologies. Integrating technologies must allow the performance of the drug representative to be objectified. Multiple performance data are combined to deduce new, synthesised and aggregated data that determine performance remuneration. The drug representatives are aware of these combinations that determine the bonuses they will receive without fully understanding the finer details as the following quotation shows:

> A2 (DR): Calculating the bonus is often complicated, however. There are times when you don't understand. It is especially in community healthcare that it is really sensitive. […] For example, there is one aspect that is on the rise… It is the average rise in patients over a 28-day period. Then, there's the increase in the competitor's anti-cholesterol drugs at sector level. I don't know what they do afterwards. They mix it up, all together. And we have so much to do.

Calculating bonuses perfectly illustrates the emergence of new categories from the combination of multiple performance data provided by the various technologies. "Rather than assert that there is some consistent 'essence' denying the addition of things that are different, we can acknowledge that numbers can be implicated in the creation of new categories of 'object' or 'entity' that arise from the play of mathematical transformations. […] Once different inscriptions are combined, they create a new tier of inscriptions that can stand for and replace the previous inscriptions" (Robson 1992, p.698, 699).

The pharmaceutical industry relies heavily on the potential to integrate technologies to conduct a control of coherence with regard to data declared by the sales force (budget spent on promotional operations, number of visits declared, etc.).

> SAD 1: Today, we are increasingly linking the tools together through other tools. For

> example, the Equilibre tool enables us always to have a view of activity and expenditure. At the level of administrating representatives' visits, it allows us to check that all the expenses do indeed relate to a professional activity.

In this search for combinability, it may occur that performance measurement technologies are diverted from their initial purpose (as we saw in the example of the CAM). For instance, when a pharmaceutical laboratory seeks to spot bogus visits, it crosses data output by technologies that are not *a priori* designed to provide information on the coherence of a drug representative's statements. Activity reporting provided by the representative in the ETMS as well as his statements of transport mileage are crossed with the findings of CAM surveys of panels of doctors regarding their memory of a promotional operation or of a message delivered during a visit from a representative.

> TT (MDP): In our group, we try to set up indicators to try to differentiate the effectiveness of the networks, if not individuals. To do this, we cross-reference activity data output by Teams and data output by CAM that give the impact on the doctor (does he remember the visit, the message?). CAM enables us to find the doctor, the date of the visit; if we cross-reference this with Teams, we could logically find the representative who made the visit. Today, cross-referencing information is what most laboratories are looking for. […] For analysis, [the RM] is constantly required to link the tools: I look at my results (in the GERS), "I'm going to find the explanations" (in Teams).

In this sense, performance measurement technologies combine data non only to objectify the performance of sales forces but also to exert a control of coherence over the sales force's statements. "Combinability allows the actor to accumulate inscriptions, aggregate them, tabulate them, recombine them in order to establish new relationships, and calculate 'norms'" (Robson, 1992, p.697). "Translation involves creating convergences and homologies by relating things that were previously different" (Callon, 1980, p.211). It is indeed a matter of producing new relationships because, fundamentally, the technologies mentioned (ETMS and CAM) are not designed to conduct investigations into bogus visits. This rise in visibility that is enabled by combining several performance data invites us to decipher the ideals that underpin technologies of control at a distance above and beyond their role in creating mobile, stable and combinable data. The technologies integrate to form a global surveillance device.

"Big brother is watching you" or the ideal of permanent surveillance

Technologies of control at a distance are based on an ideal of permanent surveillance. In this respect, the RM's management of closeness (visits to doctors in twos with drug representatives, for example) usefully complements all the instrumentation of control at a distance.

> W2 (DRM): I've already talked with people working in the agri-food business and they are astounded by the number of tools we have available. Today, there are enormous numbers of firms revolving around the pharmaceutical industry that bring us help in this aspect. I have the national data. It's sure that, seen from my office, I could be told any old thing. Locally, it's the work of the RM. It's pragmatic work, but it has value as *coaching*. It's the value of closeness. It's like the forensic police, if you will, and the local police force; it's not the same world. You may say that there are statements made, but there's a time when it is nonetheless relational. Have I reassured you?

W2 is sure of the rationality of control at a distance because an ideal precedes the link between discourse and calculation carried out by technologies. In the comments above, the ideal is that of permanent surveillance (the "police"). From this ideal, it is always possible to create an artificial link between the discourses and calculations contained in the technologies.

Technologies of control at a distance, through this ideal of permanent surveillance, redefine Bentham's panopticon referred to by Foucault in *Surveiller et Punir* (1975)[19]. The visual control of the panopticon becomes control at a distance; the architecture of the building counts for less than the architecture of the information system: the panopticon becomes electronic (Lyon, 2001; Burrell, 1998, p.26)[20]. In this electronic panopticon, control at a distance is nourished by a *feeling* of potentially permanent control rather than by the certainty of actual control. In a panoptical system, the controlled individual "must never know if he is currently being watched; but he must be sure that he may always be watched" (Foucault, 1975, p.235). In the quotations that follow, the drug representatives are imbibed with this feeling of permanent surveillance that appears through the theme of tracking. They confuse the accumulation of data, the archiving of information and the use of this information for control purposes.

> S4 (DR): I've seen listings in the laboratory, in the IT department, where you see the names of DRs, the doctors they've seen, what they did. Everything is controlled. By means of our Teams messaging system, they have an immediate trace anyways.
> **I: But then, is it used?**
> S4: Well yes, it's used. Yes, yes. They know what has been done and what hasn't been done. They even know the averages for contacts from one division to another. There are also comparisons like that. It can be done. Anything can be done. In either a positive or a negative way.

> S3 (DR): I've never heard so much talk about recall tests in my life. I think that, with the IT systems, the infamous testers, they can phone the doctor from the next day onwards. […] With the IT connexion every evening, they have the info almost in real time. […] The information is more instantaneous. That means that, from the moment you are connected, they can check immediately. […] I think that they have increasingly advanced means. How is it used? I really don't know. Because people are still people. […] Look, there was even a question… It's also perhaps just a legend. But, in theory, on mobile phones there is a way to retrace someone's day if they have left their mobile on and have used it. There was a rumour about France Telecom that said that, for a small supplementary subscription, companies that equipped employees with professional telephones could track representatives' trips each day.

Control therefore is not enacted through the real use of technology but rather, through the potential panopticon that it creates and thus the feeling of transparency that it induces. Control at a distance draws its power from the feeling the subordinate has that he may be constantly observed and that his activities may be permanently being watched. Moriceau stresses "visibility, because it unmasks or ignores, influences the structure by signifying to the managers the possibility and the probability of being observed. Their behaviour is modified accordingly […]" (Moriceau, 1997, p.184). More precisely, it is a matter, through this "conscious and permanent state of visibility" of ensuring the "automatic working of power" (Foucault, 1975, p. 234). "He who is subjected to a field of visibility, and who knows it, reclaims the constraints of power as his own; he makes them play spontaneously on himself; he inscribes in himself the power relation in which he plays simultaneously both roles; he becomes the principle of his own submission" (Foucault, 1975, p.236).

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[19] English edition: FOUCAULT M. (1979), *Discipline and Punish*, Harmondsworth, Penguin

[20] Foucault suggested this in "Discipline and Punish", underlining that "The Panopticon is a machine for dissociating the couple see-be seen: in the outer ring, one is totally seen without ever seeing; in the central control tower, one sees everything without ever being seen" (Foucault, 1975, p.235). This is what is made possible notably by the electronic network. Foucault recognises that "communication circuits are supports for cumulating and centralising knowledge" (Foucault, 1975, p.252-253).

"The figures speak for themselves" or the ideal of quantification

Technologies of control at a distance nourish an ideal of truth relying on a systematic quantification of the drug representative's performance.

> **I: But how do you believe that the RM can have a view of your activity?**
> F2 (DR): He sees it in the figure, you know. Overall, the GERS gives you everything. Then it's statistics.
>
> **I: I imagine that there are not just figures in your goals? Do you have other goals?**
> B2 (DR): […] You know, we do sales. The goals are to "improve myself", but what does that mean other than selling more boxes? We always come back to this in the end […] each time, it comes down to numbers: how many PRs[21], how many contacts, and how many boxes.

The previous quotation shows that the drug representative justifies the principle of technology quantification by mentioning the sector of activity: sales. Yet specifically, drug representation is not legally defined as a sales activity, as we have already highlighted. All facets of the representative's performance are summarised in figures and it should be noted furthermore that stating in figures (number of PRs, number of visits, number of boxes sold) covers up the issue of the incommensurable link between the representative's activity and the turnover achieved in his region. Consequently, the influence on individual behaviour is possible by calling upon quantified data, which is often both unique and financial. This kind of data is the principal outcome of most remote control technology. The ideal neutrality and objectivity that is required for any expertise lies within the unique figure. It is through this ideal translated into techniques that control at a distance, as well as accounting, claims legitimacy which appears to be above suspicion (Miller, 1994, p.29).

Generally in the comments of the interviewees, technology-enabled quantification allows an illusion to be projected regarding their capacity to link calculation and discourse.

> W2 (DRM): There is what we call the bogus visit. […] Faced with this, there is a body that is called CAM that gives me the true returns. Then, it is not really the true returns… there is a disparity in the doctor's ability to remember that always plays against me in some way. The disparity may come from a bogus visit, but foremost, it comes from a visit that hasn't brought results. For me, it's the same thing. Between "I really saw the client, I told him what I had to say, and nothing has resulted" and "I didn't see a client", the result is the same. You may say the second is a cheat and the first works badly, but for me, the bottom line is that, at 150 euros per visit, I've lost 150 euros.

To identify false statements in the drug representatives' statements with regard to their activities, the laboratory calls on control technologies such as market studies and telephone surveys. The interviewee recognises that the calculation provided by these surveys does not necessarily inform him of the source of the problem encountered (a visit not remembered by a doctor may arise from something other than a false statement by the DR). What is surprising is that the interviewee reconciles this weakness by mentioning the first calculation enabling him to give meaning to the link between a cause and a consequence that do not have any link *a priori*. Here, the consequence is quantified in the opportunity cost (the 150-euro cost of a visit is lost) and this quantification becomes preponderant, making us forget the fact that we do not know the cause of the problem; it masks the fact that the technology is incapable of

[21] PR: professional relationships

establishing and documenting the link between a discourse and a calculation. Through quantification, technologies provided ideally 'strong' knowledges in the sense developed by Robson: "the problem of truth-correspondence [between an inscription and the object to which it refers] is supplanted by that of action. The conditions for strong explanation become not truth but power to act. […] Hence, strong explanations are not explanations that are true to reality but rather the most powerful explanations through which to act upon all relevant contexts" (Robson 92, p.691). Technology provides such strong explanations; it does not indicate the cause of poor performance but enables to justify ex-post control and therefore potential sanctions (bonus cut, layoff). "Bringing together and making the same, rendering equivalent, things that were previously different allow actors to make calculation in accordance with their desires to act upon contexts." (Robson, 1992, p.701).

3.3. Control at a distance through technology: if it is not about external control, it is about self-control

Our study shows that performance measurement technologies give pharmaceutical laboratories an illusion of external control over their sales forces, and notably the illusion that the reporting line perfectly controls a system based on the statements of the sales force. However, control at a distance is exerted nonetheless using the capacity of technologies to make performance data mobile, stable and combinable, a capacity that lies in two ideals that drive the technologies (permanent surveillance and truth through quantification). If this control at a distance is not external control, what then is its nature? In this section, we show that it is a matter of self-control.

Self-control is the control that individuals exert on their own behaviour (Hopwood, 1974), as opposed to the influence exerted by other people or by the environment (Thomas, 1983)[22]. Self-control does not consist in setting one's rules oneself but in behaving as a responsible individual in the eyes of society or of the firm; that is to say, integrating the constraints of the organisation and rationalising them so as not, or no longer, questioning them (Dambrin, 2005). Accounting technologies help to develop this attitude by the individual. Accounting power crosses with accounting knowledge to make individuals reflexively monitor and act upon the world in accordance with the norms and standards they accept as neutral and true (Foucault, 1975, 1982; Miller & O'Leary, 1987; Robson 1992). Accounting has a self-disciplining power; it informs the individual about his actions and makes him recognise his priorities (Knights & Vurdubakis, 1988; Robson & Cooper, 1989). Technologies of control at a distance, to which users appose an ideal of surveillance as we have seen, seamlessly slot into this development of self-control: "the continuous surveillance created by the accounts has the potential to create auto-regulatory effects […], the inscriptions that measure and survey the individual have also the potential for creating an internal form of control" (Robson, 1992 p.700). This internal form of control results from the translation performed in control at a distance, which consists, as we have already highlighted, in translating the goals and values of others into one's own terms (Miller & Rose, 1990).

[22] A certain number of scholars (Drucker, 1954; McGregor, 1960; Dalton, 1971; Hopwood, 1974; Otley & Berry, 1977; Parker, 1977) mention self-control as a control mode in its own right within organisations and distinguish it from control external to the individual. For instance, Hopwood (1974) and Dalton (1971) discern three complementary modes in organisational control: administrative control at the level of the formal system of procedures and rules; social control at the level of the group; and self-control at the level of each individual personality.

Our case study offers a glance at two declensions of self-control resulting from performance measurement technologies: self-control with regard to targeting doctors, and self-control with regard to setting quantitative goals of turnover to achieve. We show below that in each of these two cases, self-control, meaning the integration of organisational constraints, is fostered by technologies. Indeed, technology gives the illusion of autonomy; it makes the individual believe that he is participating in, even defining on his own terms, the elements of his control (targeting, turnover goals). Subsequently, the individual is all the more predisposed to judge the very heavy constraints the organisation imposes on him positively and to consider as autonomy what is the holding of no real power (Bouquin, 1998, p.168).

The representatives often feel that they initiate their targeting while letting slip in their discourses the technological constraints that limit the amount of freedom they have.

> S4 (DR): In fact, we have some freedom… For example, the targeting I was talking about earlier. We are left… Well, even if we have guidelines to follow. We are nonetheless left some freedom to choose our doctors according to criteria established beforehand by the lab. But let's say that there is someone you don't want to see because you think that you don't get on with him and he won't prescribe a single box, we can say so. [...]
> **I: Concretely, the last [targeting] you did: could you explain how it was done?**
> S4: According to our products, we have intelligence. It's called Icomed and Logimed. There is also a more precise analysis that is done. They buy from certain groups the prescriptions that come out of pharmacies [XPonent]. If we have that targeting, we know what is done. We must choose the doctors with a big potential. [...] In general, we make subgroups with our sector, per sector. And each person says, "We choose this one." Well, anyways, we are obliged to choose all those that have a big potential. And after that, we add some more. We must have a certain number. [...] Then, we input them into the machine, the computer. Afterwards, the data's churned in Paris and then a definitive targeting is sent to our computer later.

In the preceding quotation, the drug representative begins by asserting his freedom in constituting his targeting, and then mentions the technologies that predefine it (Icomed, Logimed and Xponent). An ambiguity persists in his reasoning between the information that these technologies can provide ("intelligence", "analysis", "we know what is done") and the constraints that they create ("we have guidelines to follow", "we must choose", "we must have a certain number"). Lastly, between the freedom asserted at the outset and the "data churning" at a distance that precedes the arrival of the targeting on the computer, a whole rationalisation is performed, mainly due to the ambiguity of the technologies mentioned that are both tools that assist operations and instruments of control.

The quotation below, taken from the comments of the managing director of a firm providing technologies used in targeting, summarises well the essence of control at a distance through technologies: it is a matter of developing self-control in the individual, whereby he appropriates the organisational constraints.

> **I: The representatives tell me that *they* qualify their doctors as small, medium or big prescribers.**
> TT (MDP): No. The targeting is constituted by calling on data sources such as Icomed or Logimed. You also have information provided by TT on the prescription level of each doctor for all products combined (large, medium or small clientele). In accordance with all that, the laboratory draws up a list generally of three types of doctor. It is therefore not the representative who defines this. What we do, to be consensual, and so that the representative gets involved, is send him the list and tell him, "you can modify 10%". Then, the

representative signs somewhere, commits himself, and he may be reprimanded if he doesn't comply with it. But the fact that the representatives you have met tell you that it is *they* who classify the doctor is precisely the goal sought after by the laboratory! It has to be done by the Head Office and afterwards representatives appropriate it for themselves. But, quite frankly, the targeting is done elsewhere.

Defining quantitative goals of turnover is the second area of performance measurement where the technologies of control at a distance foster the drug representative's self-control. In the quotation, we observe confusion between individual participation in defining a plan of action and defining a goal of turnover. By participating in the development of a technology (and a technology is certainly not neutral because it acts on the pay rise during the annual appraisal), the drug representative believes himself to be the instigator of setting the quarterly goals that determine his bonuses.

I: Is it your job to set a goal of turnover, for example, or days of treatment? Or does that depend on Head Office?
A2 (DR): Well, we do that at the level of the action plan, we put our numbers of [doctors], business or rates. How many patients they are able to put on L., our product. We have forecast the level of their activity. And we get to a certain figure and we try to stick to that goal. But Head Office is not going to impose this figure on us. It calculates our goal according to criteria such as the market share of anti-cholesterol drugs, the dynamic of the competitive products and changes in the market.
I don't understand. In fact, there are two figures, then: Head Office's calculation and your calculation as a rep? Yes. **But which one will be taken into account for the bonus?**
Ah, for the bonus, it's the Head Office's goal. I don't have it. […] The goals in terms of boxes are determined for us by Head Office. I can tell you them up until the month of December because I marked them down. This is all very confidential. Calculating the bonus is often very complicated. […] They mix it all together. And we have so much to do. There you go.
So, in fact, there are two criteria. There is market share and goal attainment.
Yes, that's right: goal attainment and market share. And our bonuses are based solely on that. In fact, the sector plan of action will be more an end of year assessment. [...] It will be more at the level of know-how.

The organisation therefore has two parallel systems coexisting for defining quantitative goals: one that involves the sales representative and one in which the Head Office imposes the goal. It is on this second system that the principles of short- and medium-term incentive are based, whereas the sales representative does not actually understand the calculations that underpin the rating criteria. The representative internalises these constraints (imposition of the goal and poor understanding of the calculation process) due to the existence of a parallel system in which he participates. Internalisation is manifest here in the confusion at the outset (he believes he is the instigator of his turnover goal) and in his referring to rational discourses to legitimise his poor understanding of the calculating processes (confidentiality, complexity).

Technologies of control at a distance foster self-control because they make the individual aware of goals (on which criteria he is assessed) while keeping him in the dark with regard to the calculations that underpin these goals. For there to be self-control through technologies of control at a distance, the link between discourse and calculation must remain blurred[23]. In contrast, the norms of behaviour and results that discourses and calculations entail must

[23] It has an "interest" in remaining blurred because, as we have already highlighted, it is often groundless. The more aware the representative is of the incoherences between the norms of behaviour and the norms of results, the more difficult it is for him to appropriate them and internalise them.

appear as very clear goals. Through A2's testimony, we see that he knows full well on which discourse and calculation criteria his bonus hinges (the quantified goal of turnover and changes in market share). From these criteria, he deduces norms of behaviour and internalises the constraints because he was made to participate in parallel systems of setting goals. By knowing the goals fully, but not the link between the calculations and discourses, the representative is naturally led to give the best of him/herself to meet these goals. Here, we touch on the paradox of technologies of control at a distance: the self-control they engender makes us think of remote control. The technologies of control at a distance directly echo the disciplinary mechanism that feeds a "mechanic of power" according to Foucault's terminology. This mechanic defines how we can hold sway over the bodies of others (not only over their achievements but also over the way they reach them) so that others "perform as we want, with the techniques and in line with the rapidity and efficiency we determine" (Foucault, 1975, p.162).

4. Discussion: Towards Three Complementary Interpretations of Governing through Technology

By focusing on technologies, this research paper enables us to detail the role of translation in control at a distance. Control at a distance does not consist in linking established calculations to a place with actions performed in another place; the full weakness of the reality of this link has been shown (3.1). It is a matter of keeping this link blurred and inducing the *conviction* that this link is clear using technologies (3.2). This is what enables translation, in other words the individual's appropriation of organisational constraints (3.3).

Our study invites us to go beyond the definitions of control at a distance centred on how it functions and to envisage it equally in the light of its purposes. Control at a distance is self-control that relies on technologies. It aims to develop a dominant economic order centred on the individual.
Technologies of control at a distance function by creating and conveying information on the control subjects to the source of influence (mobility). They also function by guaranteeing stable information on these subjects (stability). Lastly, they function by enabling a combining of information on the control subjects (combinability). These three qualities are prerequisites to the process of translation. However, they do not suffice to explain the power of technologies of control at a distance to induce self-control. For this, we must look to the role of technologies (instigators of translation) rather than to the features of the information they diffuse (products of translation). Our study shows that this self-control resulting from technologies is possible because the technologies are driven by ideals. With regard to performance measurement technologies, their designers and users project onto them an ideal of permanent surveillance and an ideal of truth through quantification.

Moreover, our study empirically analyses the behaviours of self-control stemming from the process of translation in the context of measuring sales performance. We show that technologies play a fundamental dual role in the development of these behaviours. Firstly, they enable a rationalisation of organisational constraints due to their ambivalence (they are both work tools and control instruments). Secondly, performance measurement technologies foster self-control because they make the individual aware of goals (on which criteria he is assessed) while keeping him in the dark with regard to the calculations that underpin these goals. More broadly, in order for there to be self-control through technologies of control at a

distance, the link between the discourses on performance and the calculations that underpin them must remain blurred.

The analysis of technologies of control at a distance that we have proposed offers another interpretation of power in its 'modern' forms[24]. Distance is a source of problem for controlling but, at the same time, it is also a source of power since it enables those who are distanced from a setting to act upon that setting through power/knowledge inscriptions (Robson, 1992, p.691). Our findings move towards reconsidering power in its relation with knowledge and suggest three forms of complementary interpretation of governing through technologies: critical, strategic and socio-institutional.

In the critical perspective, technologies of control at a distance are criticised for their alienating power. Through technologies of control at a distance, "senior managers discover ways to influence individuals' motivations by teaching managers to control themselves and correct themselves. And this aptitude to ingrain a sense of self-discipline in employees in the field has become a much more effective control means than anything administrators have been able to do using the information conveyed upwards to senior management thanks to the control system" (Le Goff, 2000). This critical view of control at a distance is nonetheless nuanced in two ways in this paper. Firstly, the individuals interviewed are not taken in by the false autonomy that control at a distance instils. They are often lucid to the effects of the technologies. Although they may not immediately speak of the structuring impact, they recognise them relatively quickly. Secondly, they can also exploit the technologies to serve their own interests. In this respect, we touch on the limits of the Marxist analytical perspective that focuses on the subordinate's bondage to technologies implemented by senior managers. This suggests going beyond ascribing control at a distance to the class struggle, notably because any device is overridden by the ways it is used and always contributes to manufacturing what was not foreseen (Miller & Rose, 1990; Boussard & Maugeri, 2003). Nonetheless, our study's findings show that a second view of control at a distance, while purposefully complementing a critical perspective, is not satisfactory. In this strategic perspective, the unexpected effects of control at a distance stem, most of the time, from their users' diverting control technologies (for example, in our study, the use of the ETMS to input bogus visits). Seeing technology solely through the actors' gaming presupposes an excessively instrumental view of man. Thus our research suggests blending the critical and strategic viewpoints of technologies of control at a distance with a third interpretation of their effects: envisaging them as a practice of government aimed at developing an economic citizenship. In our paper, we show how control at a distance influences individual conduct in order to compensate for a decrease in rationality. Technologies of control at a distance transform the conduct of the firm and of the individual and thus contribute to building a new economic order (Miller & O'Leary, 1994b). This view of control at a distance ascribing to a programme of governing the individual calls into question the role endowed by certain scholars on accounting in control at a distance. For instance, although Johnson questions the relevance of accounting indicators for controlling at a distance (Johnson & Kaplan, 1987), he does not see in control at a distance a device for governing the individual but rather a functional tool that responds to the organisational imperatives of efficiency (Johnson, 1991). Our study shows that control at a distance through technology, based on an *illusory* articulation between calculations and discourses, integrates into a socio-economic project of self-control. The bondage of and the latitude granted to the individual, seemingly incompatible in the two previous perspectives (critical and strategic), are in fact conjugated in

[24] Here, we confer on this term the meaning that Lyon gives in this analysis of modern surveillance societies. According to this scholar, modernity means the use of information and knowledge to maintain and create power (Lyon, 2001, p.31).

disciplining the individual. Control at a distance gives greater opportunity to the individual to develop personal initiatives and simultaneously strengthens power centralised in the control technologies. This control mechanism, dynamic and flexible, drives individuals to self-discipline within the context of constant talk of responsibility and need for accountability (Hoskin & Macve, 1994, p.91). The governmentality nourished by control at a distance therefore denies the uniquely repressive character of power. The power created produces a new reality through the normalisation of behaviours that it entails (Foucault, 1984, 1994 ; Starkey, 2002; Amintas, 2002; Pezet, 2004; Lambert & Pezet, forthcoming). This power lies in the capacity to act in a way that individuals voluntarily comply with and nourish norms. In this form of government, control at a distance models the economic and social behaviour of various and institutionally distinct agents without destroying their autonomous character (Miller & Rose, 1990, p.14). This final socio-institutional perspective therefore allows technologies of control at a distance to be thought of differently than as purely disciplinary mechanisms for enforcing servitude or as devices that only live through what their designers and users do with them.

CONCLUSION

Our case study on performance measurement technologies revisits the concept of control at a distance, its functioning, its effects and its purposes. Our findings illustrate the rising trend towards implementing technologies that mediate between employees and corporate senior managements. In the 19th century, discipline in the firm was embodied in the direct confrontations between the workers and the boss. At the beginning of the 20th century, employees were submerged in quantified norms and standards that were placed between them and their boss. Accounting is actually considered one of the pillars of the development of these calculating techniques (Miller & O'Leary, 1987, p.239). Little by little, discipline was no longer embodied by the boss's will but by the economic machine itself, in which the technologies compensated for the disappearance of bodies in relationships of supervision (Lyon, 2001, p.8, 15). With respect to this observation of the virtualisation of control, our study empirically shows the ways in which technologies take part in developing self-control. Moreover, it captures behaviours of self-control induced by technologies in particular organisational contexts whereas these behaviours are usually only referred to theoretically. This work thus revisits the concept of translation at a level of analysis that is uncommon in accounting literature, inspired by the research of Callon and Latour: the level of the subject.

In this paper, we have analysed the characteristics of the translation process, on which control at a distance in the pharmaceutical industry relies. Translation is based on the right link between calculations and discourse underlying technology. However, 'right' does not mean real. Technologies of control at a distance observed in the pharmaceutical industry actually link calculations and discourses artificially. Thus, 'right' means rationalised by the users of this technology, whether institutions or individuals. This rationalisation is only possible as technology creates mobile, stable and combinable information and is driven by ideals (permanent surveillance, truth through quantification). It is these features of technologies that lead the individual to integrate the organisational constraints, i.e. control himself. In this context, problems of articulation between calculation and discourse that characterise technologies of control at a distance have not been solved in the interest of the different actors in the pharmaceutical industry: they allow margin of manoeuvre and an integration of constraints by the sales force, and they enable the laboratories to treat drug representatives as if they were sales representatives while complying with the legal constraints in this matter. Technologies of control at a distance therefore renew the myth of control: they give the

illusion of the organisation's external control of its members and they foster an internalised control by the members, which ascribes to a programme of governing the individual.

This research paper invites us to dig deeper into the link between technologies and the programmes that inspire them at the macro level. Understanding control at a distance and the role of technologies in this control would gain in relevance notably by expanding data gathering to include decision-making and regulatory bodies. With respect to the pharmaceutical industry, this would imply conducting research into control technologies in hospitals, wholesaler-distributors that manage the indirect orders from pharmacies, trade organisations and regulatory bodies such as drug agencies. Studying alliances between the private and public sectors gives insight into the exercise of power in liberal democracies (Rose & Miller, 1992). However, "the matrix that brings together actors, agencies, goals, and policy aspirations are too complex to be fully analysed within a single study" (Miller, 1994, p.30). Although our research analyses the relationships between subject and technology, additional research is needed to move up to the level of socio-institutional problematisation (Miller, 1991). This implies investigating, beyond what is done in this research, the purposes of control at a distance. If the goal of control is to improve productivity, we may think, as do Miller and Rose, that control at a distance is destined for failure: "productivity, flexibility and competitivity will remain unattainable goals" (Miller & Rose, 1990, p.27). If the goal is to enable connections among political wills, the wills of the shareholders and the wills of individual actors in order to ensure sound government of the individual and of society in general, then control at a distance, through technologies and the self-control they instil, appears to be a form of government that is both efficient and formidable in making the barriers between the economic, the social and the psychological disappear.

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Appendix 1 Overview of the pharmaceutical laboratories analysed in the case study

Initial Denoting the Laboratory/the Body	Type of Organisation	Nationality	2003 Turnover (in million) (Source: 2003 annual report)	2003 Profit (in million) (Source 2003 annual report)	Worldwide Workforce (Source 2003 annual report)
Astra-Zeneca	Pharmaceutical laboratory	Anglo-Swedish	$18,849	$3,036 (net profit)	60,000
Aventis	Pharmaceutical laboratory	French	$22,442	$(2,460) (net loss)	69,000
Effiker	Pharmaceutical laboratory		NA	NA	NA
GlaxoSmithKline	Pharmaceutical laboratory	British	£21,441 (i.e. $42,002)	£4,484 (i.e. $8,784) (net income)	100,000
Janssen-Cilag (J&J)	Pharmaceutical laboratory	American	See J&J	See J&J	6,000
Orthobiotech (J&J)	Pharmaceutical laboratory	American	See J&J	See J&J	2,000
Johnson & Johnson	Pharmaceutical laboratory	American	$41,862	$7,197 (net income)	11,600
LFB	Pharmaceutical laboratory	French	€227 (i.e. $295)	NA	1,158
Lundbeck	Pharmaceutical laboratory	Danish	DKK9,941 (i.e. $1,725)	DKK1,337 (i.e. $232)	NA
MSD (Merck Sharp & Dohme-Chibret)	Pharmaceutical laboratory	Franco-American	$22,486	$6,831	63,200
Pfizer	Pharmaceutical laboratory	American	$45,188	$3,910 (net income)	122,000
Sanofi	Pharmaceutical laboratory	French	€220 (i.e. $284)	€102 (i.e. $131)	33,086

Appendix 2 Task reporting of a drug representative in one ETMS

Source: Demonstration given by Z2(DR) during an interview

		Month: September			
		01/09/2003	02/09/2003	03/09/2003 etc.	Total for the month
Conducted:	**Visits to doctors (all doctors, even those not in the DR's target)**				**78**
	Doctors visited (doctors belonging to the target)	Number, code colour and link to identification sheet	3	8	69
	Visits to pharmacists:				
	Pharmacists visited				
	PR (professional relationships):				
	Number of PRs				
	Doctors contacted for a PR				
Remaining potential	Potential in field work (in days)				
	Number of appointments				3
	Number of provisional contacts				
	Number of PRs planned				
	Number of doctors contacted for PR				

Colour code for figures:
Green = mixed activity (e.g. visit + training, visit + meeting)
Blue = single-activity day with fewer than 4 visits during the day. For instance, the last days of September appear in blue on the screen because activity has not been computed yet in the ETMS.
Red = Days for which the DR has already made a synchronisation (computed the information in the ETMS) and during which there have been fewer than 4 visits.
Specific signs for days devoted to Professional Relationships, for dual-activity days, for holidays, for training, and for computer synchronisation.