

Reverse Experiments: Investigating Social Behaviour with Daily Technologies

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The experience of living and interacting with new pervasive technologies is often described in terms of subjective accounts and frequently recalls ideas and myths that are attached to a specific domain of knowledge. It is therefore of interest for a sociologist to investigate the accounts that frame the interpretations of the scientists and technologists.

The reactions of the scientific community to the increase of daily technology, in particular, can be synthesized in two approaches. On one side the spread of mobile and controlling technology encourages critics to foresee an Orwellian context, on the other side the availability of such information and the development of scientific tools for processing complex dataset offer an incredible opportunity to scientist and social analysts.

So to what extent are we witnessing the case for extensive and realistic social experiments? The paper investigates the role played by rules of the scientific community and institutional norms in assuring the privacy of individuals while testing in vivo the impact of pervasive technologies.

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Privacy is Not Really a ‘Private Matter’

New opportunities of social and economic relationships offered by evolving information and communication technologies (ITCs) have become in the 90’s the subject of research projects and studies carried on with the support of international and national agencies. Among the fields of investigation of the social sciences, priority at the European level has been given to the impact of Internet and Web-based services on the population and, in particular, to the creation of the so called e-democracy, giving attention to the problems related to policy making and social participation in the digital sphere.¹

The diffusion of multimedia and pervasive equipments (wireless devices and tags, graphical and video recognition, location devices and pointers) in daily life, has also questioned issues related with the conception and perception of trust, security and privacy in the institutional and organizational fields and the type of approaches and responses that individuals and groups have towards pervasive – or also defined ubiquitous – technologies (or PTs). Compared to the more established technologies, pervasive ones can strengthen social control and nurture processes of social differentiation (Taube and Joye 2002). The collection, retrieval and exchange of data gathered at the individual level pose legal and ethical problems correlated with issues such as: violation of the personal sphere, stereotyping and social grouping and more generally of balancing institutional control and freedom of the individual. On the other side, potential applications of such technologies to daily living – intelligent buildings and ‘smart’ houses, city mobility, visual and audible aids to communication, monitoring and reporting of unidentified hazards, E-government – can help normal and impaired people to make a better and safer use of the built environment. Technology may also offer them the opportunity to communicate and express more openly, and to connect more directly with institutions and public service, reducing the impact of space and social boundaries.

The public debate concerning PTs is apparently open on the media and in the specialized fields appeals and proposals express the fears, as well as the hopes, of scientists for an increasing use of communication devices and operating tools that offer the opportunity to monitor detailed information of the user (Lyon and Zureik 1996; Regan 2003) such as such as physical appearance, location and relationships and other devices used to monitor the interaction activity with technology.

When scholars in the social sciences started to pay attention to such issues, they concentrate their studies on the implementation, adoption and use of pervasive technologies by private and public institutions, and on the other side the diffusion and legitimization of ‘social surveillance’ rhetoric (Lyon 2002; Andrejvich 2005). As in the case of the ‘first wave’ of ITCs, the results of pioneering investigations and projects confirmed that pervasive technologies can promote new forms of participation to the public sphere (Dearman, Kirstie and Kori 2005), and especially in the sphere of economic and commercial relationships they can foster competition among companies and give customers more opportunities to select and require more affordable and exploitable services and goods. On the other side, the use of PTs can encourage malfeasance and illegal activities from companies and private individuals, as well as introducing discriminatory social control practices in the routines of institutions and governmental agencies (Marx 2003; Milberg, Milberg and Burke, 1996, Majtenyi, 2002).

Independent agencies and watchdogs reports highlight more and more frequently the risks associated with an un-monitored use of PTs (such as grouping and bullying communication

1 To cite among the others: the PRIME project (concerning issues of privacy and identity management in the adoption of digital technologies) and the IntelCITIES project concerning the impact of digitalization on citizens’ social participation; both these project are financed by the European Community but include also private companies.

among the young, criminal and fraud opportunities, profiling or targeting of specific individuals and ethnic groups) and the lack of rules of conduct concerning their limits (Kostacos and Little 2005). Nevertheless, their calls for balance and restraint in the adoption of pervasive technologies are highly unheard and unattended in the organizational practices of private and public companies (Hetcher 2004). Work settings and economic transactions, in particular, provide several examples of juxtaposition of individual rights and institutional concerns such as in the case of monitoring of performances and feedback of employees and customers. Organizational strategies of data retrieval and collection are also a delicate issue because the regulatory framework is still to develop fully and often lacks of defined operational boundaries and identification of liabilities.

In leisure and socializing contexts technology aids for controlling and targeting the individual are largely implemented and accessible by experts and non-experts (Westin 2003) while the risks associated to such adoption are diminished or discharged with appeals to safeguarding personal freedoms. As a cautionary strategy of approaching such problems, international governmental agencies are thus encouraging scientists to analyse the feasibility of security and privacy protection measures both on the technological and legal-regulatory sides (Cate 2001; OECD 2003)). Authorities and public organizations, in fact, in many cases do not have sound and reliable impact evaluations of new pervasive technologies. So before setting restrictions to private enterprises and corporations (Marx 2001;Stalder 2002) and to the public concerning the use and possession of such technologies we need to know more about their large social impact for the protection of civil and individual rights such as privacy and personal identity (Floridi 2006).

The Analysis of Social Interactions and Privacy Issues in PTs

Analyses of the social and relational changes induced by the adoption of pervasive technologies in public settings and in the social sphere portray the transformations that social behaviour is undergoing in contemporary society in such deep personal spheres such as intimate relations, social cohesion and conflict, and public participation. Inside this vast area of discussion an interesting area of investigation is the analysis of the impact of pervasive technologies on personal life spheres such as intimate and social relations, and generally speaking on the individual and social conception of privacy (Neil 2001).

The development in our society of concepts and practices related to privacy and privacy protection, security and safeguard of individual rights is politically and historically determined and is linked with the concept of a personal identity (Margulis 2003). But, as sociologists have largely showed the conception of a personal sphere where the individual is free to retain information, opinions and preferences and behave in accordance to his/her taste and judgement (or briefly of privacy) is a social product of contemporary society.

Recent psychological contributes seem to converge also on the idea that privacy is not a private matter but, on the contrary, is mostly a public matter (Westin 2003). So, the sense of trust and safety that persons develop towards institutions and the others express psychological traits, but are also strongly correlated to cultural and situational factors. The public space of formal and informal social interactions and the boundaries that the legislation leaves open (or closes) to individual and organizational intrusions are the real setting where privacy is defined and tested (Turrow and Hennessy 2007). As privacy of the individual (and in particular of vulnerable groups) is still depending a lot on the social conditions and institutional provisions that determine the boundaries of what is public or commodifiable and what is not (Arvidsson 2004), personal interactions and preferences are universally protected or used according to specific rules of conduct. Individuals, moreover, in constructing and re-constructing their past and current relations establish privacy boundaries concerning details and accounts of personal experiences. They also create new codes of conduct in manipulating information and facts of

other people's private life via technology (as in the case of net-etiquette); and finally recall and account their experiences of users adopting specific cultural frameworks.

The aspects linked with the formation, diffusion and reproduction of rules of conduct concerning PTs in public settings are particularly interesting; the impact that practices and routines have for users in organizations and more specifically the type of social relationship that is established (with or without the previous consent of subjects) by means of such technologies in a defined social setting, is also very significant. Political and scientific spheres, in particular, offer a variety of 'stories' or accounts that give the individual the opportunity to categorize the use of pervasive technologies as free expression or containment of personal rights (Lyon 1994). In particular, the role that authorities have in fostering and preventing more democratic (or vice versa more authoritarian) and anti-discriminatory uses of technologies and individual mobility devices is enormous and can make a difference in daily life of people and in their relational attitudes towards the others (such as acknowledged individuals, minorities and ethnic groups, and foreigners in general).

Reversing Experiments: Social Enquiry and Impact of PTs in Daily Life

As some authors noticed the very core of pervasive technologies lies in separation: separation between private and public space, separation between personal and social identity, and finally separation between self and other (Marx 2001). Pervasive technologies can reduce the terms of such divisions and induce individuals and groups to manipulate personal boundaries (of themselves and of the other people); moreover, the public use of such technologies put stress on those boundaries that have been culturally and institutionally established by means of civil rights struggles and legislation. The issue is so complex and touches deeply the functioning of democratic practices that an homogenous taxonomy of solutions is not even possible; the reasoning and debating about these topic is better addressed by using the idea of dimensionality (Brighenti 2007), where private and public, identity and social appearance, self and other are modular and overlapping concepts.

The dimensionality of answers is also a support to a more clearly defined study setting; the analysis of the impact of pervasive technologies is in fact threatened on one side, by the lack of systematic knowledge, and on the other side, by the overwhelming amount of personal accounts of users, watchdogs and public rhetoric's. Both extremes and the features per se of the technologies have discouraged and complicated the empirical studies, especially in daily life and in ordinary contexts (leisure, work, personal contacts) and only recently articles and reviews suggest academic accounts of individual and social interaction with new pervasive technologies (Markupoulos et al. 2005; Vargas Solar 2005).

Specifically, a literature review of the studies concerning privacy reveals that the level of attention is high for all the aspects concerning the institutional and public impact of surveillance technologies, while few studies and empirical investigations have addressed the social and relational elements of privacy (Margulis 2003a). Several investigations and experiments tend to concentrate on the measurement of the impact of pervasive technologies on individual users, but paid less attention to the emergence and establishment of particular relational attitudes towards technology adoption (privacy awareness) and the release of personal details (privacy trade-off). Specifically, the creation of rules of conduct concerning identity and personal information exchange among group of pairs or communities is still to analyse in social circles showing different levels of IT expertise and different levels of personal involvement in technology framed contexts and situations.

Part of this negligence is due to the methodological limits that constrain researchers' activity and the difficulty to approach from a non-positivistic perspective the impact of technology in social and relational life. Commonly the empirical study of the impact of 'new' technologies is associated to the impact of an intervening event or factor on a priori situation of

deficiency; but in the case of pervasive technologies the setting is different as these devices collide with daily life increasing the pace and the opportunities of individual interactions as well as the chances of being controlled and to control personal relationships. Consequently the introduction of technology in the living environment can be properly associated to the setting of a 'natural experiment' where the researcher, as observer, is afforded the opportunity to study differentiation processes inside social groups (Becker H. 1998).

There are of course drawbacks in adopting this perspective; which account for methodological limitations and critics to the use of natural experiments in social sciences. A natural experiment or quasi- experiment is characterized by a low level of control over the situation by the observer, who can make inferences and re-construct practically the process of causation. Participants to a natural experiment (of course this is a defining label, as we are all participating to the experiment of each other's life), on the contrary, have control over their single decisions concerning the impact factors, but in most of the cases not on the results of the overall process or its unintended consequences (Odella 2003).

Moreover, the study of natural experiments is frequently restricted to qualitative factors; and even if a sociometric evaluation of elements of the social structure, is also possible, this opportunity is seldom considered feasible and methodologically convincing. Finally, in a natural setting the choice of comparable samples and groups is tied to reality; and only a limited array of possibilities is given, also because ethical issues restrict the impact of specific factors (aka. contagion effect). Again, from a orthodox methodological perspective this determines a reduction in explanatory power of natural experiments, and limits its use to non-academic settings and mostly to practitioners.

Seen from another point of view, the adoption of pervasive technologies in daily life is a true natural experiment which, endowed with a proper '*granu salis*' of inductive reasoning (Glymour 2006), offers the chance to monitor social processes of change. This perspective, however, rather than rely on the re-construction of the situation and the selection of the impact factors (a methodological position which emphasizes forward or a priori control of the experimental setting), tries to benefit from the opportunity to analyze the experimental setting, applying a form of 'reverse engineering' to social contexts.

The term 'reverse engineering' (or RE) comes from the mechanical industry (hardware reverse engineering) and in the last decade spread also in the software industry (software reverse engineering) and in the biological and physical sciences. In general terms, RE is a process of discovery of the inner principles (physical, technological and functional) of an object (or a process) by means of the analysis of its components and operation logic. To put into practice it means to take a part an object to see how it works in order to duplicate or to enhance the object (in common sense, an attitude typical of schoolchildren when dismantling toys and testing home devices). By equivalence, a social situation can also be reverse engineered when the main elements of its occurrence are taken apart and described as components of a more complex interaction process. It is important to highlight that this process does not imply any causal explanation and is finalized above all at identifying the aprioristic assumptions and definition assets of the situation. In the following paragraph I will define more in detail such approach, relying on one specific example to analyze changes in social interactions and communication mediated by a special type of pervasive technologies.

On Scrutinizing Privacy: The Use of CCTV in Urban and Private Living Environments

A significant example of reverse engineering in observing privacy concerns of people is the spread of video surveillance or Closed-Circuit Television (CCTV) in urban and private settings, to detect and prevent criminal offences. Urban areas, in particular are represented as public spaces where the trade-off between privacy and safety is to question and this general

attitude has increased with the spread of anti-terrorist measures. The reaction of the public to urban use of CCTV is generally reported with positive response rates in surveys; however specific studies testify that this response rate is biased as the contact rate in such surveys is already prejudiced by a 'pro-surveillance position' of respondents. Only a selection of the public has a 'pro surveillance attitude' and these subjects happen to be also those ones which respond more frequently to surveys, or accept these type of 'indirect surveillance' as a routine in social participation. So people who systematically avoid to get involved in public opinion surveys on CCTV in public spaces would be paradoxically those individuals with the greatest concern about privacy (Gandy 2003).

Inside private spaces the practice of monitoring in itself, also, has spread outside the 'safety and health' settings where it had been initially introduced and now several work and business, communication and leisure settings are largely scrutinized by surveillance systems which collect and process information. Security analysts suggest that in most of the case relying on CCTV for improving protection of private spaces (homes, private accesses) can be counterproductive as may reduce neighbourhood vigilance and the level of attention of residents. The uncontrolled use of surveillance technologies is also risky not only in terms of potential violation of the individual privacy and freedom of act, but in general can determine a systematic deficit of democracy. Local governments and city boards have tried to reduce such a risk introducing rules of conduct for the retrieval and use of video shot in public area but there is still a lack of coordination among authorities and the private use of CCTV is spreading as a type of virtual watchdogs (Norris, McCail and Wood 2004).

Dismantling the debate concerning the use of CCTV we can highlight first that the real core of the dispute lies in the definition of the borders of privacy. Technology offers the opportunity to monitoring, storing and scrutinizing the behaviour of others, taking advantage of the separation in physical space between the observer and the observed – whether voluntary or not. It also underlines the separation between the dimensions of making (by the observed) and the one of watching (the observer) as two separate activities in daily life and juxtaposes them. It is significant to notice that few experiences of CCTV, till now, have been used to monitor the rural setting and natural habitats, where the presence of visitors and suspicious attitudes of people would be easier to detect.

From the point of view of the institutions, there should be no significant interaction between these two spheres and the menace can be both in the subject acting as well in the subject watching, so it is the activity in itself that has to be accountable in order to prevent separation or justify it. A great effort by institutions is thus to re-construct accounts of daily life with monitoring technologies using the more familiar separation between expert or non experts. Web cameras of streets, for example, are not anymore forms of surveillance, but aids to a daily activity and displays of ordinary behaviour in the urban setting (Graham and Marvin 2006), for the benefit of the expert digital public and web-tourists. Also, when the video monitoring activity is performed towards specific social groups, such as the elderly, school-children, disabled people inside hospices, privacy concerns are reduced; the legitimization accounts, instead rely on the assumption that pervasive technologies are inclusive (more than the first wave of IT) and thus can perform as protective devices for the benefit of groups culturally and physically separated from society (non-experts).

Recent attempts to introduce forms of surveillance that go further the one of video monitoring, such as sensors and smart technologies, go beyond the visual. Inside the 'intelligent house' (Callaghan, Graham and Chin 2007) the separation between controller and controlled will be further reduced while paradoxically the personal space of privacy and choice in how to manage a private environment would be more reduced by the adoption of automatic house-keeping devices. Again the accounts to describe this daily experiences recall the idea of a

separation between experts and non experts, instead of the one of controller and controlled; even if the core itself of the living space could not be controlled anymore by the user.

Open Questions on the Social Impact of Pervasive Technologies

As in daily living the impact of PTs is increasing we can foresee that a 'new account' is emerging: social and individual behavior can be explained and modified. But this account was at the core of the historical development of the social sciences and its implications generated hundreds of debates. So taking for granted that the diffusion of PTs is going to modify our society and our way of interacting how can we increase our level of awareness for issues such as privacy, freedom of the individual and social control? Can culture and the reflexivity associated to its forms of representation of technology raise the level of awareness among people and reduce the level of separation embedded in the new technologies?

The answer to such questions, in my opinion, has to be optimistic and provocative at the same time. Social and cultural sciences can indeed contribute to raise the awareness about these issues and promote a more democratic debate concerning the use of technology as well as the increasing adoption of 'objective' scientific standards in evaluation of social relationship. But a different contribution can also come from new opportunities to measure with sociological methodologies (observation protocols, questionnaires, interviews and relational data) the reactions of the users/subjects of pervasive technologies and to evaluate the impact of technology adoption inside specific inside specific culturally situated scenarios. One relevant example is the process of creation, use and reproduction of informal or institutionalized rules for managing information collected inside research organizations and education agencies by means of pervasive public devices (Lyon 2002).

The criteria of evaluation which we can foresee for the future are becoming more and more dependant on the acquisition and the processing of multiple sources of information about the individual. These changes will force also the social sciences and researchers to face new forms of social and cultural differentiation in society, as well as new forms of representation and expression of the identity of groups and individuals. Cultural studies, specifically, with the spread of new forms of technology mediated communication will thus have new tasks to address in their studies of society and technology representations.

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