RFID and responsible innovation: towards a positive compromise?

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The first cross-disciplinary conference and policy debate on RFID (Radio-frequency identification) was held in Paris on 14 March 2014 at Télécom ParisTech, at the initiative of the Observatory for Responsible Innovation and its working group on "Digital Traceability".[1] The discussions focused on the potential impacts of RFID and on the measures that ought to be implemented in order for this promising technology to develop without becoming a threat to privacy, health and the environment. More than a hundred participants were there, attending talks by Pierre-Benoît Joly (Research Director at INRA/SenS, Director of IFRIS), Laura Draetta and Claude Tetelin (Observatory for Responsible Innovation, WG "Digital Traceability"), Nicole Dewandre (European Commission, DG CONNECT, WG "The Onlife Initiative"), and Jim Dratwa (European Commission, Inter-Service Group on Ethics and EU Policies), and three round-table discussions:

- *RFID and Privacy*: chaired by Michel Alberganti (journalist at France Culture), with the participation of Pierre-Antoine Chardel (philosopher, professor at the Institut Mines-Télécom), Jean-Gabriel Ganascia computer scientist, professor at Université Pierre et Marie Curie), Marie-Charlotte Roques-Bonnet (jurist at the CNIL, Commission Nationale de l'Informatique et des Libertés), Olivier Rouxel (officer at the DGCIS, Ministère du Redressement Productif), Claude Tetelin (technical director at CNRFID).

- *RFID and Health*: chaired by Jean-Marc Galan (researcher at the CNRS), with the participation of Catherine Gouhier (secretary general of CRIIREM), Olivier Merckel (unit manager at ANSES), Guillaume Sacco (physician, Centre d'innovation et d'usages en santé, CHU Nice), Danielle Salomon (sociologist, Risques & Intelligence), Claude Tetelin (technical director at CNRFID), Joe Wiart (co-director of WHIST Lab, Institut Mines-Télécom & Orange).

- *RFID and the Environment*: chaired by Cécile Michaut (journalist), with the participation of Alain Anglade (expert at ADEME), Laura Draetta (sociologist at Télécom ParisTech), Nathalie Mitton (computer scientist at INRIA), Dominique Paret (RFID consultant), Etienne Perret (researcher in electronics at the Institut Polytechnique de Grenoble), Alfred Rosales (director of FEDEREC).

This initiative comes at a moment in which the topic of the Internet of Objects - a domain in which RFID plays a constitutive role - is presented as one of the most thrilling technological developments at a global scale. The figures are quite explicit: 50 billion connected objects by 2020, 10 to 20 billion euros yearly turnover expected (source: IDTechEx). In France, RFID is part of the government's plans for industrial recovery. But the prospect of economic promise is not the only issue in sight, and social consequences, possible negative externalities and potential human and environmental problems should not be disregarded. The organizers of the 14 March 2014 meeting did put upfront the objective of developing a reflexive and responsible approach to this technology and its development in society.

The morning talks located the issue within the realms of responsible research and innovation (Pierre-Benoît Joly), technology in use and social issues (Laura Draetta and Claude Tetelin) and the place of human beings in an era of hyperconnectivity (Nicole Dewandre). The fact that RFID chips are generally meant to serve very specific purposes but remain attached to the objects and to the persons that carry them was pointed out. This can open the door to unintended, ill-controlled and perhaps insidious applications. This technology is by definition invisible and pervasive. Information can be obtained on someone's behavior (what the person buys, where she goes, what she reads, etc.) without the person's knowledge and consent. Moreover, this information can be captured, purposefully or accidentally, by unexpected third parties. But information privacy and safety are not the only issues at stake. The health-related impact of the electromagnetic fields produced by RFID systems, most notably in the case of overexposure within the context of professional activities, does also constitute a pressing issue. Further issues are raised also on the environmental front, about the life cycle of RFID chips and the possibly of recycling.

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RFID and Privacy: personal data in the era of the "Little Sisters"

The first roundtable discussion was focused on privacy and started with a bold question: how can responsibility be made sense of in a technological context in which traceability is generalized? RFID sharpens this interrogation. The "machine", so to say, is not external to us anymore. It is "married" to society and is part of our intimate world. The first two speakers highlighted the need to consider the problem from the wider angle of traceability in society. It is not just about the technical object as such, but about the object inserted in society. Not all that is technologically possible is humanly and socially desirable (P.-A. Chardel). What is required is a reflection on the conditions in which compromises can be reached for the

organization of live with and within these digital environments (J.-G. Ganascia). How can we deal with the tensions that there exist between privacy and security or between transparency and intimacy? Which measures are necessary to make sure that innovation respects our social and psychological ecosystems? Two initial paths for responsible innovation are signaled. First, responsible innovation is about "the mature acknowledgment of the fact that decisions mean compromises", and it is the task of scientist to understand and explain these compromises. Second, in the specific case of the traceability capacities of RFID, responsible innovation means protecting the right to the removal of traces. The DGCIS further indicates that this right does not only concern individual citizens. It also concerns companies and their strategic information.

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Representatives from CNIL and CNRFID shed light on the problem of the protection of personal data indicating that RFID chips can be "killed" but not "muted" (e.g. if customer service relies on them). They also mentioned progress in new European regulation expected in 2014. This regulation stipulates that the public shall be informed of the event of any RFID-based implementation of data collection and monitoring. Furthermore, standardized Private Impact Assessment (PIA) plans should become mandatory. These plans consist in ex-ante evaluations aiming at identifying critical risks and measures. In France, they are handled by the CNIL. Still only a few industry players carry them out, or even know about them. It is heavily advised, at the outset of the roundtable discussion, that players in the RFID industry should be informed extensively about the relevant obligations and recommendations. It is also indicated that R&D efforts should be deployed in order to develop solutions for the deactivation of RFID chips.

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RFID and Health: action in the midst of uncertainty

The second roundtable discussion dealt with both positive and negative impacts of RFID on health, considering both the use of RFID in healthcare and the health-related effects of exposure to electromagnetic fields. The use of RFID in healthcare has many positive sides: rationalization of patient administration and of hospitalization process, traceability of samples and plasma products (as illustrated by Dr. Sacco). Agreement was reached on this point. As far as health-related impacts of exposure were concerned, the situation was considered to be more complex. Specific scientific data are rather sparse, and difficulties are met in the conduct of fine-grained studies. Each RFID use or application requires ad hoc analysis (as recommended by ANSES). Little means are offered, it is observed, for the study of risks through multidimensional assessment. Participants to the discussion remarked the difference that there exists between passive systems (i.e. mass consumption usage) and active systems (i.e. industrial usage), or between the problem of frequency and the problem of strength of signal. These parameters, together with duration of exposure, need to be taken into account.

The problem is not the RFID chip per se but rather the typology of the field, which depends on the characteristics of exposure. Daily, regular use of a public transportation card relying on an RFID system translates into no serious concern. But the situation of a worker stationed continuously near an emitter and processing numerous objects at a distance raises far more grave issues. The CRIIREM refers to cases in libraries, where the emission power had to be tuned down following complaints from employees. The discussion focused on precautionary measures for such types of workers and on regulatory supervision. Relevant authorities are working on good practice guidelines for exposure to electromagnetic fields, in accordance to the legislative debate at the Assemblée Nationale of 23 January 2014. However, it was indicated that a specific reflection concerning RFID was absent from the legislate debate and that there is a lack of thorough knowledge of the regulatory framework in the industry. For example, some industrialists wrongly consider that compliance with regulation for electromagnetic compatibility means de facto compliance with regulation for human exposure to electromagnetic fields, which is not always the case.

Two paths for responsible innovation emerged out the discussion. The first one consists in considering "switching off" emitters where they are not in use. The second relates to the clarification, within the regulatory frameworks that are currently in preparation, of the measures that ought to be taken for the limitation of possible human exposure to the electromagnetic fields under consideration.

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RFID and the Environment: when chips proliferate

The third roundtable discussion focused on environmental impacts of RFID and on the several measures aiming at reducing electronic waste and pollution. True, RFID tags are small. But in the end their mass shall increase considerably. Should specific procedures for recycling them be put in place? When and how should they be removed from the objects carrying them? This is no small business, especially if one considers that the end-consumer ought to be put to work in this process. "Impossible", argues a spokesperson from the industry (here D. Paret) pointing to the semi-invisible character of the object. FEDEREC (the Fédération des entreprises du recyclage) is reassuring: the bulk of the recycling job shall be handled directly by industry professionals. A. Rosales from FEDEREC indicates that members of this professional federation have the capacity of isolating tags from the fabrics carrying them, at an acceptable cost.

Positive impacts of the diffusion of RFID were also tacked. Applications in waste management were signaled (L. Draetta), together with the development of alternatives to paper, for example in ticketing (N. Mitton), or its contribution to the decrease of energy consumption in digital technologies - indeed, RFID systems could contribute to the decentralization and durability of access to electronic information (A. Anglade).

Moreover, research is carried out in order to develop alternatives to the metal antennas used today in RFID, which are potentially the most polluting and environmentally questionable elements of the RFID complex (N. Mitton). Research is carried out for the replacement of RFID tags with simpler printed marks (E. Perret). Research on the improvement of the environmental impact of RFID shall obviously be encouraged, as the stakes are likely to become higher and higher.

Jim Dratwa, representing the Inter-Service Group on Ethics and EU Policies at the European Commission, and the working group of the Observatory for Responsible Innovation, closed the conference with a few remarks. Because of its multiple potential uses in society, its relation to wider technological issues (big data) and the development of debates on its possible risks, RFID could become an exemplary case for responsible innovation, he argued. He also pointed to the crucial role that industrialists and decision-makers can have in this respects, and he signaled the promising paths that were opened during the day's discussions. The working group who organized the debate shall look after the concretization of these paths, in France and in Europe. Perspectives for a "positive compromise" in favor of the positive potential of RFID but against its negative societal impacts are now open.

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[1] This article is a report in the policy conference "La RFID à l'épreuve de l'innovation responsible", held on 14 March 2014 at Télécom ParisTech in Paris. The authors are members of the working group on Digital Traceability of the Observatory for Responsible Innovation, formed in 2013 and composed of 13 experts: Alain Anglade (ADEME), Geoffrey Delcroix (CNIL), Olivier Desbiey (CNIL), Laura Draetta (Télécom ParisTech, director of the working group), Jim Dratwa (European Commission), Denis Guibard (Orange), Jacques-François Marchandise (FING), Francesca Musiani (Mines ParisTech), Federico Neresini (Università di Padova), Norberto Patrignani (Politecnico di Torino), Marie-Charlotte Roques-Bonnet (CNIL), Dominique Tessier (Consulting in ICT strategies), Claude Tetelin (CNRFID). Further information on this initiative available at: http://www.debatinginnovation.org/?q=debatRFID