

Cyber-security  
Internet of Things  
Digital Enterprise  
Master IREN  
Publications



## Editorial

2013 opened with the renewed commitment for the next three years, of the partners of the Innovation & Regulation in Digital Services Chair. This is the second renewal since the signing of the Convention binds the Ecole Polytechnique, Telecom ParisTech and Orange. It is both recognition of the work done since 2007 and a commitment to intensify its activities.

Thirty conferences and seminars have been organized since the beginning, on a broad spectrum of topics related to the digital economy, from "Net Neutrality" to "Internet of Things".

For its 4th year, the Master IREN, second pillar of activity of the Chair, registered 55 students plus over twenty students under international programs associated with the Master Iren, and other auditors.

In terms of research, Frank Verboven is now leading the work, after Paul David and Tommaso Valletti did it in 2008/2010 and 2010/1012. From the beginning, the Chair chose to organize the work with a different titular professor for each period, in order to diversify the work and extend the scope of skills covered by the Chair. Frank is Professor of Economics at KU Leuven, Belgium. Frank's personal skills extend to industrial organization, competition policy and regulation. His research in the telecommunications sector is focused on investment, adoption of new technologies and the effects of competition at services level and/or at infrastructure level.  
(...)

## Innovation, regulation and cyber-security

The digital society is moving forward. The adoption and increasingly intensive use of digital technologies seems to increase its effectiveness, but also its weaknesses and its dependence on these technologies. This is a matter of work for the Chair which decided to address this issue of cyber-security during a conference held on 21 November 2012 in the premises of the Military School in Paris. Philippe Baumard (Professor - Ecole Polytechnique - Innovation and Regulation Chair) convened a panel of international experts on "[Cybersecurity: Innovation, Regulation and Strategic Developments](#)."

Issues of cyber-security concern both businesses and States. The first observation is that destabilization of a State by cyber-attacks is possible. The military world is increasingly penetrable and therefore it is absolutely necessary to organize counter-attacks to cyber-crime as denial of service, disturbances of State web sites, manipulations and provocations on social networks, interference on GSM networks, attacks of transportation networks, banking networks, water distribution, energy ... all possible attacks in cyber-space that must be considered by the defense forces.

The defenses forces organize themselves accordingly, with a unified, centralized and specialized operational command for an active defense of information systems.

All future conflicts will have their share of cyber-attack and cyber-defense. Opponents of a State have the choice today, at low cost, of the scale and accuracy of their attacks in the cyber-space where geographic borders have little meaning. So that other boundaries established by States or by companies are emerging to control incursions on their "territory".

### Knowledge and Resilience

In any case, knowledge is a fundamental element of defense. Actions to be undertaken must address the human dimension as well as the technical dimension on which they are primarily focused: the human dimension includes technical training, behavioral analysis, training of all officials, especially political and military, and citizens in cyber-defense networks. This human dimension includes in particular how to deal with crises. These are decisive moments of turning points towards the worst or the best and those responsible must be educated to prevent crises from becoming disasters. Resilience, i.e. ability of societies to transform themselves "to recover" through interaction and flow of events, is at the center of discussions on cyber-security. Thus, a good strategy is not to play on the strength, but to create strength while deploying the strategy.

The struggle against the attacks of any kind, in particular criminal attacks in the cyberspace, is permanent.

Nevertheless, be as damaging as cyber-attacks today can be, including in the industry, are they likely to destroy a State? More attention should be paid to threats on critical infrastructure in the mid and long term. States must think about their critical infrastructures at the national level, of course, but also at the international level and consider the infrastructure as a "system of systems".

On their side, firms are facing two types of threats: harassment (fraud, data theft, data manipulation...) and espionage. They are fundamentally threatened by cyber-attacks because they are "mortal".

Companies must organize themselves, which is not yet quite the case, taking into account the cyber-security governance at the highest level and balance the financial trade-offs in favor of security as it was the case in the field of ethics and social responsibility.

Today, they do not pay enough attention to their defense, not learning enough from the attacks to which they were subjected, even though there is some consistency in attack means.

(...)

(...) As part of the research program of the Chair, Frank specifically aims to develop research on:

- investment and adoption of new technologies in mobile and broadband in developed countries as well as in emerging countries,
- the definition of wholesale and retail markets for broadband sector and the implications for competition policy.

The work carried out by Tommaso during the last two years has been focused on Net Neutrality and penetration of broadband services. This result in the publication of several articles, contributing to the objectives of the Chair. We cordially thank him for such an outcome.

We are also concerned by another important decision: at the beginning of this year, Pierre-Jean Benghozi, which was a key person in the creation and animation of the Chair, has been appointed at an important national position. This is primarily a recognition of Pierre-Jean's personal skills and we warmly congratulate him. This appointment is also a recognition of the level of commitment and quality of the work of the Chair.

If Pierre-Jean must move away from our activities to devote himself to his new mission, partners' commitments remain and skills of the new contributors can only open and strengthen areas of work on which the Chair will make its contribution.

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Did they even really know their information system resulting from the superposition in time of complex layers, which nobody is really able to control?

Urgent action is needed. Cyber-conflicts are multidimensional: military, industrial, on critical

infrastructure, on sensitive sectors, and on the legitimacy of the states ... and at the same time, digital technologies are not so secure.

Against opponents who can be numerous and powerful, acting at all levels (from the supply chain of companies up to the State), it must

be answered by posing complex problems to the attackers, by facilitating the coordination of defense resources and raising the entire population's motivations for defense. The lost articulation between technical doctrines and regulation in the field of cybersecurity has to be restored.

## Internet of Things A new space for creativity

Since its emergence in the late 90s, the concept of Internet of Things has often been called to describe an important part of the digital world to come. However, little academic work has been dedicated to IoT until now, especially in a socio-economic perspective. In order to clarify the concept, its applications and implications, the Innovation & Regulation in Digital Services Chair held September 26, 2012, a conference on "The Internet of Things: a new space for creativity". This work on the Internet of Things is also the subject of an edition of [Communications & Strategies](#) journal (No. 87 - 3rd quarter 2012), co-edited by PJ Benghozi, Mr. Cave, Y. Meiller and S. Ropert.

Definitions of the Internet of Things are numerous, each author proposing his own analysis. We will refer to that given by Pierre-Jean-Benghozi and his co-authors (PJ Benghozi, Bureau S. & Massit-Folléa F (2009) - The Internet of Things: What challenges for Europe? MSH-Editions Collection praTICs).

It defines the Internet of Things as a "network of networks enabling through unified and normalized electronic identification systems, along with wireless mobile devices, to identify directly and without ambiguity, digital entities and physical objects, thus making possible to retrieve, save, transfer and treat, with no discontinuity between the physical world and the digital world, associated data."

The Internet of Things is a field for research and innovation and economic development. The areas of application are numerous, either at the company level (in the automation of production lines, in the collection and processing of market data, in supply management or distribution...), at the management of large public infrastructure level (traffic management in transportation systems, production and distribution of energy ...) or in government policies such as public health...

It is therefore crucial to pay attention to these automated processes, and their role in the digital economy, in particular the relationship between the industry and consumers.

They can be the source of new business models; they also pose new challenges in legal terms and in terms of economic regulation at national and international levels.

There are still many issues to be addressed. In addition to the technical evolutions necessary to support its development (network architecture, computing "in the cloud", semantic web ...) the IoT based on the multiplication of connections and data exchange, standardization and regulation issues quickly come to the fore. It should also question quickly the reality of geographical boundaries, the scope of the firms, or privacy against the collection and processing of personal data.

Find contributions to [the Conference "Internet of Things"](#) organized by the Innovation & Regulation Digital Services Chair.

## Digital Enterprise Design & Management

The evolution of the digital society is based on the dynamics of technical progress in three specific areas: information storage, processing and communication networks.

Business competitiveness will increasingly be based on the control of these technologies and the ability to create new digital value chains.

This requires the company to know how to integrate:

- a permanent technical perspective,
- an understanding of the uses at the end user level,
- and a strategic vision embodied in a business model.

The problems firms are facing in terms of organization are complex and contradictory, between greater complexity of organization models and a greater need for agility. The survival of the business is a challenge in itself as digitization already accelerated and will further accelerate the pace of mortality/creation of businesses.

The company boundaries themselves become blurred. The company is increasingly at customer's home and the customer more within the company while they believe that their organization must be closed (safety, secret ...).

Employees themselves are hyper-connected.

Examples of organizational changes related to digitization contribute to the understanding of the issues, the need and the difficulty of its development.

The Chair was involved in the organization of the first international conference on digital enterprise "Digital Enterprise Design & Management" (DED & M) which took place in Paris on 12 and 13 February.

[Contributions and presentations](#) are available on the Conference website.

# Master « Network Industries in the Digital Economy »: 2012-2103 Year

The master IREN has enrolled last September its fourth class and graduated its third class.

This new year is in line with previous ones:

- . the ratio selected candidates /total candidates is about 48%,
- . the participation of foreign students is still strong, especially since the registration of students from Erasmus Mundus program EMIN Paris-Sud,
- . a majority of students with scientific background, including many third-year students of the engineering schools part of the master.

2012-2013 is also a transition year for the master IREN, on the institutional point of view. In fact, in the framework of the restructuring of the French higher education in Paris Ile de France area, Paris Ouest and Pierre and Marie Curie Universities did not wish to remain partners of the Master in the current wave of renewal (effective in 2014).

On the other hand, the Paris Dauphine University wished to enter the IREN organization, and it is this University which brought the

case before the renewal at Aeres level (Agency for the Evaluation of Research and the Higher Education).

Aeres recently took its decision, with a very favorable appreciation on the master and the following assessment:

"The specialty with four lines of courses, is very consistent despite the number of co-empowered partners. The four lines of courses are very comprehensive and well differentiated. This is a pioneering proposal opening up many career opportunities in a variety of industries. Its attractiveness is international and the integration of students into working life is excellent: 100% of graduates are employed within six months after the release. The specialty is backed units seeking re-leading."

The balance of strengths and weaknesses emerges as follows:

Strengths:

- . Pioneering proposal which recruits students at European level.
- . Backing research laboratories with national and international visibility.

. Involvement of high-level professionals in teaching and innovative partnerships with many professional bodies and leading international companies.

- . Intra- and inter-partner pooling.
- . High level teaching team.
- . Mixed audience.

Weakness:

- . Complexity of the four lines of courses.

With this assessment, the teaching staff of IREN, begins recruiting the fifth class this spring.

IREN asserts itself over the years as a master of reference and builds a bridge between the two groups of higher institutions: Paris Saclay University (UPSA) on the one hand and, Paris Sciences et Lettres (PSL) on the other hand.

More information : [www.masteriren.eu](http://www.masteriren.eu)

## Coming events

During the second half of 2012, the Chair organized conferences on the Internet of Things. (September 26, 2012), The Economics of Information and Communication Technologies -ICT- (October 5-6, 2012) and Cyber-Security: Innovation, Regulation and Evolution Strategies (November 21, 2012).

At the beginning of this year, we proposed a conference on Digital Enterprise Design & Management (February 12-13, 2013). Next edition of this Conference is planned beginning of 2014.

You can find the contributions proposed during these conferences on the [website of the Chair](#).

Next spring the Chair will propose a work day on the radio media facing the digital challenge. The 2013 edition of ICT will take place later this year under the now usual academic format.

[innovation-regulation.eu](http://innovation-regulation.eu)

## Publications

- Abecassis C. et Benghozi P.J., (2012) Efficiency and Innovativeness as Determinants of Design Architecture Choices, *Journal of Product Innovation Management*, Volume 29, Issue 3, May 2012, Pages: 405–418
- Bacache, Maya, Bourreau, Marc et François Moreau (2012). "Piracy and Creation: The Case of the Music Industry," *European Journal of Law & Economics*, forthcoming.
- Bastard Irène, Bourreau Marc, Maillard Sisley et François Moreau "De la visibilité à l'attention : les musiciens sur Internet," *Réseaux*, N°175, pp. 19-42.
- Benghozi, P.-J. et Bergadaà M. (2012), *Web ; enjeux de savoir*, de Boeck, Bruxelles
- Benghozi P.J. et Bergadaà M. (2012) Métier de chercheur en gestion et Web. Risques et questionnements éthiques, *Revue Française de Gestion* Vol. 38/220 - 2012 - pp.51-69
- Benghozi P.J., E. Schenck, M. Kalika et JL Ermine (2012) *Management International*, Numéro spécial Enjeux de connaissance et gestion, (en coll. Avec)
- Benghozi P.J., Cave M., Meiller Y., Ropert S. et Vallée A., *Communication & Strategies* (2012), special Issue Internet of Things
- Bourreau, Marc, Cambini, Carlo et Pinar Dogan (2012). "Access Pricing, Competition, and Incentives to Migrate from "Old" to "New" Technologies," *International Journal of Industrial Organization*, 30(6), 713-723.
- Bourreau, Marc, Gensollen, Michel, Moreau, François et Patrick Waelbroeck (2012). "Selling less of more? The impact of digitization on record companies", *Journal of Cultural Economics*, forthcoming.
- Bourreau, Marc, Gensollen, Michel et François Moreau (2012). "The impact of a radical innovation on business models: Incremental adjustments or big bang?" *Industry & Innovation*, vol. 19(5), pp. 415-435.
- Bourreau, Marc et Pinar Dogan (2012). "Level of access and competition in broadband markets," *Review of Network Economics*, vol. 11(1).
- Bourreau Marc, Cambini, Carlo et Steffen Hoernig (2012). "Ex-ante regulation and co-investment in the transition to next generation access," *Telecommunications Policy*, vol. 36, pp. 399-406.
- Bourreau Marc, Kourandi Frago, Valletti Tommaso (2012) "Net Neutrality with Competing Internet Platforms", SSRN working paper series 2012, submitted.
- Davidovici-Nora, Myriam et Marc Bourreau (2012). "Les marchés à deux versants dans l'industrie des jeux vidéo," *Réseaux*, N°173-174, pp. 98-135.
- Kourandi Frago, Krämer Jan Valletti, Tommaso, "Net Neutrality, Exclusivity Contracts and Internet Fragmentation". Working paper, Telecom ParisTech.
- Lyubareva I., Benghozi P.J. et Fidele T. (2013), *Online Business Models in Creative Industries: Diversity and Structure*, *Journal of International Studies in Management and Organization* (à paraître)
- Valletti Tommaso (2012) "Mobile telephony," joint with S. Hoernig, chapter 6 in M. Peitz and J. Waldfoegel (eds.), *Oxford Handbook of the Digital Economy*, Oxford University Press, Oxford, 2012.
- Valletti Tommaso, "Regulating prices in two-sided markets: the waterbed experience in mobile telephony", joint with C. Genakos, *Telecommunications Policy*, vol. 36, n. 5, 360-368, 2012.
- Valletti Tommaso, "Intertemporal movie distribution: Versioning when customers buy both versions," joint with J. Calzada, *Marketing Science*, vol. 31, 649-667, 2012.
- Valletti Tommaso, "Unbundling the incumbent: Evidence from UK broadband", joint with M. Nardotto and F. Verboven, 2012 (submitted).
- Valletti Tommaso, "Net neutrality with competing Internet platforms", joint with M. Bourreau and F. Kourandi, 2012 (submitted).
- Valletti Tommaso, "International mobile roaming", joint with C. Genakos, 2012 (mimeo).
- "Net neutrality, exclusivity contracts and Internet fragmentation", joint with F. Kourandi and J. Krämer, 2012 (mimeo).