utc
Université de Technologie Compiègne
SORBONNE UNIVERSITES

Special issue

Donnons un sens à l'innovation

Interactions

FROM THE PRESIDENT'S DESK

10th anniversary of "You have the Floor..."

This Special Issue of UTC's house magazine Interactions offers our readers a collection of forty articles published since 2007, chosen from among the hundred or so contributions published over the past decade When I read them, I recognize:

• on one hand, **the tremendous richness, diversity and open-vista of the topics and issues addressed by our guests**, whether they concern, as expected, innovation and entrepreneurship, but also our outreaching university programmes, international mobility, sustainable development, the digital revolution with its big data, or reflections made about the way universities (and other HE institutions) are evolving today, the Government's Investments for the Future programme, emergent technologies … all of which are at the core of the UTC strategic development policy;

• on the other hand, **the sheer complexity of an academic world going through a stretch of turbulence**, notably as a results of three recent laws on Higher Education and Research, voted between 2006 and

2013, but also in a context where the ongoing digital revolution is leading to technological, economic and social revolutions, with significant cultural and cognitive changes, for example in terms of pedagogical engineering (e.g., "The Digital Tsunami hits the Classroom"), of innovation processes, of the way we interact and communicate, of how we co-operate and exchange collectively;

• **the high quality of the guest contributors** who accepted to offer their opinions (ex-Minister Jean-Louis Borloo, Jean Jouzel, ex-Minister Valérie Pécresse, Anne Lauvergeon, Minister Bernard Cazeneuve, Louis Schweitzer, ex-President UTC Ronan Stefan, Professor and Nobel Prize winner Albert Fert, Minister Thierry Mandon and many other personalities), all shedding light on the challenges and stakes that face UTC today (and tomorrow) and enabling us to benefit from their personal experience and professional responsibilities. ■

Alain Storck,
President & Vice Chancellor UTC

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interactions.utc.fr

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Printing - **Imprimerie Lesaffre**
UTC-CS 60319
60203 Compiègne Cedex
www.utc.fr

Printed on certified paper
ISSN 2267-9995

With the support of
Région Hauts-de-France

#1
February
2007

A new look at...

Co-operative HE Clusters in France (PRES)

The objective to see French Higher Education institutions gaining better visibility would seem to require that they equal or exceed a 'critical size'. The concept of co-operative clusters offers an alternate route for the current university system.


RONAN STÉPHAN

In an increasingly competitive scene, notably with international competition, the so-called PRES clusters (acronym in French for poles of research and higher education) can appear to provide a coherent solution, to a certain number of visible shortfalls of the French university system.

Historic and geographic disparities of the HE institutions and Research establishments in France, combined with an unacceptable level of dispersion of our research capacities has led to a ' grid' which is no longer relevant when confronted with territorial logic today. "Our university system is extremely diversified and the institutions themselves have a wide variety of characteristic features. The question then arises as to how we can make the system evolve progressively without running the risk of sparking an overbrutal revolution?" explains Jean-Pierre Finance, President and Vice-Chancellor of the University Henri Poincaré Nancy I and First Vice-Chancellor of the National Conference of French University Presidents and Vice-Chancellors (CPU). These clusters were launched


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JEAN-PIERRE FINANCE

under a Government research pact, April 2006, to federate and locally reinforce the main academic teaching and research activities in accordance with a 'site-logic', designed to "improve and foster efficiency, visibility, legibility and their level of attractiveness", adds Ronan Stephan, President and VP of UTC.

Seen as a real tool to enhance activity sharing policies, a PRE cluster first of all aims at introducing coherency in the establishments' training offer, including orientations and professionalism for those institutions who wish to commit their resources to a joint project, focusing on synergies and interactions with the entrepreneurial world. "When you set up a PRES, each member of the cluster must be able to focus highlights on its specific areas of excellence. With higher visibility and better international recognition! In all probability, there are inter-university dynamics on the scale of a given local site that should be better coordinated and adapted to fit with the local prevailing site situation.", pursues President Storck. UTC therefore privileges a "co-operative" PRES giving a formal framework to the universities, in which each of the actors can help provide a sharper definition of the work, a more efficient promotion of the offer and training cursus on a territorially adopted adapted scale. "A co-operative cluster can enhance complementarities among the institutions and avoid occasionally absurd competitive conflicts. Each PRES member must be able to express itself fully, sharing its specific skills, thus contributing to a larger-scale joint project", confirms Jean-Pierre Finance.

A PRES Cluster should be able to focus highlights on its specific areas of excellence.

If we obtain reinforced co-operations, but would not lead to mergers between universities, nor to the creation of new structures which would have a low level of usefulness, which if take to an extreme might lead to a founder institution being torn apart to benefit a PRES cluster. President Stéphan offers the following thoughts by way of a conclusion: "We do not feel, at UTC, that a single model will help reinforce these forms of co-operation, given the wide ranging diversity and heterogeneous natures of the institutions in higher education and the research establishments. But we can expect hopefully and nonetheless, that in a co-operative approach, we shall be more visible and gain a better international reputation, in Europe and round the world, in a number of "excellence" themes. Each institution that participates in a PRES cluster must be in a position to strengthen its own specific features and its areas of excellence". ■

DID YOU KNOW THIS?

Nine PRES Clusters grouping together 49 HE institutions will be in operation by end 2007. In addition to the 3 Paris regions "PRES", there will be Toulouse, Bordeaux, Lyon, Nancy, Bretagne and Aix-Marseille. After that we will see the Strasbourg and Grenobles PRES. (Source Le Figaro).

#2
April
2007

A new look at...

Apprenticeship schemes in the sunlights

Over the past ten years, apprenticeship schemes have taken off in the French Higher education. We recall that the objectives of the Government's Social Cohesion Plan foresee 500 000 apprenticeships in 2009, with those in HE establishments to be doubled. 'Interactions' interviewed Minister Jean-Louis Borloo in charge of Employment, Social Cohesion and Housing.

Can you tell our readers why apprenticeship schemes could provide a modern answer, adapted to the requisites of training courses and with excellent qualification of the future engineers?

Above all other considerations, an apprenticeship is a means for apprentice students to gain a wider vision of how companies operate. Once the apprentices graduate, they have covered ¾ of the path to being integrated in the companies that hire them. This represents a fabulous advantage when you are just starting your career! On an ever-changing employment market, apprenticeship schemes allow you to start a lap ahead of the field; qualified apprentices face their future more efficiently, more maturely, more serenely. Moreover, more than 80% of the apprentices hired are immediately offered the "no time limited" CDI contract.

Universities and enterprises should continue to come closer together

How do you plan, at Government level, to valorise apprentice schemes, i.e., "sell" them to corporate enterprise management?

It is primordial that enterprises support and adhere to the schemes, pay special attention to the plight of SMEs. Over the past two years we have engaged several forms of action and measures that are beginning to pay, given that we had 405 000 apprentices by end 2006, compared with 330 000 by end 2004. Through simplification of the admin. side and by introducing new incentive fiscal measures (as per the French law on social cohesion),

we have attained our objectives, thereby removing the final stumbling blocks that prevented a rapid development of this promising educational training axis. And an excellent indicator is that the Apprenticeship Chart has been signed by more than 1 300 company chief executives (both SMEs ad major enterprises). At the same time, it is also important that the Regional commitments be strong and visible. A great many French Reginal authorities have approved and are firmly committed to 'ways and means contracts' and are developing some interesting field experiments the benefits of which should be assembled and thus contribute to the attractiveness of sandwich courses: co-financed industrial tutors in the 'CFA' training centres, who monitor the apprentices' progress, and who provide solutions to the needs expressed by young apprentice engineers in terms of territorial mobility...

Nonetheless, it remains true that apprenticeships still carry an unjustified negative stigma

The Government plan to remedy where needed and improve social cohesion has initiated a new dynamics in favour of sandwich courses and apprenticeships reflects our efforts to reinforce a winner image for apprentice schemes. An apprenticeship means "more know-how, more professional openings, more built-in advantages, higher motivation". Let me insist on the following point: an apprenticeship is a great "plus" to ensure success. UTC is a pioneer in Higher Education sandwich courses in France. Moreover we can note that our engineering schools are now going down the same route and are convinced that this kind of training brings benefits and are convinced that Universities and enterprises should continue to come closer together". In 2003, we noted that in Germany, there were 1.6 Million apprentices, and only 300 000 in France. We must, in France, continue our efforts and target a rate close to that in Germany (viz. 6%). The professional job horizon, the success for our young people and for the corporate manpower departments call for sandwich course possibilities, notably in our French engineering schools (so called grandes écoles). ■

DID YOU KNOW THIS?

13% of higher education programmes were prepared in 2007 under apprenticeship contracts, compared with only 6% a decade before. Source: French Ministry in charge of Employment, Social Cohesion and Housing.

www.apprentissage.gouv.fr
www.orientation-formation.fr
www.institut-entreprise.fr

#3
July
2007

A new look at...

Mobility
as seen from the USA

HE Craig Roberts Stapleton, US Ambassador to France and Jeffrey Hawkins, US Consul, Lille, visited UTC on May 23, 2007 and Interactions asked them a few questions on student mobility and salary differences between the USA and France.

In your opinion, does the current European harmonization of HE curricula affect the mobility of US students?

Craig Roberts Stapelton : Since you implemented quite recently the European 'LMD' aka '3-6-9' rating in France (First Degree, Master's Degree and PhD), our two educational systems in fact are more similar. Our marking and credits scales are still different but the mechanism of equivalences enables US students to go abroad more easily, notably to France.

Adding a more European dimension to exchanges

Jeffrey Hawkins: The fact is that it is always difficult to find two HE systems that are equivalent to each other. But with the harmonization, of European grades and degrees it is indeed easier for an American student to identify a French course that corresponds to his/her personal requirements, and vice versa.


CRAIG ROBERTS STAPLETON

In your (US) relationships with other countries, what position does France occupy in terms of student mobility?

Jeffrey Hawkins : In recent years, France has been the 4th favourite destination for American students (ed. coming after 1° UK, 2° Italy and 3° Spain).

For the academic year 2005/2006, more than 15 000 came to France for further studies. And the figure has increased this year again! What remains now is to add a more European dimension to our exchanges. With globalization, delocalization … it is important to understand the complexity of the world around us in which these young people live. Hence the importance of mobility, not only for students but also for research scientists and salaried workers.

Craig Roberts Stapleton : Boosting the level of exchanges between the USA and France must become an education policy priority as should the collaborations between our institutions and establishments to accentuate scientific mobility between our two continents.

Can you comment on the level of mobility for American workers?

Jeffrey Hawkins :As far as salaried workers are concerned, it is somewhat difficult to have reliable figures. Nevertheless, the increased presence of American companies in France authorizes my comment that when the opportunities are there, American workers can make the best of the situation and they do. In 2005, the UISA was the #1 investor in France, notably in the property and real estate, and services to enterprises, in manufacturing and in financial sectors. US investment stock in France has doubled over the past decade. The French economy is dynamic and offers real opportunities. Lastly, France is fascinating in terms of its History, its architecture, of the French people, its cultural heritage not to mention the French language itself. I believe and I'm sure a great many Americans with me, that France is an extraordinary country that we find so attractive. Indeed, we never miss an opportunity to come over here. ■

DID YOU KNOW THIS?

Approximately 2 400 French companies (and subsidiaries) are now located in the USA and this represents more than 500 000 jobs.

(Source: www.ambafrance-us.org)

#4
November
2007

A new look at...

Ecotechnologies

Claude Gewerc, President of the Picardie Region and Gérard Jugie, Director of the Emile Victor Institut Polaire Français, recently appointed officer on UTC's academic Board, update our its readers as to the position and role of ecotechnologies.


CLAUDE GEWERC

Gentlemen, how would you define ecotechnologies?

Claude Gewerc : As I see it, ecotechnologies represent a new and global approach to industrial development. They are new, inasmuch as they take the environmental constraints into account as a major lever to future development. They are global, inasmuch as they encourage us to reconsider the complete value chain, from raw material procurement to final uses of the finished product(s), and including the production processes. The Picardie Region in this framework offers a wide experimental field and a place for privileged development of these ecotechnologies, given that the region is at the heart of Europe's largest consumer basin, together with its rich agricultural activities, fabulous reserves of renewable raw materials and a highly diversified industrial infrastructure.

Gérard Jugie : The term 'ecotechnologies' recalls the definition of technologies themselves, i.e., the techniques enabling an activity, a process or a product to be improved, with the proviso that efforts be mad to preserve the environment in a sustainable development approach. The Institut Polaire Français I direct is especially sensitive to global warming issues, from ice cover melting, to greenhouse gas emissions, and the ozone depletion hole … all of which are problems that engage the future of the planet seen as a whole entity..

Are new technologies compatible with the environment?

Claude Gewerc : Technological development is stimulated by two factors – the market place and public authority commissions. Now that citizens have become more aware of environmental criteria,

they pay more attention to the origins of what they consume. And, indeed, it is the mission of public authorities to relay this strong expectation expressed by the public at large. Under these conditions, ecotechnologies tomorrow will occupy a prime position in Society. The only real obstacle to their development, I think, lies in a slow awareness process. Indeed I feel that we shall not be able to modify in depth the way we produce things and consume them if we do not also make progress in our economic democracy, and therefore see the public adhering to their use and accepting the induced changes.

Gérard Jugie : The new challenge brought to light by ecotechnologies is that environmental issues must be seen as an intrinsic parameter for the development of any technology. At the Institut Polaire Français, we are led to implementing co-generation processes for our local, isolated site energy requirements, whether it be at the Terre Adélie base or at Dome C (Concordia*). Remember that co-generation consists of recuperating the heat produced from a combusting engine while running and using it to heat up a secondary circuit. .

How and to what extent would you see UTC adapting to the development of eco-technologies?

Gérard Jugie : As I see it, UTC already has a wide range of scientific and engineering specialties and research areas that allow the establishment to combine technologies and their applications with a constant criterion- to satisfy environment and societal constraints in their wider connotations. UTC is a party top sustainable development policies and is determined to contribute to economic growth through innovation while improving environment quality and protecting and conserving natural resources.

Claude Gewerc : Ever since UTC was created, the University has developed ecotechnologies without 'promoting' them as such. The Picardie Region is fortunate enough to have a university that has a renowned mastery of clean and safe processes, and has invested in so-called 'green' chemistry and urban system engineering. I personally am convinced that urban ecotechnologies will represent a major challenge for the near future. ■

**Concordia aka as "Dome C" is a joint Franco-Italian base positioned at the on a high plateau of the Antarctic Continent (75°-123°E).*

DID YOU KNOW THIS?

France ranks 4th in the world in terms of turnover devoted to eco-industries and 2nd in Europe. The French market for environment-intensive technologies is estimated at 23 billion euros and with a growth rate in excess of 5% per year (Source: PRECODD)

www.cr-picardie.fr
www.institut-polaire.fr

#5
February
2008

Albert FERT's views on *innovation*

Albert FERT, who was co-awarded the Nobel Prize for Physics in 2007 for his discovery of giant magnetoresistance and his contribution to the development of spintronics, gives Interactions an insight to his views on Innovation and the relationship between Research and Industry.

What paved the way to the discovery of giant magnetoresistance?

Progress in science often occurs at the boundary interface between several fields. The knowledge you gain in a neighbouring specialty sometimes help you overcome hurdles to innovation. The discovery we made in 1988, viz., giant magnetoresistance (GMR*) stemmed from an idea I had about the influence of the spin factor on electron mobility and the ongoing progress, at that time, about epitaxial processes using molecular jets, which was a well-mastered technology at the Thomson-CSF Laboratories. The natural outcome was collaboration between my laboratory and the laboratories at Thomson-CSF.

> The role, status and career paths of PhDs should be enhanced when they join industrial employers.

Are we to understand that the secret here lies in ties that are built between research laboratories and industry?

For public laboratory research scientists, it has now becoming rewarding, in terms of career, and notoriety, to value add to their scientific discoveries. Innovation, we know, often comes from basic research findings but there the necessary proviso for their development lies in transmission between what I would call, to simplify, upstream and downstream activities. This presupposes a certain degree of familiarity between the research community, on one hand, and the industrial R&D engineers and corporate structures on the other. The Thomson-CSF Laboratories, later changing to Thales, are used to housing large numbers of PhDs and my own personal relationships with former

PhD students I supervised at Orsay University (Paris Sud XI) proved essential to developing collaboration with these laboratories. Finally it led to the creation of a so-called mixed, or joint, research unit in physics between CNRS and Thales, in 1995. Nonetheless, it still remains true, unfortunately, that there are too few PhDs in general working in industrial sectors. The role, status and career paths of PhDs should be enhanced when they join industrial employers.

In 2009, UTC-Compiegne set up an Innovation Centre. As you see it, could this improve the relationships you mentioned earlier?

Well, I suppose such an innovation centre will lead to even stronger links between industrial partners, UTC's Laboratories and other public sector laboratories. Indeed, such centres could also help build personal relationships which often are long to establish. In my personal experience, in getting to know other research scientists or industrialists better has always been conducive to better scientific collaboration. But I am also aware that in other industrial sectors, the gap between research scientists and industry is wider and the transmission I mentioned is a much longer process. However, an innovation centre will throw light on notions such as the products and/or the market-place which necessarily, but not obviously, support any innovation process. These notions, I would contend, represent one aspect of innovation that the research scientists on their own cannot manage or control properly. As scientists, we can identify the possibilities offered by certain scientific progress when it comes to creating new devices or processes. The follow-on is a necessary concertation with the industrialists, in order to ascertain whether the innovation has a commercial future and applications. ■

**GMR : Giant Magnetoresistance*

DID YOU KNOW THIS?

The discovery of Giant magnetoresistance (GMR) had a tremendous impact on ITC devices, notably on the manufacturing technologies used to assemble magnetic reading reads that equip all modern hard disk drive (HDD) memories.

www.thalesgroup.com

#6
July
2008

A new look at...

Towards an open society

March 11 and 12, 2008, Sciences Po, Paris hosted the forum «Economia & società aperta». 'Interactions' was able to interview Professor Angelo Provasoli, Rector of the Bocconi University, Milan, organizer of the Forum and he offered us his vision of university autonomy.

With what objective have you launched the Economia & Società Aperta Forum ? What are the major themes that today's economy and society have to face ?

Bocconi's commitment, in first place towards its students, is to take an active part in the main themes of public debate and those regarding the development and growth of the country. The forum, organised since last year with the Corriere della Sera newspaper, fits in with this logic. The Forum, thanks to the commitment of many, contributes more and more to making and spreading culture. To face a dynamic environment in transformation, such as is modern society today, urges deep changes in the rules and institutions: from policies regarding competition to social welfare, to those regarding education and research to those which, in general, qualify the whole institutional system of a nation. Governing globalization in multiple backgrounds - finance, industry, trade, human capital - with the objective of the growth and social cohesion of a community, constituted the underlying theme of the Forum meetings. Education and research, in fact, profoundly feel the effects of the competitive background which emerges from an international environment evermore open and integrated.

France is granting autonomy to its universities. Is it a sufficient measure to stimulate competition in education across Europe and what are the crucial knots still to be faced ?

In Italy the law which granted universities autonomy is dated May 1989. Thus

began a long and articulated process during which different reforms followed on from each other. In particular, I have observed favorably the process which, in the wake of the Bologna Declaration, has brought the Italian university system more in line, and thus comparable, with that of the rest of Europe. Autonomy and the entrance into an international market have inevitably brought Italian universities into an increasingly competitive system. It must be considered, however, that competition tends to favor a progressive differentiation and polarization of the scientific and education results of universities. The most efficient university systems attract the best talents and obtain financing from a multiple variety of sources. In these systems, thus, the universities differentiate among themselves and, with the intensification of globalization processes, the privileges of the best institutions become more marked. Since the process of liberalization, in the current conditions, is unlikely to come to a halt and since resources are limited, the necessary meditation has to lead, in every country, to a valuation of the advisability of concentrating financial support and strengthening the development of a limited number of research and higher education institutions able to compete at an international level.

Education and research feel the effects of the international competitive background

Those in Europe governing research and higher education systems have to unavoidably face certain important questions.

The first of these is certainly the measurement and valuation of the quality and fruitfulness of research, next to that of the quality of teaching and its results. The reference to adopt must be the most stringent international standards. International competition between higher educational and research institutions also calls for suitably regulated systems which guarantee flexible organizations, equipped with greater autonomy, characterized by an efficient governance and not burocratic, structures fully in line with standards of quality, to be valued and judged on the basis of results obtained. Upon these themes, among many others, will be measured the impetus with which European society is prepared to confront crucial policies, foremost those regarding education and research and how to link them to an evermore integrated international backdrop. ■

DID YOU KNOW THIS?

Currently President and Vice-Chancellor of the Bocconi University, Milan, Mario Monto was European Commissioner in charge of competitivity, during the Romano Prodi Presidency of the European Commission.

www.uni-bocconi.it
www.economiaesocieta.org
www.ec.europa.eu

Interactions interviews...

Valérie Pécresse

The French system of R&D and Innovation has evolved significantly since 2005, both in terms of organisation and of the means provided by the State for the RDI communities. 'Interactions' put three questions to the Minister for Higher Education and Research, MESR, Ms Valérie PECRESSE [before her appointment as Budget Minister]

Will you be defending a special role for France in the planned European Research Area?

When France held the Presidency of the European Union, the main priority for the research community was to ensure better co-ordination of the European Research Area (ERA), to serve the major challenges that our Societies in the 21st Century are facing, and to propose and provide the 'instruments and tools' to secure efficiency in the ERA. For these reasons and purpose, we adopted the programme Vision 2020 which tends to make ERA a space where scientists can exchange and move freely through a Europe without frontiers, to better circulate and propagate knowledge. In the coming months, we shall strongly support the Czech Presidency to bring Vision 2020 into being. Then, using the procedures for joint programming, the Member States will be able to co-ordinate their research programmes and means, on a voluntary and variable geometry basis, focussing on major societal issues that the parties would indentify in common (e.g., food crises and their consequences on agriculture and our management of ecosystems, climate change, the evolution towards a knowledge-based society, ageing of the European populations). The programme Vision 2020 will be gradually implemented during next year, starting with our common fight against neuro-degenerative diseases and Alzheimer. France and 8 other pioneering European countries (Czech Republic, Ireland, Italy, Netherlands,

> Europe must set up and organise its own University rating system

Spain, Sweden Switzerland and United Kingdom,) will adopt and develop joint actions to fight Alzheimer's disease.

UTC set up its own University Foundation last September. Can you explain how this new source of funds will be compatible with the recent law on autonomy of the Universities in France?

Responsibilities conferred on the Universities (university foundations and partnerships), enables them to call on sponsorship programmes with enterprise and private persons, in order to finance teaching or research projects (Chairs, bursaries and travel grants, turnkey laboratory facilities …). The university governing boards have full control over the way these funds are used. Today there are 9 foundations (5 of which are university based - Clermont I, Montpellier III, Paris VI, Aix-Marseille II and UT Compiègne and 4 are partnerships: Lyon I, Paris IX, Strasbourg and Versailles). Beyond this there are nearly 70 projects to set up foundations, 10 of which will probably be inaugurated soon (Lille 3, Poitiers, Tours, Nice Sophia Antipolis, Nantes, Caen, Rennes 1…).

We hear you would like to establish a Brussels University ranking. Would such a rating, seen from a European perspective, give a better visibility to teaching and research activities in French Universities?

The European Union must have its own ranking system, not only for Europe's institutions and universities, but also for those elsewhere in the world, talking into account specific features. The purpose here would be clearly to offer our students and applicants a guarantee of the quality of the teaching that they choose to follow outside their native country. The French Presidency of the European Union registered this ranking as one of its priorities. The ranking would be by disciplinary field, and would constitute an aid to students who wish to benefit from mobility, in the form of clear and objective information as to the training course offer in Europe and elsewhere. The ranking will start in 2011 and will become a real driving force behind students' motivations to move round Europe. ■

DID YOU KNOW THIS?

Minister Valérie Pécresse, proposed last December the implementation of a national research and innovation system, designed to bring public research activities closer to the entrepreneurial world.

www.enseignementsuprecherche.gouv.fr

#8
June
2009

A new look at...

The question of sustainable evolution*

'Interactions' interviewed Ms Corinne Lepage, former French Government Minister for the Environment, Founder-President of the political party 'Citoyenneté Action Participation pour le XXIe siècle (CAP 21).

The problems we are facing today have become increasingly complex and interdependent

For quite some time now, you have been committed to protecting our environment. What was (and is) the driving force to your implication and how would you summarize the situation today in terms of environmental laws and regulations?

My ideological, association and now political commitments go back to a two encounters, the first being intellectual – in 1975, I presented my PhD thesis dissertation on social costs in public law and I was interested by environment intensive externalization. The other encounter was sentimental when I met the man who was to become my husband, Christian Huglo – at the time he was the first French lawyer to defend environmental causes. There was the Mountedison scandal (Ed. an Italian chemical industrial group) and red sludge pollution of the Mediterranean near Corsica. More than 30 years later, we can note that environmental law has progressed quite considerably and the principle has even been added to our Constitution – clean air, safe water, wastes, biodiversity … Even if we can regret that it has progressed less swiftly than the depletion/deterioration of the resources. Another source of concern is that beyond the scope of international agreements and treaties, environmental law still is 'closed shop' and local or national while the problems themselves are clearly international – global warming, preservation of biodiversity. We are today witnessing an increasingly block of pressure placed on law enforcement. Many laws and legally binding regulations are simply not (or very remotely) applied.

In your opinion, what specific action should be undertaken by the universities to comply with the constraints of sustainable development?

The role of the universities is primordial, because the advancement of science is a top priority. A great many problem areas associated with sustainable development policies stem from sheer ignorance – of the industrialists, the politicians and the citizens – albeit inadvertently. Universities, by essence, are places for training and research and must play their role in full. The subjects dealt with can no longer be handled in a sectorial, specialty manner. To illustrate, I recall that the European Environmental Agency published a report entitled "Late lessons from early warnings: science, precaution, innovation: the precautionary principle 1996-2000" in which the EEA stressed how important it is to engage in interdisciplinary academic work. The problems we are facing today have become increasingly complex and inter-dependent. If we do not approach them in an interdisciplinary manner, whether we are talking about training courses or research activities, we shall not be in a position to frame the right and relevant questions.

UTC is a key player in the IAR (Agro-resources) competitivity cluster, which focuses on whole plant valorisation, and design of bio-refineries. Do you see this as a priority research theme?

The 20th Century was the century for petroleum products; the 21st Century will be centred on the plant realm. Agro-industries will gradually replace the petrochemical sector. Your IAR competitivity cluster is already playing a fundamental role (and will continue to do so) in research on so-called' second generation' fuels and also in terms of development of green chemistry. Technologies and innovation are closely tied together by constraints (although I see them as insufficient for the moment) but are absolutely necessary if we are to reconcile social economy, ecology and human activities. Technologies will not solve all our problems, but if we by-pass their possibilities then we will surely fail!

You assert that sustainable development should not be a blind eye-patch to be used as an alibi to extend the situation as it stands today

What I propose in my book Vivre autrement*[Living an alternative way] is to substitute 'sustainable evolution' to replace 'sustainable development'. The current debate on growth/deflation is a misnomer and we should quit this vision. Evolution does not predetermine the way we should go. On the contrary, we should be asking ourselves what are the constraints that come with sustainability depending on which path we choose, weighing up the advantage and disadvantage of each. Sustainable agriculture, sustainable mobility, renewable energy sources, knowledge-based economy … are all "advantages". Petroleum products, pesticides, excessive water consumption are all disadvantages..? We really must base future economic development on what is really (and positively) sustainable, hence my idea to call this sustainable evolution. ■

** Published Éditions Grasset, collection Essai - Blanche (April 2009)*

FORUM

In your opinion, to what extent should universities be a driving force supporting protection of the environment and taking the sustainable development policy aim into account?

www.cap21.net

A new look at...

Innovation centres

The International Innovation Centre (C2I) in heart of the Techno-Park of the city of Curitiba, capital of the Brazilian state of Paraná, part of the FIEP* system is a strategic project for the development of regional industries in this Brazilian State. It is a unique structure, somewhat similar to the UTC Innovation Centre and indeed there are some collaborative links already between the two. Interactions spoke with Mr Filipe M. Cassapo, leader of the knowledge .

What are the missions assigned to C2I, your international innovation centre?

In short, C2I catalyses the relationships and exchanges among the various players in the regional innovation eco-system, so that enterprises of every shape and size and all the activities represented in the State of Paraná can develop in a sustainable manner and that likewise the Brazilian population also benefits from the ongoing developments. For this purpose, C2I modulates its interventions as a function of the level of maturity of the companies with which collaboration is established, notably in terms of innovation management. The companies may not yet be aware of the importance to innovate their products or processes and only see innovation in a random or sporadic fashion. Others have defined processes or innovative projects and are engaged in mobilizing both manpower resources and financial support as seen coherent to meet the assigned objectives. And for a third group, innovation and technology directly support the corporate strategic growth policy plans. Depending on the level of maturity of the company, our Innovation Centre will offer a full range of services supportive of more efficient innovation management, with goals running from simple awareness up to and including consulting missions, but not forgetting training and aids to structure the projects present in the Centre.

> Just like UTYC's Innovation Centre, C2I Paraná works with the prospect of reinforcing a training-research-innovation triangle.

As you see it, what are the similarities and differences of C2I with respect to UTC's Innovation Centre?

Just like UTYC's Innovation Centre, C2I Paraná works with the prospect of reinforcing a training-research-innovation triangle. But in contradiction, in Paraná, our Centre is not part of a University structure, nor is it attached to a research establishment. We do not undertake or develop research work at C2I; its role is to facilitate technology transfer of research results obtained in the various Paraná State universities to benefit regionally located companies. This form of transferred skills is necessary to ensure that the companies can benefit from the valorisation of the research. The conceptual and methodological coherency of the two differing approaches of our respective innovation Centres should, moreover, facilitate technology transfer operations (product/processes) between the Picardie Region in France and the State of Paraná in Brazil.

Could our two structures be complementary in the future?

As I see it, innovation for both structures share the same definition for innovation and can prove complementary in many areas. We can, for example, envisage exchanging on our operational practice protocols and also set up multi-cultural innovative projects. And of course there is a possibility of setting up joint training course in management thematics for innovative projects or sharing certain research objectives (France and notably UTC – Brazil in in this instance, all the universities in the State of Paraná). Several concrete potential partnerships and

joint projects have already been identified when you made two visits to Brazil and we came to visit the France. Let's take, as a case in point, two companies located in the Rives de l'Oise Technopark where we saw that there is indeed a potential for specific applications in Brazil. ■

** Federation of Industries in the State of Paraná (Brazil)*

DID YOU KNOW THIS?

With more than 30 000 corporate members, the Federation of Industries of the State of Paraná (FIEP), Brazil, is at the service of an industry based on sustainable development principles.
www.fiepr.org.br

A new look at...

A different economy tomorrow ?

In his latest book "L'Abeille et l'Économiste" (Ed. Carnets Nord) [Of Bees and Economists], Professor Yann Moulier-Boutang, Chair of Political Economy at UTC, offers his personal analysis of the current crises and defines for us an economy based on cross-pollination.

Knowledge-based and immaterial economies, a cross-pollination system, contributive economics … could you sum up for our readers what tomorrow's economy will look like?

Even today, our notion of economic value includes an increasing fraction of immaterial resources and wealth, in the form of patents, intellectual property and rights, trademarks, technical planning drawings and charts, models … and also some more implicit or tacit factors such as apprenticeships, trust, care and cooperation. Classic analysts here unfortunately limit themselves to what they can (ac)count for in a merchant exchange process, and by doing so they only identify part of the real values. When we say the world is complex and not just complicated, and reneges the statistical techniques of modelling, then we are in fact showing that there are increasing numbers of interactions. For example, the real economic value of bees does not depend just on their merchant products, viz., honey and wax, but also the plant pollination they enable, somewhere between 350 to 1 000 times more valuable that the products mentioned. If there were no bees, there would be no pollination, and without pollination there would be no life on Earth. By analogy, the production of merchant goods in a contributive economic model using human pollination, the production of goods become ancillary top that of human activities as they interact with the milieus.

> It is no longer possible to think of world transformations without placing appropriation of associate technologies at the heart of the analysis.

To what extent are economic, financial, social and ecological crises positively conducive to seeing the development of a cross-pollination economy?

The finite nature of our planet implies that we must become economical in relation to the biosphere, the Earth and its resources.

Our immaterial society today on the contrary has infinite potential for expansion capacity (knowledge). Current crises, as I see them, stem from the scales/units of measurement and categories established by the Founder Fathers, Adam Smith and Ricardo, in their time. Classic political economy revolved round the concept of value. What I assert today is that the discovery of various new forms of human cross-fertilization, as seen in the digital world and networks connecting human brains together, have led to a sharp systemic shake-up. We can, for instance, no longer measure an individual's productivity. And innovation in this light can only be fully understood in a global, societal framework. So, now we have the question: how do you measure human or intellectual activities? What I propose is that we add an ecological criterion to the concept of merchant trading exchanges whereby we can identify whether a given activity is a predator or a pollinizer of non-merchant resources.

Does your lecturing tenure in technology-intensive universities such as UTSeuS (Shanghai) and UTC influence you as an economist?

It is simply no longer possible to think of world transformations without placing appropriation of associate technologies at the heart of the analysis. What I teach at UTC is how to escape the ambient econometric and financial ghetto, better than anywhere else. In this respect, the transdisciplinary dimension of social sciences and humanities, as found in the UTC-Costech Lab** gives me a terrific opportunity and represents a major challenge ; indeed next academic year we launch a Master's specialty in "Management, Intangibles, Strategy, Complexity, Ecology (MISCE)" within the UTC Master's degree in Quality Assessment. My participation in the UTSeuS project in China allowed me to come to grips with to the complex reality of a metropolitan area as dynamic as the city of Shanghai, and to set aside mistaken ideas that underestimate the evolutionary potential, will and sheer speed of the Chinese when it comes to developing and transforming traditional their industrial sectors. ■

** UTSeuS – the Sino-European University of Technology of the University of Shanghai.*
*** UTC-Costech Lab - Connaissance, Organisation et Systèmes Techniques [Knowledge, Organisation and Technology-intensive systems] (CNRS code EA2223)*
**** The full programme of Prof. Moulier-Boutang's lectures in China can be found on the UTC-Interactions web site at www.utc.fr/interactions*

DID YOU KNOW THIS?

The so-called French immaterial heritage agency (APIE) created in 2007 is in charge of patents, licenses, trade-marks, images, data bases and other immaterial State property.
www.apiefrance.fr

#12
August
2010

A new look at...

Engineers tomorrow

Dominique Wolton is one of today's most prominent sociologists. He is a Senior Research Scientist at the CNRS. He comments for our readers his vision of tomorrow's engineers in the process of innovation.

To communicate, you must negotiate

In your latest publication, you write that "To communicate is learning to live together". To what extent, as you see it, is co-inhabitation necessary for any innovation process?

In our "open" world, where social and professional fractures and differences are becoming increasingly obvious, innovation paradoxically is going to encounter more difficulties to develop than previously. Whether we are talking about technologies or entrepreneurship, the innovation process leads to a gap that will inevitably widen between, on one hand, production capacity, diffusion and more and more efficient intercommunicating systems, and on the other, communications between humans and societies. The speed and richness of information exchanged this way will come into conflict with the heterogeneous features of knowledge and our differing cultures. These two time-scales are both complementary and contradictory. To communicate you must negotiate. There will therefore be a time allotted top negotiation, coming between the time for research activities, for R&D and to find and develop applications … hence there is a necessary co-inhabitation. The sooner we encourage situations, at university level, in which we accept contradiction, the faster we shall be able to educate to face reality tomorrow! Innovation demands that we invent a more 'co-inhabitationist' model, including a longer time scale for negotiations.

What sort of solutions could a qualified engineer propose to reconcile the two

scales of time: time to innovate and time need to get to know other people and their cultures?

The engineering profession is at the crossroads of two timescales. The key question is as follows: how do engineers move on from a vision of a technology-intensive global village to approach that of a more complex cultural, diverse reality with its differing life styles? They have two possible solutions. One consists of admitting that information and knowledge will circulate twice as fast due to content translation – i.e., the industry that complies with cultural diversities. This industry is exactly symmetrical withy the concept of respecting the environment in its ecological dimensions. Developing a better understanding of others and other societies and, paradoxically, multiplying our contacts and our physical travel possibilities. We can, for example, valorise the fact that a young French engineer spends two years in Chile, three years in Nigeria or one year in China … can you realize the amount of adaptation needed to do just that?

UTC is constantly reframing its training course contents to respond all the better to needs expressed by the entrepreneurial world. What should we do to improve and enhance the connections and relationships between academic objectives and entrepreneurship?

Even those companies that have integrated globalization in the way they operate must tomorrow also take into account political, cultural, linguistic and/or ideological differences. Tomorrow's global capitalistic economy will face a confrontation of contradictory points of view. The single solution we need will be to bring these two spheres of training and business enterprises closer lies in the confrontation and co-inhabitation of the various points of view. And it would not be a waste of time, but rather a consubstantial condition for the cooperative agreements to be signed; in this sense co-inhabitation means a successful confrontation. But even in such a co-inhabited world the universities and engineering schools must remain places of teaching/learning and enterprise the world of production. To better understand the complex and contradictory world of tomorrow, engineers must acquire historic, cultural … milestones and thereby attempt to understand 'irreducible' aspects of culture. Only human intelligence, in an association with the widest vision possible, will be in a position to adapt to radically different contexts. In cognition sciences, the only valid definition of intelligence is our capacity to adapt, which asset can be all the more readily developed when the vista of the observer-actors is wide open. ■

* *« Informer n'est pas communiquer » [Informing is not communicating] (CNRS Editions – 2009)*

DID YOU KNOW THIS?

Dominique Wolton is the founder (1988) and Editor in Chief of an international review Hermes, the objective of which is to analyse communication between individuals and the relationships with techniques and technologies, cultures and societies.

www.wolton.cnrs.fr/FR/hermes/ouvrages

A new look at...

Industrial Property Rights

Interview with Yves LAPIERRE, Director General of INPI (French National Institute for Industrial Property Rights), on the occasion of the 2010 annual Engineers of the Year Prize ceremony for which UTC-Compiègne and INPI are partners.

What connections do you see between Industrial Property Rights and Innovation?

Industrial Property Rights (IPR) primarily constitute a tool serving the interests of innovation. Given the level of global economic competition as it exists today, we could summarise innovation as the capacity for a country like France, or a continent like Europe, to create wealth. Wealth is something that needs to be protected and safeguarded! When we apply the notion of Industrial Property Rights, we are defending not only the interests of the right-holders but also contributing to add-on innovation factors, notably through knowledge-management and dissemination. Beyond the basic protection of innovative processes and or devices, Industrial Property Rights (as, for example, stored at INPI) represent the largest and most sure archival store of technological information available today. This information is free of access via Internet with over 70 million patents that can be consulted on line, from any Internet connexion whatsoever. Industrial Property Rights also serves as a watchtower for coming and future technology-intensive developments and provides answers as to how and when to register a patent claim, or to identify what markets could accommodate the product or process envisaged.

As you see it, does wealth creation need to be protected?

Certainly and more than ever before! Industrial Property Rights guarantee entrepreneurial competitiveness. As we can readily observe, IPRs in innovation lead not only to economic growth, but help also fight counterfeit products and processes; the fact that a counterfeit product is readily identified, we are beginning to change our mentalities in this area. We need only take the example of counterfeit medicinal drugs, accessible via Internet points-of-sale. Not only do such drugs impact negatively on the market rights of the original manufacturers, but represent per se a highly potential danger for public health. The added risk for the pharmaceutical sector is that their image and efficiency will be called to question.

If I understand you correctly, at INPI you associate growth via innovation with the level of competiveness of enterprises?

Ever since the Lisbon Summit [Dec. 2007] Agreements reached by the Heads of State, policy makers have become aware that the development of a country is closely linked to development of innovative ventures. The objective of the so-called Lisbon Strategy is to turn the European Union (EU) into "the most dynamic and competitive knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion …". The areas where reforms were identified were innovation seen as a driving force for change, knowledge-based economies and a new vision for society and the environment. Since 2007, we at INPI are committed to bringing academic research and the industrial world closer together. In fact, we no longer hear of R&D as an isolated activity; it is now generally associated with wealth creation through innovation.

Are you therefore asserting that there can be no wealth creation without innovation, nor any innovation without awareness of industrial property issues?

Indeed! Innovation needs to rely on Industrial Property Rights in order to develop normally. When you ask a young research worker what IPR is, he or she often finds it difficult to frame a relevant answer. Their reply very often boils down, unfortunately, to some vague notions about patent registration. We must point out that IPR has a much wider scope, inasmuch as it covers all the procedures designed to protect innovation. On one hand, of course, there are the patents, on the other there are also notions of secrecy, the so-called Soleau envelopes, drawings, registered trade-marks, prototypes … all of which contribute to added-value for the products and or processes protected in these ways. If we wish to develop and accompany efforts to generate and implement innovation, then we must be made aware – this is my personal opinion – very early in our studies of the advantages and processes underpinning Industrial Property Rights. INPI, moreover, set up an "Innovation Generation" to help school students to come to grips with the basic principles of Industrial Property. INPI also addresses research-lecturers and university level students, among whom I would readily single out the doctoral level graduates, helping them specifically to identify those areas of their research where an industrial property rights strategy would be useful, or even necessary. ■

DID YOU KNOW THIS?

Le 8 décembre 2010 était organisé «Le Prix des ingénieurs de l'année». Laurent Rouxel-Duval, diplômé UTC en génie mécanique (1988), aujourd'hui chef de projets chez STX France (ex chantiers de l'Atlantique), y a été récompensé du «Prix pour un projet industriel». www.inpi.fr

#14
June
2011

A new look at

Corporate Social Responsibility (CSR)

Since 2002, Nicole NOTAT has been CEO of VIGEO, a European leader among social and environmental rating agencies. Here is her vision of the aims covered by the notion of Corporate Social Responsibility.

How and when did this concept of CSR to be?

The concept first appeared in a Green Paper issued in 2001 by the European Union; CRS or Corporate Social Responsibility has gradually been referred to at various world summits, in the context of challenges revolving round the idea of sustainable development. It arose at the same time as it was thought that sustainable development could provide an answer to major ecological and societal challenges, in contradistinction to short-term development objectives. Why could the corporate enterprises not contribute also to help meeting and solving these challenges. It is not really a novel concept that the enterprises could be aware of the impacts they have on society and the environment, even at a time when the prime aim seems to be to assure maximum return on investment for the shareholders. This Green Paper drafted as an EU initiative provided a solid definition for CSR and

invited the corporate world to adopt it. Thus, as of 2002 in France, companies of a certain size registered on the French Stock Exchange are required to publish in-house reports on Good Practice in terms of sustainable development, and to account for their commitments and results in this area of their influence. The concept now has institutional validity and in some States, such as France, has a regulatory and legal value.

Briefly speaking, what does the concept CSR cover?

One definition could be the way in which companies contribute to the planetary goal of sustainable development. CSR is a necessity that the company must comply with when it takes the expectations and the legitimate interests of all the entities implicated in its ecosystem (the company customers, the personnel, the sub-contractors, the local environment …) and to give a new meaning to the way the company manages its personnel, its environment and the local context. To do this, the company must accurately identify the various challenges that exist in its sphere of influence and activities, in order to define a corporate policy that in agreement of the value chain of its products and/or services. Behind the CSR concept, I personally see a chance to achieve a reconciliation between society and the company, insofar as it puts an emphasis on what the finally of an enterprise should be. Historically speaking, some companies in the Mutual Assurance sector consider that enterprise, over and above its economic and financial finalities also carries a social finality. From this point onwards, those enterprises that are positioned at the very heart of the market economy and the capitalistic system we live in, will adopt the concept and its associate, new reality. As I see things, the CSR will value add to the corporate image – which occasionally is criticised – and will regenerate new societal-corporate links and enhance confidence in enterprise.

The CSR concept is a lever for corporate innovation and creativity

What are the risks for an enterprise if it chooses to ignore this new development related concept?

The CSR has become a fully-fledged "given" for measuring global corporate performance. A number of the major industrial groups have already become aware of the risk they take if they do not implement the new forms of responsibility. The same holds for SMEs which are often actors in a chain of value, of a much larger ecosystem framework. They will find themselves answering calls to tender that increasingly will incorporate criteria that stress commitment and sensitivity to questions that are inherent in the CVSR concept. As a complementary item form the classic criteria for analyses that govern choices for investments, the shareholders and managerial staff will be required to take CVSR rules into account. In other words, a new category of investors who are not seeking just the immediate highest possible profitability factor. Obviously, philanthropy is not then rule of the day and d the corporate objective will be oriented more as a way to reduce risk factors in the long term. Enterprises must make themselves more attractive for these investors. When there is a vested interest in CSR, we must at the same time know how to correctly exploit the new forms of reality and see them as opportunities in favour of innovation.

As you see it, is corporate innovation policy compatible with the precepts of CSR?

Oh, yes! And I would go even further. When a company adopts a CSR, it acts as a lever or as an innovating and creative factor for the enterprise, through its R&D work, its productions processes or in its new products … Companies, rather than run the risks of ignoring the concept, will welcome it with interest and see it as an investment and not a cost or a constraint. The CSR will generate forms of differentiation and growth in all our sectors of activity, inasmuch as every sector will be concerned by this concept. The challenge today is to identify these forms of differentiation and growth. But today there are no predefined rules and framework to carry through the concept. The challenge is to build a methodology and a reference for our analyses, to develop quantitative and qualities pointers that would be tangible, taking into account the company's performance and a control of corporate risks. ■

DID YOU KNOW THIS?

Published at the end of year 2010, ISO 26000 is the only international standard that provides organisations with the outline directives in terms of societal responsibility. There are 7 main questions: corporate governance, human rights, work conditions and relationships, the environment, good business practice, questions that relate to consumers and societal responsibility.

www.iso.org
www.vigeo.com

#15
November
2011

A new look at

Knowledge Management

Knowledge management (KM) is now a key to the success of enterprises and organisations. Bruno BACHIMONT, senior research scientist at UTC Compiegne helps decipher the concept.

Can you tell us how the concept of Knowledge Management (KM) started?

Well, as you know most human activities rely on the knowledge we have at our disposal. Often, we are referring here to "immaterial" entities. Thus, only a fraction (large or small) of this knowledge can be readily formalised and handed on. Usually this is scientific or theoretical knowledge than can be formalised and shared with all, in terms of time, space and communication. This indeed is a paradigm largely spread over our present Western world civilisation, and acquiring and using knowledge is one of our traditions. There is also, however, an implicit form of knowledge that can be tacit, factual, procedural … when it comes to implementing a given task. The key problem in frame KM as it is abbreviated, suddenly transpired when we realised that a great deal of our "practical" knowledge could not be formalised or even theorised.

Is this second form of knowledge important for enterprises?

In order to learn how to do things, you must do things. There is therefore a learning period during which we put our knowledge into practice. The employees every day in their enterprises put various procedures and processes

into practice according to the way they have analysed the problem/task to be solved/accomplished and there is nothing explicit or theoretical in this … The risk, of course, is that Society (first the enterprise) may lose this know-how or acumen and the cognitive capital of the company is eroded. An area of research and engineering was subsequently opened, given the value of the knowledge background at risk, and to learn how to best exploit, stabilise, transmit the tacit knowledge that in fact lies at the core of the activities or the value of the organisation as a whole. KM has become an important economic key to proper management of enterprises and their employees.

There is a double risk: companies losing part of their know-how and thus part of their cognitive capital.

What are the possible stumbling blocks when management tries to instil KM practice?

Up to the present, KM has mainly been seen in the context of a "change in format". Knowledge management can be summed up in many instances as a changeover from practice to theory and the reverse. Nevertheless, there remain two problems. Even theory is based on practice, for example, practice in reading, understanding documents, charts … But how are we supposed to make this knowledge last through time? The time factor is indeed crucial. We often are only concerned with contemporary knowledge. Knowledge transmission must cross time. If we look at the example of nuclear power stations we can observe that seventy years down the road, the station will be decommissioned, dismantled and this will require that the demolition engineers can access, read and understand thoughts, written papers that were edited, formalised over half a century in the past. Can the time factor lead to a piece of knowledge becoming incomprehensible to future generations? If "yes" what do we do today to counter the phenomenon? ■

DID YOU KNOW THIS?

The global market for service industries appertaining to knowledge management (KM) was estimated to be 13 billion $US for yr.2005 (source: IDC)

www.idc.fr

#16
December
2011

A new look at Y Generation

Monique DAGNAUD, senior research scientist and sociologist at the CNRS has authored a book about the so-called Y Generation, those who have been recently recruited on the job-market.

So, do tell us, how do you define the Y Generation?

It can be defined according to several criteria. The age ranges from 15 to 30, and is a generation brought up and educated in a morose context, far removed from the utopian visions of the post 68 elders. Society is again questioning its very bases. They have benefited from a modernised education, relatively democratic, with very few hierarchic links. Everything must be discussed, negotiated. This generation started learning when the digital revolution was developing and more recently got involved in the advent of social networks. When they are 20, approximately 90% of the Y Generation are registered on at least one social network. They tend to see the world in a global manner. They do not hide behind an identity. We agree that Internet does not exactly favour "sovereign" independent thinking. These young people are writing the history of their generation in an international mode, with criss-crossed communication lines and simply ignore frontiers

> The enterprises will make the most of the intrinsic qualities and competencies of the Y Generation.

Do you feel that learning and training processes will also change?

The relationships between teachers-students will necessarily evolve, inasmuch as the younger members of the Y Generation refuse hierarchic models. We should remember that the cultural identity of the net is egalitarian, transverse, horizontal. In the Net universe, users are bombarded with an almost infinite flow of information. The name of the

game is serendipity plus curiosity when it comes to exploring non-hierarchic information. These young people surf from one site to another, can be superficial and avoid going in-depth and systematically into a given sector. We shall certainly have to rethink the way we teach, placing the focus first on how to select information, how we prioritise, how we add on the concepts of checking the facts, synthesising what is useful to our purpose … management practice tomorrow will no doubt evolve too. We are in a new psychology, a new relationship to the surrounding world, in a cultural context where everyone shares everything. We now learn to exchange in an affinity-network environment.

Would you go as far as saying that the Y Generation is disinterested in science and technology?

Today our Societies valorise social sciences, communication, self-expression … Young people therefore show a natural inclination for social sciences, humanities and artistic activities. Behind scientific studies, there is the notion of sacrifice, abnegation, .. concepts that are not in phase with the way we live today. In contradistinction, these young people are the prime users of technologies. But we must recognize that you do not need much computer training to surf the Net or need any other scientific competence in particular. The Y Generation is net-acculturated and has benefited enormously from digital communication and associate technologies.

The Y Generation has arrived on the job-market. Might there be an inter-generation clash in our enterprises?

First of all I think that the enterprises will make the most of the intrinsic qualities and competencies of the Y Generation. They represent a truly pluridisciplinary age group, flexible, open to the world who interact quickly and can 'bounce' rapidly from one idea to another. Notwithstanding, I don't think this will lead to an inter generation clash or a cultural confrontation between the written word, passive images and even the digital formats. Some of our elders probably feel they are "dephased" with respect to the new knowledge-intensive world and new ways to live and work in a digital universe. They do try to approach and use new tools, and are intimidated but quite admiring when they see the way young people can converse instantaneously with the outside world. However, this should not be experienced as a disturbing factor and to conclude, I do not see them rejecting or refusing the new digital world.■

DID YOU KNOW THIS?

The Y-Generation is already leaving its place to the Z-Generation, also known as the C-Generation (C standing for Communication, Collaboration, Connectivity and Creativities), viz., those born after 1995

#17
May
2012

A new look at...

Crises
seen as opportunities for innovation

'Interactions' addresses three questions to Bernard STIEGLER, philosopher and Director of the Institute of Research and Innovation (IRI) at the Centre Pompidou exhibition centre.

Are you suggesting that the ongoing crisis could prove to be an opportunity for innovation?

We can observe that it is always during periods of crisis that many important events take place in the fields of knowledge, whether this knowledge be scientific, artistic, political or religious. Our Western societies have been built in the aftermath of successive crises. The very principle of evolution in the western world, ever since the Greeks, has been tied to the capacity of society to generate crises and concomitant opportunities to reinvent the way we live. Notwithstanding, the ongoing crisis is special in that it is truly global and affects the Indian tribes in the Amazonian jungle every bit as much as those who live the heart of Manhattan or in the City of London. The question we are now faced with is how do we turn this crisis into a critical moment? Criticism, according to Kant, relates to the analysis of the limits and not to any form of denunciation. And the limit analyses lead on to new opportunities. In this respect, a good engineer must become a specialist of such limit questions. Today we are experiencing a new trial of the limits, those that bound technology and its applications.

Are we witnessing a crisis of current innovation models?

Society is certainly in the grips of a doubt about the "positive" outcome assigned to all technology. We need to clarify the nature of the crisis. Firstly, there was the model known as creative destruction. The Schumpeterian model based on consumerism, that came to be in the 1920s in the USA was called to question. In other words, the American way of life was challenged. Destruction

which had been held to be virtuous and lead to new creations, is now seen as exclusively destructive, viz. it now carries a negative connotation. In short, we need to innovate in innovation; All existing models have been exhausted. Tomorrow, we shall see the arrival of new innovation models based on progress in social actions. Via Ars Industrialis, an association I created, we are battling for a new industrial society or rather the process that will enable its reinvention. We notably support the idea that innovation firstly is coming to be through the digital revolution, kin much the same way as we se social innovation progressing.

We are likewise convinced that the notion of territory is being rethought inasmuch as it is neither a defensive return to local parameters, nor even limited to national considerations. Our inter-relations are now taking place on a de- or re- territorialised level. In this framework of thought, digital networks are territorial entities that enable extremely dynamic social network policies to be implemented. Again in short, technology enables territorial initiatives to be organised.

We shall see new models arising through innovative social actions

Do you perceive the digital world as both the poison and the remedy?

As Maryanne WOLF showed, our brains are transformed according to the way we practice reading and writing; the new digital world has radically changed our cerebral functioning and this alone could lead us to stop thinking about social sciences as a simple supplement to computer science making inroads in the our lives. As I see it, going "digital" is akin to the age old 'pharmakon', both the poison and the remedy. It is true that the digital world leads to several contributive models, but at the same time we recognise the collateral damage it creates: hyper-consumption, addictive dependence on a computerised personal environment. We must therefore clearly announce the limits before we envision setting up a responsibility innovation model that would correlate to a true social debate. Society today is crawling in a model that sees information flowing solely from the producer to the consumer. Information today is produced by an infinite galaxy of contributors. This encourages us to look closely at contributive research (i.e., the very base of a contributive economy) even if there are contributive models that I reject personally, such as Facebook® which I see as both perverse and dangerous to users insofar as they implement a deformed 'contributivity' . As I see it, UTC Compiegne is the only university institution in France that has the capacity to engage in this sort of research. However, this does imply that the scientific and technological streams at UTC be reoriented to accommodate input from the social sciences, through a development of digital humanities or digital studies… ■

DID YOU KNOW THIS ?

Ars industrialis is an international association, created in 2005 by Bernard STIEGLER with the aim to develop a critical review of "technologies of the mind" and to academically to analyse and if necessary call to question the associate economic constraints.

www.arsindustrialis.org

#18
September
2012

A new look at...

Innovation

Arnaud MONTEBOURG, Minister in charge of Productive Rehabilitation [Redressement productif] in the J-M. AYRAULT Government, gives his views on Innovation to Interactions.

You are one of the main actors behind the Government plans to orient industrial development. What position do you assign to innovation in terms of the competitivity of French enterprises?

Innovation is one of the motors we need to get out of the present crisis, in an industrial odyssey currently implemented by the Ministry for Productive Rehabilitation. Innovation must be seen at the heart of the strategy followed by every company in France since they must innovate if they want to grow and export. Our future growth in France will depend on our capacity to encourage the emergence of break-through, scientific and technological progress, or in marketing and organisational management. Breakthroughs and progress must be accompanied by people meeting people and on diffusion and circulation of ideas. Innovation presupposes that a need in confronted with a novel way of doping things. Developing and funding applied research does not spontaneously lead to creation of commercial success stories: on the contrary, we must create ecosystems that are conducive to the creative process, and these must be framed in long-term projects. France is facing a long-term challenge that will benefit future generations. In the USA, for example, 20% of the economy is due to 'actors' who did not even exist 40 years ago.

I am convinced that we must not follow world trends blindly

LUTC-Compiegne is a major stake-player in two poles of competitivity and is a recognised laureate in several "Invest for the Future" facilities (IEED, Labex, Robotex, IRT…), in particular in the areas of plant chemistry, robotics, or system systems … How do you see these tools and are they, in your view, appropriate levers to induce innovations?

The State programme "Invest for the Future" provides strong incentives for innovation. . The poles of competitivity also allow the actors to strongly accelerate the implementation of innovative actions and growth of enterprises. Our Government intends to reinforce these initiatives, so that they go beyond the level of "R&D project factories" and become "future project factories". Beyond these tools, the State must also rediscover its strategic role and contribute to design of products for tomorrow, to the discovery of market slots in which the country could very well become an economic world leader.

UTC Compiegne has created an innovation centre that aims at implementing a local ecosystem where students, industrialists, lecturers, research scientists, associations … can all meet and exchange. What would you, as a Government Minister, expect from a University of Technologies such as ours, to help stimulate and develop innovative projects even further? Tout First of all, I would offer that you should pursue development of your eco-system, in order to maintain your dynamics and your vitality. I am convinced that we must not follow world trends blindly, but we should prefer to identify those technologies and market slots that can benefit France, those that we can use to develop French activities. If we do this, we have a chance to rehabilitate the country's economy. ■

DID YOU KNOW THIS?

Thirteen projects, under the heading « Mutualised Innovation» Platforms (PFMI), connected directly to the poles of competitivity, were recently selected in the framework of the Government "Invest for the Future" programme.

www.redressement-productif.gouv.fr

A new look at...

An analysis of Europe's innovation strategies

Bernard Cazeneuve, Delegate Minister for European Affairs at the French Foreign Office, was present at the ceremonial laying of the corner stone of UTC's coming Innovation Centre. He offers his vision as to Europe's R&D 'landscape.

By financing 4.7 Meuros out of a total close to 13 Meuros, the EU is one of the main contributors for the UTC Innovation Centre project. What will be the role of research and innovation in the EU strategy?

The EU must place innovation at the heart of its policies in favour of competitivity. The crisis did facing Europe reminds us how importance research and development for economic growth. The confrontation of world economic powers, in coming years, still remain subject to a high level investment in a knowledge-based economy. And this is where Europe can show its real strength. Our capacity to innovate to retain a competitive edge is one of the bases on which a competitive European industrial policy can be established, in order to keep productive activities – the source of employment – within the EU frontiers. At UTC, Europe contributed 40% of the investment needed for the Innovation Centre (via the FEDER – European regional development fund). In the framework of the "Europe 2020" strategy that was finalised in 2010, the objective the EU west itself was to attain 3% GDP for a cumulate level of public and private investments for research and innovation, so as to support appropriately an intelligent, sustainable and inclusive growth

pattern. The 'Europe 2020' strategy will benefit the economic actors, the employees but also the younger generations, their education and training requirements. In order to enable implementation of the reforms needed to attain these objectives, each Member State has subscribed a set of guidelines that ensure monitoring and follow-through for measures achieved in each domain. Moreover, it is very important that for its next budget, the EU will decide to set enough sufficient finance and means for research and development. The mistrust shown by citizens in reference to consequences of trade globalization and the economic crisis on jobs in France (and indeed in Europe in general), the fear that they will jeopardize our social protection systems are clear areas of concern to which "Europe 2020" will try to come up with some solutions. The main idea is to endow the European Union with an industrial policy that favours development of SMEs faced with very strong international competition, to support employment policies, to favour professional mobility and prioritize an overall growth target that also covers social cohesion and the fight against poverty.

The main idea is to endow the European Union with an industrial policy that favours development of SMEs faced with very strong international competition

How could an innovation centre such as UTC's - inasmuch as it strengthens partnerships between universities, engineering schools, enterprises, territorial authorities - contribute to this desired overall European effort?

The EU must strengthen links between education, research and development and innovation and provide support to the universities who play a central role in the offer of scientifically qualified manpower for research and development. And France as a member state played its part in advocating the creation of a European Institute for Technology and Innovation (EIT) for the stated purpose of promoting a joint European approach, reinforcing the synergies between academic teaching, research and innovation with a view to future commercial applications.

UTC's Innovation Centre illustrates perfectly these objectives. It will be a platform for collaboration between cutting edge research in the Region, will conduct an assist collaborative projects that group together research, training and industrial valorisation and also technology transfer functions. In this manner the academics, the industrialists and the entrepreneurs will have a way to facilitate the immediate,

concrete translation of 'sky blue' basic knowledge into various applications areas such as smart transport systems or biomedical technologies and subsequent protocols.

The EC's Framework Programme (FP) called 'Horizon 2020' is a 7 year financial instrument, with 80 billion euros earmarked for Research and Innovation. What will a European Research Area (ERA) look like in year 2020?

The European Union – ever since the Lisbon Treaty was ratified, has its own prerogatives, enabling the Union (via the EC) to take initiatives deemed necessary to build the joint European Research Area (ERA). The financial commitments made this far must be pursued and further analysed, in order to facilitate the implementation of the FOP R&D programme and projects, to improve coordinated efforts on a European scale, to really instil a culture of European innovation. Europe needs a unified research area to attract talented scientists and investments. For this reason, we place special importance on the budget allocated for research and development in the coming European budget. The European Commission (EC) is proposing to allocate a budget of some 80 billion euros over the 7 year FP (2014-2020), i.e., an increase of some 45% with respect to the previous FP budget. It is a programme that calls for scientific excellence, to the highest possible international standards, bringing with it improvements by simplifying access to EU funding, reinforcing the participation of enterprises, notably the SMEs and at the same time increasing the fraction of private financial sources in addition to the EU financial instruments (such as FP). The French Government subscribes fully to the policy in principle of increasing the European budget devoted to research and development (…) ■

DID YOU KNOW THIS?

The EC Framework Programme (FP) for Research and Innovation, code-named Horizon 202 has three assigned objectives: attaining scientific excellence, establishing industrial pre-eminence and meeting societal challenges.

ec.europa.eu/research/horizon2020

#20
February
2013

A new look at...

Innovation

Christian ESTEVE has chaired UTC's Academic Board since 2005. He was Vice-President for the Renault-Nissan Alliance and was party to the start of the Government programme Investments for the Future (Ministry for Higher Education and Research). Before he steps down from the Board Chair, in March 2013, he accepted an interview for this issue of Interactions. Christian ESTEVE gives readers his vision on innovation and how the engineering profession is evolving.

How do you see the engineering profession change?

The main change will encompass a more operational stance. Freshly graduated engineers must be operational as soon as they are recruited, since the companies they join will not have any spare time to pursue training. The graduates will also be part of an accelerating world, with its cortege of rapidly created and equally rapidly destroyed professions and whole business sectors. The business environment is undergoing constant change. Today's engineers must adapt and question themselves constantly. At Renault, our management teams began asking questions whenever any part of the corporate organisation did not change. Globalisation forces us to adapt and neutralises any desire to hide behind a bush, so to speak. In the automobile sector, in Europe, we have run into a major period of disequilibrium, mainly due to basic production over-capacity. But this, in turn, opens up opportunities for new technical solutions and the launching of new models such as the Bluecar by Bolloré that will soon be market ready. In this context, priority must be given to orienting our engineers to engaging in more innovative areas. It is one of the strong features of UTC Compiegne to open paths like this and placing research and innovation at the

very heart of the teaching curricula.

Could innovation be the solution to today's economic doldrums?

Innovation is a prerequisite. But then you still have to turn promising ideas into economic winners. The concept of the entrepreneur is every bit as important as that of the qualified engineer. Our engineering schools (les grandes écoles) should not limit themselves to turning out management level engineers for the major industrial groups or for French Administration. They must also teach young people how to face risk intensive situations and help them assume and accept taking risks. The whole field of teaching entrepreneurship in France is wide open. Tomorrow's wealth will depend largely on today's next generation entrepreneurs. Indeed, we can see UTC's new Innovation Centre as a concrete translation of this guiding spirit at UTC insofar as it will accompany young creators of start-ups. The UTC local innovative eco-system, largely due to the initiative of Prof Alain STORCK, is totally in phase with the logic exposed here. We must do everything we can to encourage innovation and entrepreneurship.

Our engineering schools should teach young people how to face risk intensive situations and help them assume and accept taking risks

How do you explain the typical French fears faced with entrepreneurship?

Well, one answer is that the question of 'enterprises' is nowhere central in school programmes in France. On top of this, there is a paralysing premonition faced with possible business failure. Going bankrupt is seen in France as a terrible, stymieing set-back whereas in other countries going into receivership three times is often seen as the best guarantee that the fourth time round will be a profit-making bonanza! We must also change our attitude to science per se – there is a high degree of a priori distrust. If we fail to do this, France will become a 'living museum'. When I negotiated the buy-out of Dacia by Renault and started the assembly lines that produce the Logan, I realised that intelligence was totally pervasive, everywhere. Rumanians can produce just as well as we can (or even better) because they adopt a more pragmatic vision than we do to automobile assembly. In France, we tend to prefer well marked tracks rather than going down the albeit more risky roads opened by research and innovation.

Has the Government 'Investments for the Future' funding provided new impetus to innovation when creating value?

After I left Renault, I simply thought it was important that in a world where access to knowledge was becoming "open shop", we needed to upgrade innovation and value it as a national priority including it in an overarching process that will hopefully save our children from difficult times ahead. And that

was why I got involved in the Government Investments for the Future programme. This Government funding programme represents a powerful leverage even through I regret when I see how it is slowed down by administrative hurdles that lower the competitivity of the projects designated as worthy of support. Some projects advance well; others get bogged down just because of these admin. brakes. We must be aware that the rest of the world is not going to slow down just for us!

What memories will you cherish after 8 years' office as Chair of the UTC Governing Board?

I personally took great pleasure in co-setting the heading for our University, along with all our research scientists. UTC Compiegne now has an internationally recognised status and is a magnificent tool that the university corps of research scientists must defend and see flourish. ■

DID YOU KNOW THIS ?

The Government programme Investments for the Future (IF) was launched end-2009 with an earmarked 35 billion euros, to bring France to the forefront of innovation in 5 domains: higher education and training, research, industrial sectors and SMEs and sustainable, digital development.

All current calls to tender in the IF Programme are at: http://investissementavenir.gouvernement.fr/content/action-projets/tous-les-appels-%C3%A0-projets

#21
April
2013

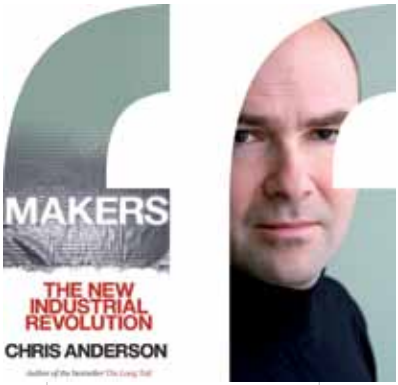
A new look at

The Entrepreneurial Man

Chris Anderson, with unveiled enthusiasm, tells Interactions about a new revolution he has described in his latest book 'Makers', published by Pearson [www.pearson.com/]. Former Head Editor of Wired, Chris serves up some examples of how the Makers are already industrialising the DIY world, thanks mainly to new digital equipment.

Tell us Chris, who are the makers?

A maker is anyone who belongs to the Web generation, who chooses to make a move from a virtual world to a real world situation. Such people have been using digital and network tools to actually 'make' things. Given their familiarity with Open Source software, they know that by sharing a bit they can obtain much more. And in much the same way as Internet has changed the place of business companies in the communications sectors and information processing (ICTs), Makers are now modifying the place of conventional companies and industrial sectors. They continue to sell goods, but the latter are created by communities working together on a common idea, in an open and totally transparent process approach. Internet has itself led to even more competition and innovations in the ICT world and has generated what Anglo-Saxons call "the long tail" [ed. another of C Anderson's books, where



he explains how Internet enables sales of many, many objects, but in small quantities each time, in other words selling less of more »]. Products for sale with small volumes can, when aggregated, represent a market-place share at least equal or even higher than for best-selling items. The Makers phenomenon is opening up a truly revolutionary prospect with an associate

explosion of creativity in goods manufacturing and production.

How can conventional companies adapt to this ongoing revolution?

Good question. Very easily! They can take part in creation of communities round an idea, a product concept and integrate their own contributions into the design and innovation process. The members of a community, for example, can design a new telephone set. The Maker model opens up the 'creative' role to everyone interested and it is the community that decides on the future of a given contribution based on the positive support it gets. Large scale companies can also encourage and enhance a creative eco-system round their core activities, integrating the SMEs into their community. Together they act in a complementary manner, through the large companies' specific knowledge of the market place and the possibilities and the ways in which they can help the SMEs to expand their market positions and networks. Transparency and open-mindedness are key to the game and essential to federation of ideas, energy and the contributions generated within the community.

In economic terms what does the Makers' movement represent?

Hundreds of companies are now using this model ands some have a turnover that reaches millions of dollars. The company I created, 3D Robotics is a case in point. We started from literally nothing and now we are assembling civilian use drones in two factories in Mexico. We employ 64 persons and have a cash flow of 99 million dollars; we also watch over a DIY drone community with some 36 000 members! Most Makers companies simply could not have developed ten years ago, if only because the tools needed for their development did not exist or were not as yet democratised: open source software, user communities, the possibility to purchase components, parts and raw materials in small quantities anywhere in the world, development of e-trade, logistics solutions and more recently the advent of 3D printers which make prototyping and small scale production possible. All of this is conducive, as I explain, not only to seeing entrance barriers come down, but also it facilitates production and even enterprise creation.

> The Makers phenomenon is opening up a truly revolutionary prospect with an associate explosion of creativity in goods manufacturing and production

Do you feel this announces a new era for globalisation?

Indeed, yes. The last few decades have seen manufacturing delocalisation, guided mainly by the cost of labour. Today, these costs are smoothed out, so to speak, and it is the arrival and deployment of robots on the assembly lines that is accelerating the movement. The key factor now in the policy decisions as to where to locate an assembly plant is time. The rule is that we must always work faster and faster, be more and more flexible, and this itself leads in creation of companies even in traditionally high cost countries, but also located close to creation and consumption intensive areas. Take the case of 3D Robotics: the design office is only 10 metres or so from the assembly line!

What role will qualified engineers have in this movement?

The movement depends far more on engineering than on highly qualified Engineers (note the capital "E"). Thanks to progress in e-learning, there is an increasing easy access to design and manufacturing tools and you do not need to possess an engineering diploma to do engineering. In the Makers' companies, the ratio of qualified engineers is definitely far lower than in conventional companies. You no longer need a diploma to begin: all you need is some talent, some ideas and a driving force to succeed, viz., a passion for the job. ■

DID YOU KNOW THIS?

In a global network of local laboratories, the fab labs encourage inventions, enabling private individuals to have access to digital manufacturing tools

Cf. the list of the MIT network fab labs http://fab.cba.mit.edu

The French Fab Labs : http://fablab.fr

#22
June
2013

A new look at...

Sustainable cities

Discussing the concept of "sustainable" cities with Michèle PAPPALARDO is always exciting. She has been, successively, President of the French Agency for the Environment and Energy control (ADEME), French Commissioner General and Interministerial Delegate for Sustainable Development and in the function of Legal Counsellor at the prestigious Cour des Comptes (the National Comptroller's Office). Moreover, she has recently been appointed Federative Overseer for the "Living better in our cities" programme initiated by Ms Nicole BRICQ, Minister for International Trade, with the remit to organise and coordinate the offer made by French companies in favour of sustainable cities.

Is there a specific French approach to the sustainable city?

Yes, indeed, I think there is a particularly French approach to the sustainable city. This consists of applying an integrated vision of various urban component constituents, seen as an eco-system and without a need to segment issues such as transportation, waste management, water or power supplies, air, parks, data circulation, etc. My mission today is to demonstrate how 'French style' sustainable cities would comply with this global vision, seen as becoming more and more attractive round the world. New solutions arise when we adopt the urban ecosystem approach, and these help maximise overall city performance factors. For example, a given building can embody the 'best energy saving design' going, but its global performance rating will still depend on the existence of lean-energy transportation to get there, and get home.

Smart or sustainable cities ... what intelligence lies in the concept of sustainable cities?

Sustainable cities really become 'intelligent' when they incorporate the best available technologies, notably in the field of digitised or numeric data, but with the proviso that they are used not only to meet the needs of the citizens but also to prove lean in energy consumption, efficient in performance and attractive. Performance must not be the target if it runs counter to a certain life style or cultural standards. The risk, obviously, is that the inhabitants will not accept the changes. This in turn implies that we must not simply see technology as a bolt-on process, no matter how advanced these technologies may be, nor should we seek to enforce a single, simplified model to every country. Solutions must be adapted to local contexts, to culture, to history, to the complexity of urban environments; we must seek to understand the city's inhabitants if we wish to offer buildings, areas, complete cities that they will learn to accept and cherish. France's cities have this likeable 'touch' and their inhabitants are quite happy with their surroundings and facilities: our challenge is to valorise the process!

Solutions must be adapted to local contexts, to culture, to history, to the complexity of urban environments

Do you think your mission can come up to the expectations of the actors in this field?

France's major building contractors, our transportation sector, our energy and water utilities are world famous. Our architects, our urban designers and are design offices have extremely high reputations; our SMEs are 'innovation intensive'. More and more of the actors above are beginning t share the vision of a sustainable city – and this is where the concept must be formalised, to be in a better position to sell it to our customers, viz., the elected officers in the cities and towns and the local citizens. For instance, if we were to answer a call to tender for a new tramway route, we could propose the carriages and the rails … and at the same time a positive vision of the consequences in terms of urban improvements. This global vision demands that the industrialists work together to come up with an integrated coherent offer. Each actor here, of course, has specific high level skills, know-how … and at the same time, he can understand what the other partners are offering too. It proves to be a highly stimulating yet complex way to implement the task, but it is now seen with enthusiasm. The actors, overall, are now aware that there is a need to move forward together. Witness the recent collaboration between COSEI (a strategic committee formed by the eco-industrial sector representatives) and AFEP (French association for private entrepreneurial concerns). There are, however, several obstacles to working in a transverse manner, if only some of the stipulations in the Labour Code. If we want to have show-case examples in France for this integrated global approach, then we must have joint offers made in response to calls to tender for rehabilitation of a city precinct, and

this is simply just not possible with current rules and regulations.

Are there some identifiable markets where you could export the concept of sustainable cities?

In order to avoid spreading my efforts too far, I would like to concentrate on 3 to 4 countries, to test the response to our methodology, to adapt the approach in terms of local contexts, and look for the best consortiums possible. My first two priorities are China and Morocco. In China, the thematic of sustainable cities was addressed during the recent presidential state visit by François Hollande to China, notably on the occasion of a renewed contractual agreement to co-operate on a pilot zone called Greater Wuhan (Hubei Province) with its 12 M inhabitants. There are two factors that make the Middle Empire attractive as a possible market outlet: the Chinese are aware of some mistakes they made inn planning some recent cities, built at full sped without any real global vision. Here is a place where we could demonstrate our skills, all the more so that our "urban system" corresponds fairly closely to their dual wish for harmony and balance. In the case of Morocco, certain new sustainable cities have been built there, notably integrating some complex problems in terms of mobility. I would like to see France in a position to associate our national skills to propose efficient urban areas to the Moroccans, thanks to a better integrated approach. The good marker for my mission will be to see the approach 'exported' by the industrialists outside the pilot areas on which I want to start. ■

DID YOU KNOW THIS?

The sustainable city concept is taking shape in France, thanks to the impetus of the Sustainale City Plan and the French Government's Investments for the Future incentive programme. France now has 9 show-case cities (and the list is growing: Greater Bordeaux, Greater Strasbourg, Greater Lyons, Grenobles- Alpes Connurbation, Issy-les-Moulineaux, Lille Connurbation, Marseille Euroméditerranée, Nice Côte d'Azur Connurbation and Nantes Connurbation

www.developpement-durable.gouv.fr/Vitrine-des-villes-durables,31763.html

#23
August
2013

A new look at...

Ongoing digital revolution

Benoît THIEULIN was appointed Chairman of the French National Council for Digital Applications in January 2013. He is also Founder CEO and Director now of the digital agency La Netscouade. He see the digital wave bringing in a new civilisation through what is called "empowerment", the very basis of Internet.

What are the challenges raised by the digital revolution?

Well, I can readily identify two: 1° the need to apprehend the digital world as a whole, and 2° to save our values of liberty and autonomy that were in fact advocated by young computer scientists and by the Founders of Internet. Total digitisation of Society, currently under way, is leading not only to a technological and economic revolution, but also social, cultural and cognitive change. It is akin to inventing printing in the 15th Century and the industrial revolution in the 19th Century – progressing with all the pressure of immediacy. To illustrate this, we recall that while the first Bible was printed in the 18th Century in Georgia, Africa today is using certain digital services that are more sophisticated than in Europe! The digital revolution is not only a sector of activity: it is even bring in a new and deep-reaching change in the

way we think. Moreover, and to avoid excesses, the second challenge consists of preserving the frame of mind of the Founders of Internet, who shared a strong political will: to give back to the citizens the powers of calculation and increasing miniaturisation of computers, with a view to providing for a new and greater autonomy. As of the

1950s, these young computer scientists – themselves often college lecturers who wanted to teach, to share and were opposed to the War in Viet-Nam, to a hierarchized society to centralised data in the hands of a few enterprises or states. The digital revolution would only have meaning is it continued on that direction, that of empowerment of the people.

Can we guarantee this 'empowerment'?

The digital revolution also gives institutions the possibility to better serve citizens, clients but also to better monitor them, control them. We must therefore always be wary that digital innovation is both made available to the institutions but also to improve individual autonomy, failing which we shall induce rejection and revolt. This is the underlying meaning in the Advice Notes issued by the Conseil national du Numérique (French National Council for Digital Applications) when it refers to Internet neutrality and open data. In this respect, computer generated data (monitoring consumption patterns, expenses, health questions, etc.) do bring an added value to the companies: those that use such data must tell us what they are doing with them; and restore them to the clients so that they too can choose in an informed manner. If in the future one of my consumer cards tells me I'm buying more sugar and fat than recommended by WHO, I shall be in a position to regulate my consumption as I see fit. Internet has already made a phenomenal number of things possible: I can publish articles, edit videos, and share music with literally billions of people. But, if as we see we can write more, the recent Snowden affair has shown that a State can monitor the total e-mail flow of the world – which is infinitely more complicated when the exchanges are in paper written format. Digital revolutions will always follow this thin tight-rope wire, between Orwell's Big Brother world and one of total freedom. In the political arena, digital processes have become a too – President Obama was an almost unknown Senator before the US presidential elections; Ségolène Royal was not a front-runner when the Socialists in France held their primary votes in 2007 and the Arab Revolutions made the most of this tool for concertation, synchronised actions and mobilisation of their forces. Just think, Internet today in Africa allows millions to access knowledge that a European student would never have been able to fin d even in the best libraries only 20 years ago! The consequences here will become rapidly immense.

> The University must have them the capability to learn and to analyse, and to enjoy a self-guided access to knowledge.

How do you see the role of the Universities?

Even more than yesterday, our Universities must learn how to think

and provide the means to think freely. Faced with the avalanche of knowledge round us, how are we supposed to discover the information we really want? The first generation of digital natives is here today and we shall see the effects on them of the digital wave: questions of concentration, dropping memorisation capacity, 'destructured' thinking … The University must have them the capability to learn and to analyse, and to enjoy a self-guided access to knowledge.

How are digital techniques changing the face of innovation?

The digital world is modifying the fundamentals of innovation, the latter no longer coming from a few scientists or a laboratories – it has become collaborative and collective. Societies today are totally changed: organisation is less pyramidal, hierarchic and is now more horizontal with a collaborative approach to each project. A digital world also takes you away from uniform innovation models – the case in point was Fordism of course – and now we have a hyper-personalised production=everywhere we look. ■

DID YOU KNOW THIS ?

Today there are 6.4 billion mobile phone subscriptions in the world and the forecasts are for some 9.1 billion by 2018. 50% of all mobiles phones sold in the world in the first semester 2013 are 'smartphones mobiles. Traffic generated by these phones has doubled over the past year.

Source : Ericsson Mobility Report, juin 2013, www.ericsson.com/res/docs/2013/ericsson-mobility-report-june-2013.pdf

#24
October
2013

A new look at...

The Open Data scene

H. Verdier is Director of Etalab, a special French government service reporting to the Prime Minister on questions related to Open Data. He graduated from Ecole Normale Supérieure (ENS), was appointed Director General of Odile Jacob Multimedia and then Director of Innovation at Lagardère Active. He then created 'Futur numérique', a think tank at the Institut des Télécommunications. He was among the Founder members of the competitivity cluster Cap Digital which he chaired from 2008 to 2013. He has authored, inter alia "L'Age de la Multitude. Entreprendre et gouverner après la révolution [The Age of the Masses. Entrepreneurship and governance after the digital revolution] (Ed. A. Colin, Paris).

What are the challenges Etalab faces?

Etalab reports to the French Prime Minister and is an ad hoc but institutionalised team in charge of sharing on line public data. The mission reports via the Secretary General for the modernisation of pubic action. It accompanies the various administration sectors to open, develop and feed the national portal www.data.gouv.fr and to overview re-utilisation and innovation of public data downloaded or transferred.

As you see it, could information delivered by Etalab be a vector for innovation?

There are 3 dimensions to your questions and all 3 are very important. On one hand, public data can of course mask in-depth treasures that only become apparent when innovators use them. The lists of the laureates of the Dataconnexion completion (see insert), for example, show just how creative the innovators can be. On the other hand, and even if we do not speak too much about the trend, the administration in France is

moving towards a real "open innovation" approach. In meeting these innovators the administration gains by examining and taking on board their talents and intuitions and thus progresses. The simple fact that for a large-scale structure, getting organised and being accountable and accept occasional criticism leads to organisation changes that enable the administration as a whole to fully entre the digital modern era.

Who today are the utilizers of the portal data.gouv.fr, and how do you see near future developments?

www.data.gouv.fr serves the administration sectors directly. It is a national portal that enables access to 355 000 pieces of free, public, re-utilisable data, or as lists of state-owned property. The purpose is to be accountable to the public at large as to state operations with a higher level of transparency. We are also aware that here are a lot of start-ups that integrate public data into their products and services. A small community of journalists is being built up round the public data and we have a very active civilian follower community, that is very active, demanding … We are currently working on a revamped site that will, we hope, interest an even larger fraction of the public; our aim is that open data will become part of the Nation's heritage.

What role could a University of technology play in the process and what interest would it find in participating?

In my opinion, the universities, like any other public institutions, should join in the process and have everything to win by doing so. It's a process that leads on to open innovation, open education, etc. I personally think that open data is going to require new skills, in computer science, data sciences, data display, etc., It will also require control of action oriented strategies, such as so-called 'data-driven strategies', 'behavioural politics', etc. A university such as UTC must prepare its students to enter this new era. That alone is a huge challenge... ■

LE SAVIEZ-VOUS ?

France come 3rd ex æquo with Japan in terms of providing basic public statistics in an open data format. Thee rank, given by the British association Open Knowledge Foundation, covers the G8 countries and relies on 10 criteria: public transport time-tables, government budget, public expenditure, election results, national statistics, pollutant emission levels … France obtained a mark of 46/60 compared with 51/60 for UK and 54/60 for the USA.

http://census.okfn.org

#25
December
2013

A new look at...

Innovation

French Prime Minister Jean-Marc Ayrault has appointed Anne Lauvergeon, CEO of Areva from 2001-2011, to chair a new 'Commission on Innovation 2030'; the Commission comprises some 20 personalities – industrialists, scientists and economists. The Commission's Report sets out 7 ambitions for France in this field.

In your view, could these 7 ambitions lead to a real industrial policy in France?

The Commission I had the honour to chair received its remit, April 18, 2013, to select a number of strong ambitions based on major innovations. Our work was complementary to that undertaken by the Nouvelle France Industrielle in the framework of the industrial and innovation policies decided by the Government. The ambitions we chose are all long term: they should stimulate innovative practice in enterprises of all sizes focusing on sustainable priorities so that France can avail of world-class leaders in rapidly growing sectors. These 7 ambitions are opportunities we cannot afford to neglect, all the less so that they correspond to strong societal expectancies. They also represent strong potential markets for which France has solid key features.

What obstacles do you see opposing innovation in these same sectors?

France's international competitors will not sit down while our country moves with determination into these markets. We must be aware of this and stop "zapping" and dispersing our efforts. We must concentrate on a limited number of ambitions and mobilise all we can get (from public and private sectors) to attain our goals. It is as if Society today was simply afraid to innovate. Our Commission recommends some structural reforms in terms of education

to entrepreneurship and innovation per se. Our children must learn in school and lycées that taking risks can be value-adding and rewarding. For this reason, we propose that there should be an innovation principle, seen as complementary to the precautionary principle.

How could we free opportunities in these areas? What is the nature of added value you foresee for 2030?

The Commission selected these 7 ambitions to be in phase with global needs. The sectors concerned will be world-level markets and with very high financial prospects (sea water desalination, value adding to big data processing and storage). The major associate innovations will create wealth and lead to employment opportunities in France. Of course, this creation of wealth will also depend on our capacity to win these markets. For this reason, we must get our act together today in order to ensure that we shall have these economic champions in France in 2030.

Movements between public and private domains in terms of development are often necessary, to see the innovations complying with a real need and to position themselves appropriately in Society.

A series of innovation-intensive competitions was launched on Dec.2, 2013, with a budget outlay of some 300 Meuros. What are the selection criteria and what do you expect in the way of applications.

The world-level competitions in innovation that we are launching also have the objective to attract talented persons to France and to support them in order to 'create' the world leaders in these 7 pre-defined fields tomorrow. The competitions are open to all. Any enterprise, small or large, French or foreign … who wishes to develop a project and create employment in France can be an applicant. Each competition has 3 phases. First phase began December 2, 2013 to pre-select some 100 innovation-intensive projects. Each project pre-selected will be financed by the French state an amount of 200 00 € to cover R&D expenditure. We shall begin the second phase in a year's time. A more stringent selection process will identify some 30 "most innovative" projects and will be accompanied in their development. Public finance could amount up to 2 Meuros per project and we wish to co-finance these development phases in partnerships with the private sector. A third phase will bring the number of projects down to 10 or so, to help the beneficiaries expand with an input of public finance up to 20 Meuros/project. Final selection will depend on the coherency of the project with a chosen ambition, its innovative features (technology based or not), its technical and/or scientific feasibility, its economic potential and above all other considerations the capacity of the applicants (project leaders and

managers) to be really successful in the market place. At the Commission, we want to select men and women truly capable of taking their innovation projects forward!

What will be the role of research and of the universities to implement these ambitions?

The calls for projects are addressed to single enterprises or to ad hoc consortiums, whether in association or not with actors in the public research sector. The project leaders are free to choose the means they see best fitted to efficiently developing their innovations. The Commission chose 7 ambitions in areas where France has intrinsic advantages, notably in public and private sector high level research. Movements between public and private domains in terms of development are often necessary, to see the innovations complying with a real need and to position themselves appropriately in Society. But it is up to the enterprises to decide: they are the candidates and it will be among their innovations that the selections are made.■

DID YOU KNOW THIS ?

The seven ambitions set out by the 'Innovation Commission 2030' are energy storage, recycling of raw materials, valorisation of rich marine resources, of plant proteins and plant chemistry, personalised medical care, big data and the so-called 'silver' economy.

#26
February
2014

A new look at...

Higher Education in Brazil

Denis Pietton, HE the Ambassador of France to Brazil, accepted to answer a short series of questions about Higher Education in Brazil. Before taking up his appointment in Brasília, in 2013, Denis Pietton was Ambassador in South Africa and in the Lebanon, and also Director of the Privy Council of Laurent Fabius (France's Foreign Affairs Minister).

What are the main characteristics of Higher Education in Brazil, often described as in-egalitarian?

Well what I could call a lack of egalitarianism in the HE system here, stems firstly from the cut-off effect between secondary schooling and higher education. On one hand, the best Brazilian lycées register children from the country's middle class. Public primary and secondary schools - free but with pedagogical results of lower repute – take in the less well-of socially, i.e., the lower classes. In higher education, the reverse is true. The best education establishments, 62 federal universities and the major State universities ((São Paulo) are free, but the places are totally taken by the best students from the private sector, while the students from the public secondary sector have to go private establishments and pay their way (fees). There is also a high number of confessional higher education establishments. Moreover, there is no

national scheme to help students find lodgings, even if the larger universities have built campus accommodation. For some 15 years now, Brazil has been trying to facilitate access to higher education with bursaries and tutorships to encourage band enhance ethic, cultural and social diversity, including some measures called "positive discrimination" to aid populations with African immigrant ancestry. Another

democratic move is under way – traditionally, admission to a university was subject to succeeding in an entrance examination, specific to each establishment, called the 'Vestibular'. Now the federal government is encouraging recognition of results of a higher secondary leaving certificate called the "Enem' that accounted for 7M candidates in 2013.

Are the engineering training courses in phase with market needs?

In terms of quality and the palette of themes offered, the answer is "yes". However, the Brazilian HE system only trains about 1/3 of the needed engineers, if we refer to the job market. The positive result, if I may say, is that the graduates are quickly absorbed by the recruiters and have attractive salaries to show. It should be noted that few engineers receive a science-based training so there are proportionately less research scientists who focus on applied scientific research or innovation.

> We must be prepared at home to welcome Brazilian students who come with demands that differ from what we normally offer in our establishments.

What are the main recruiting sectors for young engineers?

All employment sectors in Brazil need engineers. Priorities here lie in the petroleum product industries and, in more general terms, energy, civil engineering and public works, transportation, ICTs and industry at large.

How do you judge France's position in terms of university exchange programmes with Brazil?

France occupies an excellent position, thanks to its offer of solid programmes and the level of commitment of the actors, notably the institutions, with support from the Government in Brazil and through the ministries. We can be proud of having the oldest university training co-operation with Brazil, going back to the19th century. In 2014, for example, the country's largest university, at São Paulo (USP), will be celebrating its 80th birthday, with the participation of France contributing as it has to the growth of USP ever since it was created thanks to the famous "French University missions" (Deffontaines, Levi-Strauss, Braudel, Bastide, etc.). Closer to modern times, Brazil implemented its first university level co-operation programme, in 1978, Capes-Cofecub that led to awards of over 2 000 PhDs in 800 research programmes – in other words, we are celebrating the 35th anniversary of this co-operation in November 2014. And even closer again, the Brafitec joint engineering courses – UTC being one of the mainstay partners sending students every year to Brazil to complete their training with the aid

of the French ministries for Foreign Affairs and for HE and Research. This two-way mobility is a signal as to the quality of the training courses and a good omen for future economic and academic partnerships. This year, France will welcome over 1 000 bursary engineers and will send some 300 students to Brazil, which makes the Brafitec programme the most important mobility programme between the two countries. France is Brazil's first research and mobility partner in Europe. In both university co-operation and technology matters, we are always looking to improve the system continuously, with new arrangements, new programmes that are innovation-intensive (Cifre doctoral degrees) or for better advanced training for future Brazilian mangers through appropriate Master's degrees.

If we consider the development policies that Brazil has been launching in the past few year – do you perceive opportunities for France?

France has some excellent cards to play here, if we can associate the high level of our engineering training to the parallel potential for our economic presence in Brazil's home markets. But first and foremost, we must continue to do what we have been doing well, viz., ventures like Capes-Cofecub or Brafitec: we must build on the co-operation we have in research projects and student training exchanges. Moreover, France's technology-intensive establishments can offer a training framework close to the business world and the bridges that exist must be valorized as best as you can; this is something the Brazilians welcome a lot as it largely increases the level of employability of its graduates. Lastly, backing this work by efforts in research agreements is a guarantee that state-of-the-art science and innovation will be present and possible. Likewise, we must be prepared at home to welcome Brazilian students who come on an individual basis, with demands that differ from what we normally offer in our establishments. In short, we must be prepared to adapt the offer to the demand! ■

DID YOU KNOW THIS ?

Brazil's Higher Education system has nearly 6 million matriculated students, 4.5M of whom are in private establishments and 1.5M in the public sector (universities...). Many of these students hold jobs in parallel or follow courses once they have left the initial training programmes. Distant Learning in Brazil is followed by 2.5M students.

#27
April
2014

A new look at...

International student mobility

Hélène Conway-Mouret, minister-delegate for Foreign Affairs, in charge of French abroad, was invited to inaugurate a joint course between UTC and the Lycée Jean d'Alembert in Chile. As she sees it, student mobility is primordial for France's reputation in the world and for the performance expectations for French enterprises in the international scene. An interview with Interactions.

For the potential employers, expatriation is an advantage inasmuch as it identified those people willing to take risks and adapt themselves.

For 14 years, you directed the foreign language department at the Dublin Institute of Technology: what does international student mobility represent for you?

Our younger generations are the most mobile category of our populations. It was for that reason that I decided to organize a Round Table on: "International youth mobility: opportunity or necessity" during the Encounters I also organized April 3 on the thematic "The French abroad, an advantage for the country". It is obvious that young people who go abroad to complete/pursue their studies or enjoy their first professional experience have fully integrate the notion of globalization. They well know that in an international, competitive market-place, it is important for them to have acquired certain personal, human qualities, such as simply being able to master foreign languages, learn to be flexible and open-minded, in a word to be able to adapt to situations as they arise. These 'add-ons' can be acquired abroad, as and when they meet other cultures and values. For the potential employers, expatriation is an advantage inasmuch as it identified those people willing to take risks and adapt themselves.

Why do you think these young people could be an advantage for France?

Even those who go abroad and settle there – or for sentimental reasons – remain closely attached to France. I have never yet met an "expat." who left France because he/she deeply disliked the country; they are our young ambassadors and they contribute to our international image in terms of culture, economy, language, etc., and their

higher education skills. When our national companies answer call to tender in foreign countries, the fact that there are French 'expats' there can play in favour of the contract. The Encounters I organized offered an opportunity to make an unusual poll with the question - What do the French think of Expats? to straighten the records. I met literally thousands in two years; I listened to their testimonies, their expectations. This is a little known community as seen from France and they are stigmatized with negative images: when the word expat comes up, the clichés are 'brain-drain', 'tax evasion' … but in fact the plane truth is quite different: These expat French represents a chance for our national economy. They embody France's qualities, at a time when every effort possible must be mad to create jobs and attract investors in and to France.

What can be the role of the Universities in this context?

Each year we welcome 288 000 foreign students in France but we send less than 60 000 French students abroad. We still have a lot to do to increase their presence on the international scene. All our Commercial Colleges propose a year abroad in their curricula, but it is an opportunity that is reserved for an elite group. The Erasmus Plus EC programme should help here, given that the programme in France will be endowed with 4.6 billion € between 2014 and 2020 to enhance international student mobility for scientific, technological and professional streams. The role of the Universities, as I see it, is to set up double degree structures, recognized in France and in the partner countries, to facilitate mobility both ways. I was in Brazil recently where we launched a grant programme called "Sciences sans Frontières" that plan to attract and register 10 000 students exchanges/yr.

Why do you feel that the inauguration of a joint course agreement between UTC and the Lycée Jean d'Alembert in Chile is important?

The President and his colleagues at UTC believe in student mobility and encourage these actions. It is a great opportunity for UYTC students who can benefit from a positive, open-minded international policy thrust that accompanies the undergraduates as they explore new horizons. Apart from the traditionally attractive Anglo-Saxon destinations, the emerging countries are becoming increasingly interesting. These countries need skills that they simply do not have locally. The French are generally most welcome, given the high level of their studies in France. Chile is one of these countries. In a word, developing and promoting international student mobility is a development for France's reputation abroad. ■

DID YOU KNOW THIS ?

Young French people who go abroad to enrich their experience return to France in 80% of the cases observed. Government has now deployed a mobility strategy for Europe and in the world at large, the aim of which is to increase and diversify the beneficiaries, so that more young people from lower social classes can access this privilege, notably through an rise of over 40% in the budget allocated to the European mobility programme, 2014-2020, "Erasmus Plus" and a democratization of the system, singling out and focusing on technological and professional training streams.

#28
June
2014

A new look at...

Innovation and the Climate

Jean Jouzel, a climatologist by profession, is Vice-President of the IPCC (Inter-Government Panel on Climate Change) has recently published 3 sections of its 5th Report on climate change and global warming and their consequences. He will preside over the ceremony of the PhD awards of Sorbonne Universities, June 14, 2014.

What are the key conclusions of the latest IPCC Report?

Global warming is now definitive and without precedent. This is the main conclusion of the most recent reports of the working parties* that comprise the IPCC. Compared with previous editions, the figures contained in these versions show that the greenhouse gas emissions have continued to grow despite the economic crisis, that they have never been as high as they are today and that the global warming is due to increased GHG effects. Since the 1960s, the Erath's mean temperature has risen by 2/3 degree and we shall reach a CO2 level of 400 ppm next year (cf. insert below Did you know this). The increased greenhouse effect is due (for 80%) to combustion of fossil fuels. IPCC proposes several scenarios: if the emission are maximum in the near future, the mean global temperature will rise between 4 to 5° by year 2100, with sizeable impacts on biodiversity, health, agricultural crops, etc., and the oceans' surfaces will rise by 1m. This scenario should be avoided at all costs because it will be very difficult to adapt to the situation. We must try to contain the global warming to +2°C by 2100 and this requires that we divide by a factor 3 our GHG emissions

To make renewable energy sources more efficient and competitive, we must innovate in energy storage techniques and capacity. Renewables could assure 50% of our energy requirements by year 2050

by 2050, so as to retain a degree of autonomy in terms of our adaptation. It is technically possible, provided that we move rapidly to using carbon-free energies.

What innovations would be needed to combat global warming?

What we need are solutions in terms of energy efficiency: dividing by a factor 4 the French emissions of CO2, as written in law, implies that we divide by a factor 2 our national energy consumption, without sacrificing the national economy. To make renewable energy sources more efficient and competitive, we must innovate in energy storage techniques and capacity. Renewables could assure 50% of our energy requirements by year 2050. The nuclear sector –b with its well-documents limits – is also mentioned by the IPCC, as are capture and storage of carbon (CCS). Current research in this area must move rapidly from laboratory to industrial phases, and this is not among the policy options we see today. As a Member of the Governing Board of the European Institute of Technology (EIT) for climate questions 'Climate KIOK), I am especially interested by the innovation aspects. The EU devotes 70 Meuros to innovative projects in the form of call to project proposals for Climate KIK 2014. The objective of this European initiative is to favour innovation and creation of associate enterprises. Projects relate to cities, agriculture and emission of GHGs. For example, one of the difficulties in our field is to measure precisely emission levels in urban areas or for a given Region. Climate KIK supports research

projects that addresses such a challenge.

What role can science play?

I am among those who defend basic science – which is falling apart in France. Today if you wish to ask for a grant for a climate related innovation, it will be far simpler than asking for a budget to obtain polar ice glacier borehole sample. It is becoming difficult to financially launch a basic research project – but I see this as a policy mistake. It is this basic work that underpins the innovation in a decade from now. We must find a balance even if I clearly understand the accusations that in France we are very slow to move research from the lab to enterprise.

You were Godfather to the PhD awards ceremony at Sorbonne Universités (Cluster) – how did you feel?

In France, for as long as the Ph is not really recognized in enterprises and to a lesser extent even in public service, then Universities will remain less attractive than the graduates from France's

engineering schools. This ceremony contributes to PhD notoriety. One of the work ahead for the Universities, if they wish to be successful is to make the PhD attractive, as is the case today in Germany and elsewhere. I am a French docteur ès sciences myself, obtaining my PhD at the age of 21 on the topic of how hail stones are formed and at the time, getting job offers was no problem; today it is a much more difficult afire for our young PhDs. ■

** IPCC Group 1 looks at scientific data in regard to climate change; Group 2 analyzes "the consequences, areas of vulnerability and adaptation"; Group 3 prospects for mitigation measures.*

DID YOU KNOW THIS ?

In May 2013 - for the first time since Man appeared on Earth - the threshold value of 400 ppm (parts per million) of CO2 in the atmosphere was exceeded, compared with the value at the end of the 19th Century when it did not exceed 300 ppm. It is this concentration that increases the greenhouse effect and leads to global warming.

A new look at...

The investments for the future

Louis Schweitzer, Commissioner General for Investment and Chairman of the 'Initiative France' Plan, shares his thoughts and convictions about these two structures, refusing as he does the idea of an inevitable decline of France. He will preside over the UTC Graduation ceremony, November 22, 2014.

What is the relationship, if any, between your two functions?

A shared desire to achieve growth and produce innovation. "Initiative France" is a body federating the efforts of 230 associations for the purpose of aiding start-up creators and business purchasers - 2/3 of whom are currently unemployed – to successfully move their corporate projects forward. We have contributed to the creation of 16 500 enterprises in 2013, with 40 000 employees on the payrolls. Their survival rate (with a horizon set at 3 years) is 87%, compared with the national average of 60%. These good results can be explained by the "intelligence" imbedded in the Initiative France approach, whose role it is to accompany and support the start-up creators, offering an interest free guaranteed loan somewhere between 2 000 and 25 000 euros. These loans are invested in the company's assets enabling the management to obtain bank

loans representing amounts some 7 to 8 times more. The procedure is open to all – this therefore includes applicants who are (under)graduates from UTC. In the future, Initiative France will focus more on growth of recently created companies, to compensate for the marked reticence of the banks. We shall likewise inaugurate several regional service points to help innovative companies and we wish

to bolster our action to companies deemed "remarkable" in terms of their growth potentiality. There is a similar mission assigned to the Government's "Investments for the Future" programme (PIA). The latter carries more 'punch', with a distribution fund close to 47 billion euros, but also with the aim to financially support projects considered as remarkable in terms of intrinsic excellence and innovative potential?

What orientations would you like introduce to the Investments for the Future Programme?

The extraordinarily remarkable idea underpinning the PIAs is based on the analysis made by two former French Prime Ministers, Alain Juppé and Michel Rocard. The Commissariat General for investments works well and as get ready to distribute 15 billion euros (second wave PIAs) over the next two years, I personally would stick to the line viz., respecting continuity in projects as set down by Messrs Juppé and Rocard, who themselves agreed to pursue their co-chairmanship of the PIA monitoring committee. PIA calls to proposals allow high-quality project applicants to make themselves known. Their files are examined by experts capable of judging their relative merits and potential to innovate. The amounts distributed run between several hundreds of thousands of euros to several Meuros. We can of course improve the procedure making it more expedient and loosening a bit the criteria for selection. Current delay is around one year and we shall endeavour to reduce this to 6 months to analyse the application files and set up the contract agreements with the laureates of the selection process. For both research laboratories and enterprises, the simple hope to benefit from a PIA allocation does not necessarily implies a positive decision. The good example to be followed here is the World Innovation Competition, which selected 100 laureates after 2 waves of proposal and selection. Some of them were still undergraduates! Three months after their files were registered, they received 200 000€ subsidy. Those who present an attractive level of potential growth obtain 2 Meuros more and for the most promising among the selected, 20 Meuros. The grantees told me they had never before enjoyed such an efficient system, including those who are familiar with the American ecosystem. I hope to be able to launch a 3rd wave of calls to proposals.

We can improve the procedure making it more expedient and loosening a bit the criteria

Could there be a special role for the universities of technology in the PIAs?

Inasmuch as the universities of technology (and UTC in particular) serve as excellent go-betweens between basic research and industrial applications, they can be seen as natural partners for the Commissariat General. From the outset, UTC was a novel concept and the institution has lost none of its vitality after 40 years, witness the success several

of its projects have met in our calls for projects. The Institute for Energy Transition (ITE), aka PIVERT, is the perfect example of success here and reveals the extraordinary potential of UTC.

What advice would you give graduates arriving on the job market? More specifically, those who want to set up a company?

I am convinced that team quality in any enterprise is more important than its basic sector activities. Some people like to work in a competitive atmosphere, others in a less stressful ambiance. The graduates should choose a company where they feel they can fit in well. For those who want to set up their own companies, France offers a technically rapid and not so expensive environment. However, if they wish to avoid having to go into receivership after 3 years (1/3 of new companies know this fate), the entrepreneurs must have a good project, whether it be technological or not. Innovation lies more in the concepts than in the technologies and is not restricted to just several sectors of activity. Wood and timber - wrongly considered to be traditional raw materials, for example - are sadly lacking in innovations. Networking is also a key to success, to build up a solid financial structure before suddenly finding yourselves alone in the more difficult times. ■

DID YOU KNOW THIS ?

47 billion euros were ear-marked for the French Government's Investments for the Future Programmes (PIAs). A first round of 35 billion euros was voted by Parliament in 2010 and a second round of allocations worth 12 billion euros was likewise approved in 2013.

#30
October
2014

A new look at...

American University White Paper

Prof. Vincent Price was appointed Provost at U.Penn in 2009 and supervises the teaching, learning, research, academic affairs and student life on all U Penn campuses. He is also Professor of Political Science specialist in public opinion questions, on the social influence and political communication. Today he is investigating the growing role of digital technologies in building knowledge base and public opinion. He is a member of a group of 14 heads of American HE establishments with the mission to assess new education models in the «Presidential innovation Lab».

What is the aim of the Presidential Innovation Lab?

The Lab was established by the American Council on Education – with generous support from the Bill and Melinda Gates Foundation – to examine the future of higher education in the next decade, especially as it may be informed by new technologies. It emerged from the recognition that a confluence of economic, social, and technological factors have reshaped student populations, altered employment markets, and given rise to a variety of new educational practices alongside more traditional forms of instruction. Some recent developments – for instance, the advent of MOOCs (massive online open courses) – have the potential to disrupt conventional educational practice, while also increasing access to higher education to historically underserved populations around the world.

As Provost of the University of Pennsylvania, what is your contribution to the Lab?

I have participated along with thirteen other leaders of colleges and universities to examine collaboratively the potential challenges and opportunities posed by new forms of learning and publish white papers based on our research and recommendations. We represent a range of institutions – from research-intensive universities to community colleges, including both public and private institutions -- to focus on such areas as: the potential of new forms of education to engage new kinds of students, especially those from historically underserved populations; the new financial and educational models that might emerge from the rise of new educational methods and technologies; and the use of such technologies to rethink teaching and learning on our own campuses.

It suggests that changes in our students over the next decade will be driven by overlapping changes across demographics, technologies, and learning styles.

What is your analysis of the way pedagogy is changing?

The opportunities are quite exciting, and they rest not only in the potential to increase access to higher education outside our campuses, but also in using new media and new ways of thinking about education to transform teaching and learning within the traditional university. This potential is especially strong at the moment in helping us to find more engaging and interactive forms of learning that go beyond the traditional classroom lecture, and to gather the data needed to test the value and effectiveness of these new methods. For example, here at Penn, we are engaged in an initiative in what we call Structured, Active, In-class Learning (SAIL). These courses "flip the classroom" by engaging students in hands-on activities in class, often in groups, with the professor acting more as a coach than a conventional lecturer. Traditional lecture material can then occur outside class time, whether online or through other media, so that SAIL courses can be taught by faculty who are actively engaged in online open learning and also by those who are not. We received a grant from the Association of American Universities to pilot-test these methods in STEM (science, technology, engineering, and math) classes, and we are also now offering resources and grants to faculty members who would like to develop them for humanities classes.

Who is the student of the future? How will universities have to innovate to adapt in the next decade?

This is in fact the topic of one of the Lab's first white papers. It suggests that changes in our students over the next decade will be driven by overlapping changes across demographics, technologies, and learning styles. Over this period, forecasts suggest that higher education will draw a higher number of non-White students, especially from

Asian and Hispanic populations, as well as older students, lower-income students, and more first-generation students. The widespread and growing adoption of smart phones and social media, even in poor countries, will continue to alter assumptions about the availability of knowledge. In particular, these new technologies accustom our new students to being highly interconnected and highly participatory, active, and creative. As such new forms of learning proliferate, the university has a perhaps paradoxical set of twin responsibilities. On the one hand, we will need to incorporate and learn from what is best about these new forms; while on the other, we must continue to be a steward of forms of knowledge that are older, more deliberative, more contemplative and complex. ■

DID YOU KNOW THIS ?

The 'Presidential innovation lab' has published 4 White Papers on the business model for US higher education, the role of changing universities, future student profiles and major changes in higher education.

http://www.acenet.edu/news-room/Pages/Presidential-Innovation-Papers.aspx

UTC and U.Penn set up their first joint double degree in 1975

#31
December
2014

A new look at...

The digital tsunami at school

Emmanuel Davidenkoff, Chief Editor of the magazine L'Etudiant and specialist of teaching issues, earlier this year published "Le tsunami numérique" [The Digital Tsunami] at Editions Stock, Paris.

In 20 years' time, will parents still drive their children to school?

Yes! We shall always drive our children or grandchildren to school, for both practical and political reasons. School will always be a place where children learn to live in Society, which is something that goes beyond learning simple multiplication tables and grammatical rules. But the school model – viz., the school we dream about or imagine – will no longer be summarized as "4 walls, 1 teacher and 27 pupils – 50 minutes class". Other operational modes will prevail, but it would be a brave person who seeks to predict them today, given the speed at which ongoing changes are occurring and where they are taking our schools.

What educational paths might we envision?

On-line learning, video supports, group work based on MOOCs and globally speaking digital supports will be far more extensively used than today. But we are still only in the laboratory phase and we ignore for the moment how these new learning modes will fit together to better serve teaching efforts. We already know that digital approaches are more efficient than humans when it comes to learning repetitive sequences, such as are needed to learn multiplication tables. Well thought out, game-driven applications facilitate memorization, which is contrary to what

we knew with time-worn exercises with children repeating reams of figures and tables by rote. Digital approaches act like taste enhancers (exhausters). Up front teaching from a dais will always exist, but its omnipresence will be compensated by active methods, learning will be action-oriented and activities will be collaborative, in groups …

Will the contents of teaching also change; if so, how?

Schools must be enabled to train young people capable of understanding and building tomorrow's world. To do so, a general cultural background must be instilled, including a technological input – algorithmic logic, encoding, etc. but must extend to all forms of general knowledge: law, geography, biology … new questions must be addressed such as the future destiny of digital data, the legal framework of car or home sharing, legal status for living organisms … all of this represents a major challenge for schools: they will be required to integrate new curriculum contents and assimilate ways to teach, preparing future adults for a digital world in which the frontiers between scientific specialties become blurred. Future enterprises will need bio-computer sciences, data journalists … the game will change name and the lines will shift, towards a new equilibrium. For example, when pupils in a same group are doing a 'TPE' (personal, monitored studies) after collective work, they get the same mark – which is crazy! This sort of logic is sketching out a world which we may or may not desire: one with competition, or one with collaboration?

France can turn out philosophers, engineers, managers capable of thinking seriously about the far-reaching changes in civilizations. We must now move on, to a new era of encyclopaedic knowledge breaking down the remaining barriers between specialties.

What are the strengths and weaknesses of the French system faced with this digital tsunami?

Recently we visited a high school at the heart of California's Silicon Valley, on a level comparable with a good French lycée. The way we organize teaching facilitates social life and collaboration and allows time for sports, culture and the role of parents in the educational school circuit. In contradistinction, the French system trains young people with skills that are rarely equalled elsewhere in the world. French engineers are highly sought after recruits in the Silicon Valley. The idea that prevails in France that we have a bad educational system comes from our failure to fulfil the mission to reduce inequalities. If, in contradistinction, the target is to train elite managers, engineers, scientists for the international market places, then we have been very successful. France can turn out

philosophers, engineers, managers capable of thinking seriously about the far-reaching changes in civilizations that we observe. We must now move on to a new era of encyclopaedic knowledge and know-how, breaking down the remaining barriers between specialties.

How may a digital world upset the economic model of education?

There are a great number of enterprises working today on the design of an offer that will combine face-to-face teaching and digital teaching, especially in the USA where universities fees are so expensive. Will one of these companies come up with a formula that will have as big an impact on schools as Amazon or e-Bay have had on book stores and small ads? In France, the private sector only represents 15% of the higher education institutions: could this signal the dawn of a new market slot? The future of such a market will also depend on the value attributed to digital tools and methods by the universities themselves and the labour market. If UTC approves the credits obtained by 'attending' MOOCs (which is only the tip of the digital iceberg) and if future employers valorise diplomas awarded under these conditions, the MOOC phenomenon will really take off. Otherwise, there will be a total flop. It will be for the labour markets to decide. ■

DID YOU KNOW THIS ?

there are 3 036 MOOCs in the world today
25% are European
53% of these deal with science and technology

Penn University
63% of registered MOOC followers are over 30 years of age
9% are students

www.openeducationeuropa.eu

#32
Feb/March
2015

A new look at...

The innovation process

Jérôme Siméon, Executive Director General for Application Services at Capgemini, heads a team of 8 000 whose job it is to integrate computer science systems, no matter the sector of application. "This has been a growth activity in the Capgemini group for years now, and this constantly calls for innovation that benefits our clients", says Mr Simeon by way for an introduction.

Capgemini proposes fast-track workshops for its clients to implement novel applications

How important is innovation in your sector?

Along with industrialization, innovation is the main differentiating element in the computer science market place. We can observe a market-place with a concentration of actors, a necessity if you want to preserve a critical mass to be able to contribute with these elements. Computer science systems and their applications – over just a few years – have progressed from artisan to industrial conceptions. In just 20 years, they have revolutionized work and production methods, which are now being increasingly outsourced. But what is even more significant is the revolution that is taking place today. New technologies are constantly coming on line and are transforming our daily lives. In our business jargon, we call that the SMACT effect: S for Social Media, M for Mobility, A for Analytics and Big Data, C for Cloud and T for Things, viz., the object-world Internet. Our job is to help the entrepreneurial world to use these new technologies opportunely, in the right place and to meet their objectives of contributing the company's value.

How do you accompany your clients in this process?

Innovation per se, from a strictly technological point of view has limited value. It must be integrated to the corporate

processes to attain a targeted value. It must be incorporated into a larger model combining industrial capacity, co-operation among the teams and the company's eco-system. Without co-operation, innovation is a mirage with no future, which neither improves the competitiveness of the company nor its market position. To enhance the integration process, Capgemini places its trust in its human resources, insisting on continued training, on taking brave even risky decisions and on a renewal of teams to integrate dynamic young graduates who offer fresh visions, novel ideas, new behavioural attitudes … to assist the change from ideas to projects, Capgemini has instilled specific work methodologies and equipment, e.g., the Lab'Innovation.

Capgemini has set up 7 Lab'Innovation units in France. What do they exactly?

In France, yes, we have 7 Lab'Innovations units in Suresnes, Nantes, Rennes, Lille, Lyon, Grenobles and Toulouse. Altogether, there are some30 such Capgemini units round the world. They are networked and enable collaborative work with both clients and partners. These units are demo-intensive places, conducive to creative ideas, to prototyping and serve to accompany the digital transformation of the clients. It provides an excellent opportunity for young people to express their potential all the more so that in these Lab'Innovation units they can work with start-ups who often bring a "disruptive" point of view.

What is your strategy, in terms of innovation?

I always demand three things from my teams: 1° proof of ROI (return on investment) while preserving their all-important right to make mistake; 2° a specification for the use value of any innovation; 3° speed. On this latter point, speed is essential if you want to remain efficient in a digital world and this implies having and using efficient tools and methodology in our offices.

What advice would you offer to students in innovation?

Anything and everything is possible! Discard all your mental barriers – envisage progress just like the horizon, it is always on the move and elusive. ■

DID YOU KNOW THIS ?

69% of those companies who process Big Data have noted an added value to their innovative activities

Algeria (90%), Turkey (90%), South Korea (84%), Brazil (83%), China (83%) and Mexico (80%) represent the most enthusiastic countries when it comes to believing that Big Data processing will improve their innovation activities.

General Electric – the 2014 Global Innovation Barometer General Electric www.ge.com/stories/innovation-barometer

#33
May
2015

A new look at...

What exactly does innovation mean?

Professor Jean-Michel Besnier lectured on philosophy for 15 years at UTC when he was Director of the Social Sciences Department, up to year 2000. With his a doctorate in political sciences and an 'agrégation' in philosophy, he now holds the Chair of Philosophy of communications technologies at the University of Paris-Sorbonne. Here is the analysis he offers on the meaning of innovation.

What does innovation tell us about our relationship to the world?

In order to imagine we can innovate, we must first see the world as being incomplete. This was a postulate I defended and developed in a working party (WP) in 2009 at the French ministry in charge of scientific research, when we are preparing a framework for a National Research Strategic Plan (SNRI). My line of thought, which was included in the SNRI programme general introduction made a distinction between two ways to view the world. The first vision that we have inherited from the early philosophers assigns a predestined place for everything in our universe and that technologies express our wisdom to discover and preserve them the places.

> Any innovations are worth pursuing – the resulting value will depend on the capacity of the innovation to coincide with societal dynamics. The large degree of 'luck' involved explains why we applaud 'serendipity'

The second vision, the modern view considers that Man lives in an open world and that technologies must explore every possible option. Innovation, in this light, becomes a promethean expression; Men in their demiurge ambitions wants to finish the world and to reveal what does not yet exist, using technologies. These two visions coexistent in our minds today. The wisdom of the Ancient philosophers led to instilling ethics in seeking the appropriate 'place' for all things. Today we realize and accept that this 'place' does not in fact exist and moreover we need to discuss and debate matters to orient as best we can our coexistence as human beings.

How do you analyse today's desire to innovate whatever the cost?

The French national 5-year Plans, the Planning Commissariat General itself, have been repealed and disbanded, notably because they conveyed a top-down authoritarian (totalitarian) connotation. Today, innovation is presented as a definitive horizon to the prosperity of our individualistic societies, slipping from a stance inspired by Lamarck to a more Darwinian position. Lamarck's 'adaptationism' could have justified a programing logic: scientists seek to answer the needs expressed by society and supplies a specification that covers the needs. Darwinian evolutionism takes another path: it is not society that drives innovation but the arbitrary activities of Men themselves and their inborn genius. Our techno-scientists continue to produce innovations that do not necessarily correspond to expressed needs and we find them in the market place, regardless of whether there are potential buyers or not and the selection operates. From this point of view, any and all innovations are worth pursuing – the resulting value will depend on the capacity of the innovation to coincide with societal dynamics. The large degree of 'luck' involved explains why we applaud 'serendipity' why we ignore the question of the finality of the innovating to accept profit-making in marketing and agronomy. This hold true in every sphere, including the health sector. We want to live a thousand years whatever the price to pay and we welcome anything and everything that follows this path, while running the parallel risk of downgrading our values and the symbolic dimension that are characteristic of a truly human existence.

How would you explain the tough opposition we see to breakthrough innovations (nanotechnologies, GMOs, synthesis biology, etc.)?

All of these innovations open up eminently striking perspectives from a metaphysical point of view. At a nanometric level, for instance, living matter is hardly different from inert matter, nor are humans so different from animal, vegetable or mineral realms. The distinction living/inert which proved so structuring for the way we think no longer has any meaning and his allows scientist and engineers to manipulate the matters. This position is defended by theoreticians of synthesis biology, who have no qualms at all in announcing their aim to create a form of life without DNA, or the production of hybrid creatures, a mix of biology and applied computer sciences! Our digital and digitized culture has now led us to see ourselves as akin to flames circulating in cyberspace (as Pierre Lévy was wont to say), and comforts the euphoria that greets innovations that will in fact be the ruin of substantiated identities.

What would you consider, if it were to exist, as an ideal innovation?

By definition, innovations cannot be foreseen. But by way of contrast, we can consider and ask ourselves what would be the conditions necessary and sufficient to see what we want emerge. From this stand-point, politicians should be prepared to accept that the civilian world take part increasingly in research programming, so that the innovations that science produces cab be perceived as beneficial in a shared vision of the world. Steps have been taken in this direction at the Inserm (health research), or at Inria (computer sciences, control and automation) where I was a member of their ethics committee for 8 years. These research establishments are exemplary in this sense. The members assert their refusal to lose control as some techno-prophets suggest; Hanah Arendt indeed saw a time approaching when engineers would define themselves as people who seek to be surprised by what they are capable of doing instead of setting their efforts and time to carry through chosen, debated subjects. It nonetheless remains true that these ethics committees that would aspire to moralize technology most often are opposed to the logic underpinning political and economic deciders. At the time of the public debate on nanotechnologies, I was posted at the ministry in charge of Research where I defend the thesis that there could not be a moratorium here, inasmuch as international competition would not allow us to waste any time on wondering if civilian society felt that this new nanoscience (down at the 10^{-9} scale) was justified … the sole value that was to be admitted by policy-makers whether there would (or would not) be an added value in the applications, and this occasionally ran counter to what the public at large was feeling. ■

DID YOU KNOW THIS ?

80% of the persons polled say that innovation has improved their life-style in the past decade

79% of the persons polled think that creative or breakthrough attitudes lead to innovations

Only 32% think that the structure in which they are working currently contributes efficiently to innovation

GE Global Innovation Barometer 2014

#34
August
2015

A new look at...

The digital economy

For Ms Axelle Lemaire, Junior Minister for The Digital Economy, reporting to the Minister of the Economy, Industry and Digital Questions, "When we talk about the digital world and its actors, we often refer to young digital-intensive start-ups who produce hardware, software and associate services. Beyond being a purely technical domain, the digital economy often introduces new business models and totally changes the way we design, produce and distributes goods and services".

We are moving into a new form of economy in which innovation cycles are shorter, rely on user and/or developer communities and occasionally 'dis-intermediate' or shunt completely certain sectors of the classic economy.

The answer here is that the digital economy is much more than a "sector" and that is why I prefer to talk about a 'digitized economy'. The various economic segments are no longer separate entities and they evolve along with the overall transformation of traditional economics. Smart textiles, connected objects, MOOCs, Web and smart phone applications in medicine, law, finance … there are only a very few sectors now that have not experienced innovative changes because of the digital world.

To what degree does the advent of a digital economy represent a major turning point for the French economy and is higher education particularly of interest here?

A digitized economy is an important turning point inasmuch as we must now live and think with new referrals and attributions: connected trade and business outlets, dematerialized public services, new jobs ... Our objective is to accompany start-ups as they grow and develop, on their way to becoming large(r) business concerns. The prime

aim is to include Society as a whole in the trend, without making any differences of age, social backgrounds or territorial differences: the future will be made of everyone's participation and contributions! Obviously, innovation goes hand in hand with education and research. Our main challenge for the coming years is to be in a position to train more and more people and to do this even better, to improve the competitive position of France in the global economy context: digitization has become an incredible lever to reach out to new audiences, via MOOCs but also provides a way to experiment new forms of apprenticeship, notably in project mode. Our Higher Education must also be prepared to train for new professions, to integrate new pedagogical approaches, to create bridges between the Universities and research areas – like the efforts you are deploying at the Sorbonne Universities Cluster (COMUE), to bring science and technology closer together.

The various economic segments are no longer separate entities and they evolve along with the overall transformation of traditional economics.

Does France benefit from any advantages here and what is our position in Europe?

Yes, France has advantages, over and above the clichés: our universities are among the best in the world and attract some of very brilliant foreign students; investors and foreign enterprises continue to locate their business here – France ranks 4th for the amount of direct foreign investments; our infrastructures are reliable and efficient as can be observed with our very high data rate fixed networks (2nd in the world). the French count among the most connected nations- 83% use and practice Internet, 400 000 are matriculated for MOOC courses. Along with Germany, France is a driving force for European digital strategies. We are moving towards a connected European 'single market' which will be a powerful tool for the expansion of our enterprises and, of course, useful for the consolidation of the European Union as the world's first economy power.

What actions in favour of digitization do you see as most strategic and innovative in coming years? And how should we reassure people who are scared of digitization?

This is indeed the objective of the French Government's digital plans, published in June. Thera are 4 priority thrusts: freedom to innovate, equality of rights, fraternity – digital access for all and an exemplary transition of the State services. These axes will comprise the spine of the digital economy draft bill I shall be presenting to Parliament before the end of the year. In order to innovate freely we must make best use of 'French Tech', the promotion of open innovation, of open access (free access to research papers and publications), free user licenses. It is a way to guarantee and reinforce citizens' rights as to the

safety of their personal data and/or on line payments; it also reinforces the confidence and transparency through having a truly neutral net context. And the State authorities must be exemplary. Innovating also means developing dematerialized public services, combining ease of access, and efficiency: the « digital hospital, on line registration of complaints, social service simulations, mesaides.fr. … there are lots of projects in the offing. We should also be looking at the opportunity to do things more easily with a digital tool, such as being easier ways to collect data and this is the ambition of our programme "One stop question portal" or simplified access to administrative services as can already be seen at "France Connect". In a word, we have a splendid chance here to be "more open" in a digitized world.■

DID YOU KNOW THIS ?

110 billion €
The digital fraction of the French GDP, more than in financial service and agriculture.

1,5 M €
Value of jobs dependent on the digital economy in France

+40 %
Potential market turnover gains for a company that proves successful in its digital transformation.

www.mckinsey.fr
www.axellelemaire.eu

#35
October
2015

A new look at...

Innovation in French SMEs

Christophe Lecante, founder CEO of TKM (TecKnowMetrix), an SME with 20 salaried personnel, specialists in entrepreneurial technological foresight operations, likewise Vice-President of the Richelieu Committee – an independent think tank association designed to encourage and enhance innovation in SMEs and President of the national IHEST (Advanced Institute for Scientific and Technological Studies). Readers will discover below his views on the strengths and weaker points of the French Innovation Eco-system, based on his personal experience and track-record as an entrepreneur.

Innovation in SMEs is often misconstrued with the start-up phenomena, but maybe it is the tree that hides the forest

In the early years 2000, the installation of business nurseries was something very favourable to the creation of star-ups that arise through public research. TKM is an excellent example – "incubated" in Grenobles as of 2003. Since that date, the initiative have been multiplied, including in the private sectors. We can rejoice that the topic of SME start-ups has become interesting again. But the other innovative SMEs, who represent a large fraction of the French industrial and commercial scene, generating hundreds of thousands of jobs, should not be forgotten. When we talk about innovation, we must combine former economic and industrial schemes with new and highly mobile forms of corporate structures. We can, for example, draw our inspirations from the US Silicon Valley model but, at the same time, we must stay lucid as to different entrepreneurial cultures and in the way we perceive business failures and also the far faster access to the market-place and to financial support. France's

> It is essential that we find the ways and means needed to mobilise financial support to reach acceleration conditions and not just stay focused on the start-up phases

scientific and technological excellence and also the high quality of our Higher Education institutions (universities, engineering and commercial schools) are undisputed advantages. The size of the French market-place and the possible financial circuits to accelerate corporate creation do not allow us to produce French Googles or Apples, or simply ISEs in sufficient quantities. And because we cannot physically attain the necessary scale in France, the best of our start-ups are often taken over by foreign capital investors when they want to move to a business acceleration phases. It is essential that we find the ways and means needed to mobilise financial support to reach acceleration conditions and not just stay focused on the start-up phases. We must encourage growth of companies through a more rapid access to the market-place, incorporating a dose of economic patriotism via the major French groups and public purchasers (something along the lines of the famous US Small Business Act) and create the regulatory and cultural conditions for a real European economic area (EEA).

Is innovation really something 'accessible for SMEs, via the R&D efforts deployed by the major Groups?

Most modern innovations come out of our SMEs. This calls for research in advanced areas that are too numerous and varies to be controlled in a single company structure. Even in very advanced sectors such as pharmaceuticals, there are increasing numbers and differing technologies running from chemistry to biology. Breakthrough innovations often occur

at the frontiers between technologies. SME's explore these frontier-lands and therefore play a decisive role alongside the major groups. Moreover, they are both ''mobile' and 'agile', as we say. This implies that the enterprises and their personnel display varying cultures and skills. In a context like this, scientific prospective watchtower functions play a capital role to detect and follow through product and process evolutions? That us our key mission at TKM.

What paths should we explore to encourage, enhance and "free" innovation?

Well, to retain the "agile" » factor, I just mentioned, we must build up the links and connections between public research and these innovative SMEs. The relationships must be considered carefully, with a view to securing benefits to both sides. Research scientists discover places outside their lab environments to conduct experimentation and test protocols for their hypotheses and the enterprises consequently can look for higher competitivity through these innovations

in the market place. Nonetheless, there is still a lot of ground to be covered between these two worlds; The French Government "Investments for the Future" incentive programme (PIA) allowed us to have new "areas to meet" such as the SATTs (accelerated technology transfer companies) and the IRTs (institutes for technological research) but they also contribute to 'complexifying' a situation that even before was not that simple! Every move that allows you to simplify and fluidify life for the SMEs, or helps to identify relevant research laboratories or seeks and makes for rapid ways to set up collaborative agreements should indeed be encouraged. With these new formulae that are consequent to the PIA, we still have to identify "good practice", good models and these really do exist … and then we must persuade the parties to adopt these proven, viable models. A 'small' country like France simply cannot afford the luxury of having 15 different models to propose to companies depending on the territory where they are (or wish to be) located. In a word - France, when viewed on a world-scale has the size of a Post-it®, albeit ingenious … but small nonetheless! ■

*An intermediate-sized enterprise (*ISE) is a company with between 250 and 4 999 employees.*

DID YOU KNOW THIS?

69% think that collaborative projects encourage and enhance innovation

63% do not see themselves as candidates to the EU Horizon 2020 Programme

Source – Poll by Global Approach Consulting and the Richelieu Committee, questioning innovative SMEs

#36
December
2015

A new look at...

Multi-physical behaviour

Professor Klaus-Jürgen Bathe, one of the key pioneers in computational mechanics has recently been awarded the distinction of a *honoris causa* doctorate by UTC. Professor Bathe was born in 1943 he was recruited by the Department of Mechanical Engineering at MIT (Cambridge USA) in 1975. His combined teaching, research and industrial development work have made him a world-class, reputed specialist in the field of computational mechanics. He offers 'Interactions' readers his views on the specialty and its future prospects.

Professor Bathe, can you define computational mechanics in simple terms?

The techniques of computational mechanics consist of forming a computer based model for the purpose of modelling a real, physical, process. The latter can be an existing reality or be incorporated in a prediction of something physical that may occur. To illustrate this, a model of the Golden Gate Bridge at San Francisco was established to evaluate the bridge's resistance to various levels and forms of earthquake and to identify several configurations where the bridge would be seriously damaged or even destroyed. Computational mechanics can be seen as the art of predicting the future with a computer.

Professor Klaus-Jürgen Bathe has already been awarded 7 honoris causa doctoral distinctions (over and above that conferred by UTC): notably from the universities of technology of Bratislava (Slovakia), Rzeszow (Poland), Madrid (Spain), from the University of Buenos Aires (Argentina) and the University of Cape Town (South Africa).

What are your best success stories in the field?

We developed and finalized novel computation mechanical processes commonly found and used today in both industrial and academic sectors.

It was this work that led to the creation of a company, ADINA R&D, in 1986, where our development work covers a wide range of modelling

tools used in solid-state and structural physics, in electromagnetic applications, in thermo-mechanical engineering and in fluid mechanics. Handing down this knowledge has also been a non-negligible part of my activities, with numerous university courses and several books edited in German, Russian, Japanese, in Chinese and even in Iranian Farsi languages.

In engineering sciences, what are the challenges attached to computational mechanics?

Today's challenges focus on the infinitely small and, at the time, on large-scale phenomena. For example, modelling objects such as cells, DNA strings or other nanometric structures brings with it new problems. These structures and phenomena implies using approaches that simultaneously require various physics specialties such as fluid and gas mechanics, electromagnetism, or physico-chemical behavioural reactions. Large-scale phenomena such a major bridge construction work or understanding climates and weather conditions present the same order of difficulties, because of their multi-physical, multi-scale characteristic features. ■

DID YOU KNOW THIS ?

The honoris causa doctorate is an honorific degree conferred by a University. It is a distinction for a personality who has significantly contributed to a given area or specialty.

The previous honoris causa degree awarded by UTC went to emeritus Professor Klaus Mosbach at the Department of Fundamental Biochemistry at the University of Lund (Sweden), in April 2013.

A new look at...

Innovation

Emmanuel Macron, French Government Minister for the Economy, Industry and the National Digital Plan.

Mr Minister – you have just come back from the 2016 edition of the CES at Las Vegas where France was ranked top for the start-up attendee exhibitors. How do you explain ongoing wave of pessimism in France and what positive actions could boost to support innovative ventures and opportunities?

You are right. There is wide gap between, on one hand, the energy deployed and the successes of the French, their strong will in day-to-day living, to get up and out and progress, to innovate, to create business and enterprise, and in contrast the ambient, deep-reaching, deeply rooted pessimism when the French look at their future together. I am personally convinced that to stop the erosion, so to speak, we must engage in a double revolution, the first of which is 'cultural'. We have been shackled for far too long now in a logic that stigmatizes those that fail – we have clear evidence of this in our schools and throughout the academic cursus – with the reverse effect of a sense of wrongdoing for those that succeed. You can surely agree with me that this leaves a very small margin for manoeuvre! The spotlights must be focused on the success stories of our economy to demonstrate to all that France is a country that has the courage to take on challenges and to innovate. That is how we can put an end to "French-bashing". The second revolution is tied to innovation. We still imagine that innovation is 'top-down', i.e., initiated by the major companies and/or by State incentives. We simply are not looking in the right direction! Today innovation is 'bottom-up' with multiple initiatives. It should be in the responsibilities of public authorities to accompany and support those who innovate and to remove the stumbling blocks they meet, enabling their creativity to flourish. Let me take two examples, we have made provisions that the CIR (research investment tax

> Innovation is the field where research scientists draft, frame and think through a project and the enterprises implement them.

relief) become a solid institution for companies that innovate and I also reorganized the French industrial policy perspectives round 9 solutions that help the business sectors (especially the SMEs) to reorganize themselves in terms of investments, corporate transformation, innovation and to be in the forefront for future markets.

UTC saw three of its start-ups present at the CES2016. As you know UTC is a combined "grande école" and University. Do you think it could play the role of a nursery structure for a future French economy? If so, what actions, in your view, would this involve?

Universities and the French 'Grande Ecoles' are already to the forefront in innovation and entrepreneurship. 37% young people today say they intend to set up (or take over) a business concern; what was an exception 10-15 years ago has now become commonplace. So to accelerate the movement, we created the statute of student-entrepreneur, precisely so that students can set up a business during, or just after completing their HE training courses without losing their social security protection as it stands. We also created students poles for innovation technology transfer and entrepreneurship acronym PERPETIE in French). UTC also allows its students to access the Picardie Regional, PEPITE. I want to encourage you to go knock on their door (if you have not as yet already done so). Lastly, innovation is the field where research scientists draft, frame and think through a project and the enterprises implement them. That is why we must strengthen even more the links between academic teaching establishments and

the business work-places. We can already see synergies like this elsewhere in the world, and they represent the future of business innovation. All the skills, all the ingredients are out there to ensure that French innovation reaches and stay at the cutting edge of world successes here. We just need to bring the actors closer together!

Could Europe itself be a positive lever to improve national competitivity levels?

Europe today is not only a lever to improve corporate competitivity in general, but I believe that it presents the best chance we have in French to see our economy become one of the most competitive in the world. The EU Single Market zone provides a great opportunity for our companies. There are close on 500 M consumers and this allows them to undertake large scale development possible. This huge market also gives access to new technologies and to a reservoir of talents that are not found elsewhere round the world. Our companies are currently in direct competition with American or Chinese

giants, for example, in the digital- driven sectors so we must be in a position to make best use of all the resources we have in Europe. That is why the bolstering of the single market and the improvement of European competitivity have been taken as two of the main priorities for the formation of the European Council of which I am a member. Allow me to recall a quote from Jacques Delors that sums up fairly well the way I see the EU Market, quote "Competition that stimulates business, cooperation that strengthens bonds and solidarity that unites us". It is indeed because our enterprises are facing a much larger market area that they become more competitive and at the same time, inasmuch as they are European, they have common challenges to face. I should add for the UTC students that Europe is a tremendous opportunity for young French people to head elsewhere and complete their studies or even set up businesses outside France. To allow them to travel even more simply, I proposed that the Erasmus programme be generalized, open to all young people in Europe as of the age of 18, to spend at least a semester in another European member state, to study to complete an apprenticeship. I am convinced that gaining training outside France is a positive way to see young French people to return with new ideas and to innovate here, in France. ■

#38
April
2016

A new look at...

Innovation

By Thierry Mandon, French Government Minister in charge of Higher Education and Research, answers questions from Interactions. The report co-commissioned by the Ministry of the Economy and the Minister for Higher Education and Research from Prof. Suzanne Berger (MIT)* underlines the need to rethink the relationships between public research laboratories and the private sector companies. Two pivotal points emerge in this area. In the first instance, intellectual property rights do not constitute a financial objective, but are a means to improve and enhance collaboration between research and enterprise. Secondly, the less intermediate go-between there are between the research scientist and the entrepreneur the more fluid innovation will be. In this framework, UTC can be considered a mature actor and has perfectly understood the new deal and circumstances.

You defend the idea that Higher Education and Research must play an essential role in getting Frances economy back on a positive, upwards curve. Could you comment for our reader, lease the main conclusions and good practice noted in the Berger Report on Innovation, a Report you co-commissioned from an MIT professor, an expert in economics?

Public research must not be seen as a gold vein to be explored but an actor with whom collaboration can and should be sought

The main conclusion is that in the midterm public research establishment and private enterprise must move closer together, so that they can identify new areas to explore jointly and also to learn to cooperate better. This is not only the case for technological and applied research. Enterprises must also go out of their way to seek potential innovations in basic research. These explorations will offer a vision of what the market-place will be like in 5

to 0 years to come. One important and central consideration to bear in mind is the evolution of intellectual property rights. Far from adopting the vison of "treasures within" our universities, we adopt the position that intellectual property rights represents a means to bring research and enterprise closer together, in an exchange process that is win-win, i.e., a mutually advantageous situation. Public research must not just be seen as a gold vein to be explored but an actor with whom collaboration can and should be sought.

UTC is a leading-edge University of technology still pioneering in many sectors, combining the status of engineering school and university and constantly in the interface with the entrepreneurial world; can this combination be conducive to co-construction of an innovation-intensive ecosystem.

Universities of technology, and in particular UTC, were able to integrate their environments ever since they were established and are now involved in what we call today innovation ecosystems. Through its close relation with enterprise, and its international networks (indeed as a pioneer in the case of links with China), UTC has become a key actor in innovation projects and practice.

What developments would you expect from UTC to enhance its role as a university of technology on a par with other similar European of American institutions?

Constantly listen to your students (who are the real wealth of any university), constantly be in touch with your partner companies, emphasizing the international partnerships, to be more innovative in the campus pedagogy … in short, UTC has no choice but to be ambitious – 'noblesse oblige!' ■

DID YOU KNOW THIS ?

*The Berger Report, forwarded to the Ministry, January 20, 2016 on «Good practice in Innovation in the framework of industrial ecosystems»

www.enseignementsup-recherche.gouv.fr/cid99081/rapport-de-suzanne-berger-sur-les-dispositifs-de-soutien-a-l-innovation-en-france.html

#39
May
2016

A new question …

Could entomophagy be a solution for 2050?

Romain Fessard is a rather unusual character. For over ten years now, he has been advocating insects as a foodstuff in France - and this is not just a hobby for him. He breeds, prepares and distributes insect-based foodstuffs and was one of the pioneers in France making a case In favour of fly-food, or more scientifically, 'entomophagy'. At the TEDxUTCompiègne, which is a programme of public lectures designed to «Inspire Creative approaches, to encourage Change and to enhance Innovation», Romain Fessard explained to the audience how consuming insects could change the deal in terms ion sustainable development is concerned. His subject was perfect for the January 2016 TEDx session, the core theme of which was «The 2050 Horizon, Innovation and Society».

Do Westerners really balk at the thought of eating insects?

Well, yes, there is a degree of reticence in the West when it comes to eating insects. Nevertheless, when I experiment today with insects specially prepared as «aperitifs», some 80% of the guests accept to taste them. Entomologist Marcel Dicke asserts that on average a French person consumes 500 g insects per year, through contaminated fruit, or vegetables collected industrially. Insects inadvertently get trapped in jam pots, fruit juice 'bricks' or vegetable soup packs … Food intake systems may change too. The Romans loved a most unusual dish, the pink flamingo and especially appreciated the bird's tongue, served at 'business luncheons'. Today, potatoes constitute the second most consumed foodstuff in the world, just after wheat. And yet there were suspicions, in the 17th Century, that wheat could transmit diseases such as the plague and were only fed to pigs and prisoners. Tomatoes for a long time were

only considered as decoration in North Europe before reaching our tables in the mid-18th Century. Our sense of taste constantly evolves and quite probably eating insects will become commonplace in the West by 2050.

How do you see insect eating change in the world and in Europe in particular?

Today, about one third of the planet eats insects on a daily basis. The number of insect species consumed in the world is close to 1 900 and the figure is constantly on the rise. Most of these insects are collected directly outside, in fields, on trees … it is a food source that goes back to our origins, Men eating insects probably before they began hunting and eating meat. The only regions in the world where this is not an accepted feature are Europe and North America; in Europe, only the Netherlands and Norway can made the change and you will find restaurants in these two countries who have had insects on their menus for 10-20-30 years now. In France the turnover in this foods sector probably does not exceed 1.5 Meuros. I personally learned to enjoy insects over ten years back and I quickly moved to set up the web-site http://www.insectescomestibles.fr/ so that other in France could discover the products in Europe and particularly in France. I was the first trader to produce insects in France. In the beginning I only sold whole insects and today I have several species on sale. We breed comestibles insects but we also prepare them. The range runs from insect-aperitifs, to insect flour and other products such as protein bars. The breeding and raising of part of our stock take place in Pattaya, Thailand, because the temperatures there are more favourable to insect growth. This sort of breeding/raising is very widespread in Thailand and offers traditional products that are environment-compliant, such as 100% natural Thai crickets. Concerning transformed products such as protein bars or insect pates, we are gradually developing a real level of expertise in France, a sort of techno-food with a mix of innovation and nature compliancy.

> Insects also produce 10 to 100 times less GHG (greenhouse gases) than a herd of cows. In terms of space needed, they also represent a huge gain. One tonne of insects can be produced in 3 months on only 30 m²

Can insects be considered as contributing to sustainable development schemes?

Insects may one day represent the mainstay, staple diet of human food! Already, they can be seen as delicious with a variety of tastes! For example, flour maggots taste like hazelnuts, crickets resemble potatoes. Remember that insects are very rich in protein contents, some species even more than beef. There are regions in the world where pregnant women or ill persons are encouraged to privilege insect intakes. By

2050, it will be necessary to feed some 10 billion inhabitants on Earth. With today's diets, with increase meat on our plates, it simply will not be possible in the long run to keep up. It takes 10kg of vegetables to «make» 1 kg of meat, 5 kg of poultry or 9 kg of insects. The latter therefore display a favourable ratio here, not forgetting that they can be fed on organic wastes, such as discarded food, manure or garden composts. Insects also produce 10 to 100 times less GHG (greenhouse gases) than a herd of cows. In terms of space needed, they also represent a huge gain. One tonne of insects can be produced in 3 months on only 30 m². Such a surface would allow you to raise one cow, yielding 400 kg over 4 to 5 years to rear it to maturity. Insect DNA is quite distinct from human DNA, so the questions of transmission to humans of various illnesses and disorders is avoided - whereas these problems do exist when we consume produce from poultry and other mammals. And for all those people who worry about animal wellbeing and who are not happy seeing animals going to the slaughterhouse, entomophagy will be a way to limit one complicity with various forms of cruelty to animals.

Can insect products be developed easily ?

Production can be carried out in an artisan way and does not call for any special skills. It needs few means and reproduction and breeding only require small surfaces, in the countrysides or in urban areas, in every country round the world. Insects need heat to develop so it will be less costly in terms of energy in warmer climates, but is not impossible to envisage insect farming in large European cities or in the USA. Setting up an insect farm only needs small surfaces and few means, so local production can be enhanced. Today the prospects seem promising. Countries like Belgium, Italy or the United Kingdom are interested in the field and insects are already beginning to come onto the shelves of the supermarkets. ■

DID YOU KNOW THIS ?

TEDx is a public lecture scheme which enables schools, colleges, enterprises or local authorities … to reproduce the concept of then TED lectures created to disseminate ideas «worth disseminating». The licensed TEDx programme is organised directly by the students? UTC will be organising its 3rd Conference venue in 2017.

A new look at...

a God-Mother for UTCs 2016 graduate ceremony

The new God-Mother for UTCs 2016 graduate ceremony, Anouchah Sanei is currently Global VP Science and Technology for Campbell Soup at the company's Home Office in Camden, New Jersey, USA. She has a track record that is passionate, full of challenges and pragmatism and it proves that over and above her excellent engineering and technical skills, our PhD alumnus also has both the capacity to adapt to a pervasive and global 'present' and also to innovate in a changing world.

Anouchah has been selected to be God-Mother of the 2016 graduates [ceremony scheduled Nov.19] and will be an opportunity for her to say "thank you" to UTC, her university and to instil to the awardees keen open mind, her rigorous thinking and adaptability, not forgetting a tremendous sense of pragmatism which has enabled her to cover three continents and work with three agro-food world leaders. Now as VP for Global Science & Technology with Campbell Soup base at Camden, New Jersey, Anouchah Sanei is not only an internationally flavoured Godmother, but also a professionally accomplished woman. "None of this was written on the wall when I launched on my early career-path", she explains, insisting on the importance of learning "to develop a personal strategy to live for and, why not, inventing a new

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path. Nothing today will be easy for this up and coming generation, concerned as it is with ethical issues and long term commitments but at the same time fascinated by the immediacy of 'now'", she offers. "It is important to motivate them in their own fields and offer them a strategic, global and modern vision from the first day they are hired, and at the same time to realize the must cultivate their capacity to seize on opportunities as and when they occur". Anouchah Sanei is highly critical of what she perceives today as a trend to recede into a national, ever-anxious, survival mode.

Since she is not exactly sure what being a UTC Godmother implies, Anouchah Sanei suggested that she could help share her eXperience by moderating debating groups, or even on-line chat sessions to fully play her role as mentor to the new graduates. "UTC, from the very beginning, tried to welcome 'the best' candidates, in terms of their school track-records, but also recruited some original profiles where their sense of developing and fostering relationships and their innate entrepreneurial spirit enriched each and every class", she underlines insisting on this highly important and specific feature which is the trade mark of the university. "When you enter a world level recruiting arena, you must be able to recognize that competition is not only important per se but it is also quality-intensive and companies tend to be careful in the way they look at criteria, between those of a European university and any other HE establishment on another continent; certainly a well-educated brain is necessary, but above all, you need a well-connected, adaptable brain that will be the only cutting edge advantage you can offer to ensure due recognition in the world for our scholastic predispositions in France", she underlines, to conclude. ■

DID YOU KNOW THIS ?

Christophe Lecante, Julien Bahain, Pierre Gattaz and Louis Schweitzer... had all accepted to be Godfathers of earlier classes.

The talks delivered by the Godfathers to the year's graduates are on : http://webtv.utc.fr/ under the heading 'Notre quotidien/Parrains... '