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A CAMPUS FOR TECHNOLOGICAL INNOVATION : FROM MINATEC TO GIANT

by

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Overview

In 2000, the CEA, which was already a pioneer in applied research with its LETI laboratory in Grenoble dedicated to electronics and information technologies, created MINATEC, a micro and nanotechnologies innovation campus which brings together large numbers of people and encourages transfers between fundamental research and industry. In 2006, this concept was expanded and a so-called 'French M.I.T.', named GIANT (Grenoble Innovation for Advanced New Technologies), was created specialising in research covering six major fields : new energy technologies, biotechnologies, microtechnologies, nanotechnologies, nanoscience, and technology management. In order to attract competent people, GIANT's priority is not only the quality of the scientific environment it provides, but also the landscaping and development of the two hundred and fifty hectare site it occupies in Grenoble's Scientific Polygon park. GIANT is both an important project in terms of training, science, and technology, and also for lessons to be learned in city planning.

TALK : Jean-Charles Guibert

Having studied polymers at the University of Montpellier and in Strasbourg, I started working for LETI (Laboratoire d'électronique des technologies de l'information), the CEA's applied research centre. After I had completed my studies as an engineer and a researcher and been made head of the laboratory, I was then put in charge of LETI's microelectronic programme. At the end of the 1990s, Jean Therme, the CEA's director for technological research, asked me to take part in the launch of a project to create an innovation centre for micro and nanotechnologies to be called MINATEC. In 2004, at the end of MINATEC's project phase, I was appointed CEA development director for France. I am also an administrator of our subsidiary, CEA Investissement, which allows us to buy shares in our start-ups for between 100,000 Euros and several hundred thousand Euros per project. I am on the supervisory board of the Emertec venture capital fund which was co-founded by the CEA. Finally, I have been a director at MINATEC since 2008.

A little history

One of the characteristics of innovation in Grenoble is that it is firmly established in the industrial history of the region. The development of hydroelectric power led to the development of electrical engineering, and then electronics and microelectronics, notably with the establishment of companies such as Merlin Gerin (bought by Schneider in 1992) and Capgemini, which is an off-shoot of the Sogeti company which was created in Grenoble in 1967 to develop software.

In 1956, Louis Néel, recipient of the Nobel Prize for physics, founded the Centre d'études nucléaires de Grenoble (CENG). In 1957, the CENG created an electronics department to work on the Mélusine neutron reactor. In 1967, this department became the LETI at the instigation of Michel Cordelle. From the outset, this laboratory worked according to a very simple principle : 'to each Euro of public finance is added one Euro of private finance'.

The culture which we are developing today at MINATEC and which consists of collaborations between education, research and industry, was started in Grenoble by 'the three Louis' : Louis Néel (for research) ; Louis Weil, founder of the Grenoble national Polytechnique Institute (INP) (for teaching and also for research) ; and Louis Merlin (for industry).

In 1972, at the instigation of Jacques Lacour, director of LETI, an initial spin-off, the EFCIS, was created which later became STMicroelectronics, and which today employs 6,000 people in the region. The LETI is also behind Soitec (1,000 jobs) and about thirty other start-ups which together represent 2,500 jobs in sectors as varied as infra-red imaging, organic screens and medical imaging.

The CEA has a second laboratory in Grenoble, the LITEN (Laboratoire d'innovation pour les technologies des énergies nouvelles et les nanomatériaux : Laboratory of Innovation for New Energy Technologies and Nanomaterials). With a total of more than 4,000 employees, the CEA in Grenoble counts for more than all the other research institutes in the Rhône-Alpes region put together. These include the IFP (Institut français du pétrole), the INRETS (Institut national de recherche sur les transports et leur sécurité), the Cemagref (Centre de recherche pour l'ingénierie de l'agriculture et de l'environnement), the Onera (Office national d'études et recherches aérospatiales), and the CSTB (Centre scientifique et technique du bâtiment). The number of people employed at the CEA in Grenoble is also greater than any of these institutes on the national scale.

The very important development of the Grenoble industrial base, notably at the instigation of the CEA, can be explained by an unusual fact which always surprises our foreign visitors. Two of the past three mayors of Grenoble were engineers at the CEA. They are Hubert

Dubedout, who was key in the choice of Grenoble as the site of the Winter Olympics, and, more recently, Michel Destot, a former CEA engineer who created his own start-up.

A campus for technological innovation

The CEA is very well known for its activities in the nuclear sector, and in defence and security. However, many people do not know that it has also become very prominent in the electronics and the automobile sector as well. However, whereas the financing of defence and nuclear activities remains stable, financing for its other activities has been decreasing for some years. Since the defence and nuclear sectors are not located on the Grenoble site, it was seen to be essential to strengthen this site's attraction if we wanted to find new resources to help us to deal with cuts in public funding. In order to do this, we had to increase its public profile urgently.

This feeling was echoed by Jean Therme who had the idea of creating an 'innovation centre' or 'pole' in Grenoble. The term 'pole' conjures up the idea of concentrating technological means and scientific talent. Today this word, which is difficult to translate internationally, has been replaced by the word 'campus', and we can now talk about a 'campus for technological innovation'. Each of these three words has a meaning.

The 'campus' model

There are several research organisation models in France. Bodies which fall into this category include an EPST (establishment of a scientific and technological nature), an EPIC (establishment of an industrial and commercial nature), the CNRS (national centre for scientific research) and universities, and they all follow an organisation model which exists on a national scale, and has multiple local sites. All these bodies also have a public profile, but their efficiency may be a problem.

Research clusters cover an area of around 10,000 square kilometres. They help to create innovative projects between industry, research and universities as a result of funding for this purpose and organisation teams with which they are equipped.

Technology parks cover areas of around 100 square kilometres. In France, the most well known example is Sophia Antipolis. They provide the premises for both public and industrial laboratories, average-sized industrial sites, and because of their size, allow companies to share a number of services and facilities.

The new model which we are hoping to encourage and which we hope will spread is the innovation campus. This model is on a relatively small site, one or two square kilometres in size, and has an educational element, an academic and applied research element, and finally an industrial element common to all the industrial laboratories and start-ups. Those present on the campus meet up regularly for various reasons : maybe because they use common platforms for research ; or because they eat at the same cafeteria ; or because Grenoble is a medium-sized city which makes it easy for people to meet up outside of the work environment. Often misunderstandings between academic and industrial researchers stem from inability to communicate supply and demand correctly. When people have opportunities for discussion, academics generally discover that industrialists state relevant problems which should and can be resolved by fundamental research. This geographical closeness on the MINATEC site is in contrast to the CEA's Saclay site. There are exceptionally talented people who work there, but this site does not really have the capacity to create a group atmosphere largely because there are few opportunities to meet people casually.

Technology

The 'campus for technological innovation' model also means that our vision is essentially an engineer's vision. We do not have just a 'technology push' culture because our research is

also applied, but we know however that in order to develop applications, we must have 'shelves' of technologies, and know how to empty them from time to time.

The dominance of technology in MINATEC can be explained by the presence of a large number of technical platforms. The PTA (Plateforme Technologique Amont), run jointly by the CNRS and the CEA, aims to satisfy the needs of academic researchers by offering them access to efficient technological methods which are grouped together in the same clean room. We also have a platform for developing characterisation techniques which is unique in Europe. MINATEC has platforms which are intended for industrial transfers between companies, such as the Nanotec 300 platform, operated by LETI and dedicated to nanoelectronic industries. It operates 7 days a week, 24 hours a day. The MEMS 200 platform involves sensors, and enables the production of prototypes for companies in the applied, development sector.

Among MINATEC's technical platforms, there is also a building for industrial partners and start-ups, and managed by MINATEC Entreprises, a semi-public company. It offers 10,000 m^2 of offices and clean rooms which are rented to manufacturers, start-ups, and also laboratories (including LETI) for specific activities to promote industrial transfer. Occupants include Crocus Technology, a start-up which develops magnetic memory and is currently in the pre-production phase ; Cytoo, another start-up which devises tests for the pharmaceutical industry ; and Essilor, whose Grenoble site is dedicated to 'intelligent' spectacles which have built-in sensors.

As well as these technical platforms, there is a training platform, the CIME (Centre interuniversitaire de microélectronique), which offers tutorials in 700 m^2 of clean rooms.

Innovation

The aim of all the activities carried out at MINATEC is innovation. The objective is not just to do research for research's sake, but to help our industrial leaders to grow, to create jobs and therefore to be an integral part of local, national and international economic development.

Technological transfers take place in several stages : from academic laboratories to applied laboratories ; from applied laboratories to pre-industrial laboratories ; and finally from pre-industrial laboratories to industry. All the links in the chain are important because, apart from some rare exceptions, academic laboratories do not carry out direct transfers to industry. If one really wants to construct an 'ecosystem' of innovation, one must make the transfers reliable at every single stage.

One of the MINATEC buildings is specifically dedicated to research development. In it one can find the Observatory for micro and nanotechnologies, a partnership between the CNRS and the CEA, which keeps strategic watch on publications and patents on an international level ; the offices of the Minalogic research cluster, the National Agency for Research, and the Regional Agency for development and innovation ; a consultant in charge of research development and analysis of intellectual property, Avenium, which is a CEA subsidiary ; and finally CEA Investissement which invests both in CEA projects and non-CEA projects with other venture capitalists.

The MINATEC culture can be explained by what is called 'the rule of the four P's' : a very strong link between fundamental research *(publications),* technological research *(patents),* industrial development *(prototypes),* and finally mass production *(products),* a part of which is still carried out in Grenoble, despite the fact that there are a certain number of relocations.

The main role of the CEA

On most campuses or innovation clusters in the world, there is a main operator who is the driving force behind the site. For Fusionopolis, it was the Singapore Economic Development Board. For the Eindhoven High-Tech Campus, it was Philips which wanted to pull out of another site, and decided to set up the academic research in Eindhoven with support from people involved in local economic development. In the case of MINATEC, the main operator is clearly the CEA. All the other people involved (researchers at the CNRS and the INPG, university staff, industrial staff, and so on) agreed to work along the same lines as the CEA.

A special feature which often surprises our visitors is that MINATEC is not a legal entity. It is merely a site, a registered trademark, and an organisation based on an agreement signed by all the companies and bodies on the site, which determines the appointment of a director and a steering committee.

The financing

Even though MINATEC is not a legal entity, we consolidate the budget of all the partners present on the site in order to raise our international profile. This budget comes to 350 million Euros of which about 40 % is taken up by salaries, 40 % by the functioning of the site, and 20 % for investment. The total amount of investments made over the past ten years comes to more than 1.5 billion Euros.

One-third of the revenues comes from public grants (intended for academic research and education), one-third from industrial financing, and one-third from public financing through contracts. There are two ways of looking at these figures : either that two-thirds of the MINATEC budget relies on public financing, or that two-thirds of it may come from financing from contracts.

A Japanese study recently compared the position of important research bodies from two points of view : the R&D phases to which they devote themselves (ranging from fundamental research to production) ; and the type of financing they receive (ranging from 100 % public financing to 100 % private financing). On the sliding scale which goes from fundamental research (which is entirely State-financed) to industrial production (which is entirely financed by the private sector), there is, in order, the German laboratory Max Planck; the National Institute of Advanced Industrial Science and Technology (AIST) in Japan ; the VTT (Valtion Teknillinen Tutkimuskeskus, or the National Centre for Technical Research) in Finland ; the Fraunhofer in Germany ; the IMEC (Institut de microélectronique et composants) in Belgium ; and, finally, LETI, 70 % of whose budget is made up of financing from contracts essentially for applied research and process certification.

If one studies all the innovation campuses around the world, one notices that this distribution of financing probably constitutes the most long-lasting model. When industrial financing becomes very important, it is undoubtedly better to work exclusively with industry, but one may then run the risk of losing funds which academic research can bring. On the other hand, transfers to industry and the financing which they bring are essential not only because public funding is decreasing, but also because industry needs applied research which allows industry to create value.

From local to global

The MINATEC innovation campus is part of an ecosystem which has four dimensions : local, national, European and global.

On a local level

The innovation ecosystem in Grenoble relies on a large number of people not only on the MINATEC site, but also in the Grenoble urban area including the industrial site of Crolles, in

the suburbs of Grenoble, where STMicroelectronics has set up one of its largest manufacturing factories. There are numerous contacts between LETI, in the centre of the MINATEC campus, and Crolles. Microelectronic manufacturers sent about one hundred people to carry out research at MINATEC, and the MINATEC researchers are working on industrial projects. A daily shuttle service between the two sites allows the researchers from each site to send each other the slices of silicon on which they are working.

On a national level

As well as the critical mass which we are trying to reach on a local scale at MINATEC, we are also developing activities on a national level. For example, we have responded to calls for tender made by the French President to create a national network dedicated to innovation in nanotechnologies, Nano-INNOV. Our proposal, which was chosen, relies on a solid connection and collaboration between the three sites of Grenoble, Saclay and Toulouse. The public financing in terms of nanotechnologies will be focussed on these three sites according to very specific rules which have been taken from the culture of the CEA : all laboratories have the right to ask for public money to enable the laboratory to function, but, in exchange, researchers have to generate intellectual property in order to perpetuate and develop French research. We have devised rules for this new network which fix the number of patents produced by millions of Euros of financing. This is a very original approach compared to the traditional ways of financing research programmes.

On a European level

We also take part in a certain number of European programmes, and are members of EARTO (the European Association for Research and Technology Organisations). We are part of the HTA (Heterogeneous Technology Alliance) network which brings together four laboratories : LETI (France), the Swiss Centre for electronics and microtechnology (CSEM), the Fraunhofer Verbund Mikroelektronik (Germany), and the VTT (Finland). As a first step, the objective is to produce a tender both in the microsystem sector for aviation technology and the automobile industry.

On a global level

Considering the industrial investment necessary (several hundred million Euros) to develop each new generation of integrated circuits, only an industry giant such as Intel can still work alone in this sector. Most of the other industrial companies involved have to make alliances on a global scale. STMicroelectronics, the most recent European star on the international stage, is part of the IBM alliance with about ten other semi-conductor manufacturers such as Chartered and Samsung. LETI is the only non-industrial partner in this alliance. Because of LETI, the innovation ecosystem in Grenoble is part of this scheme which has global aspirations and is aimed at developing technologies of 45, 32 and 22 nanometres which will contribute to perfecting future generations of integrated circuits.

The results

MINATEC currently employs 4,000 people a quarter of whom are students, a quarter academic researchers, a quarter applied researchers and a quarter people who are involved in industry.

Each year, 300 young people graduate from MINATEC with an engineering degree in the fields of physics, electronics or materials. Every year there are about 1,600 scientific publications and 300 new patents.

The main regions of the world which have registered the most patents are Tokyo, San José, New York, Boston, and Seoul. The Paris basin (Île-de-France) is 9th, and the Rhône-Alpes region is 29th, which is significant.

On a European level, the Isère *département* and Paris are exceptions compared to countries in southern Europe where the culture for patent registration is not practised very much, as opposed to the Scandinavian countries and Germany. This is nonetheless an essential objective for tomorrow's industrial development.

Two reasons for growth

We think that MINATEC will develop and grow because of two reasons. The first is investment in infrastructure and R&D staff. When one wants to be the best on an international level, one has to have good tools. Twenty or thirty years ago, research laboratories used optical microscopes. This was followed by a generation of scanning electron microscopes, and today, there are transmission electron microscopes which cost several million Euros. A laboratory which does not have this sort of equipment will find it hard to publish articles and register patents internationally, even though its staff may be extremely competent.

The second reason is a cross-disciplinary one which can be regarded either from a subjective point of view or from a value chain point of view. To make biochips, for example, one must encourage collaboration between specialists from the fields of biology, electronics and microfluids. Cross-disciplinary relations include uniting, on the same campus, all levels of research, ranging from academics who develop original concepts to specialists in the R&D department who construct prototypes on a pre-industrial scale. The model which appears to be best suited to these two principles is the MIT (Massachusetts Institute of Technology) model. On the other hand, we should note that the Sandia national laboratories which have considerable financial resources do not accord cross-disciplinary relations the same importance that we do. The California NanoSystems Institute is well orientated towards cross-disciplinary relations and integration, but unfortunately it lacks the financial means. North Carolina State University's Centennial Campus is orientated towards the biotechnology and health sectors, and has a well-balanced position with regard to the two principles.

The MINATEC model around the world

Christian Blanc described Grenoble as 'a French model of the ecosystem of innovation' and drew its inspiration from brain-storming which resulted in the creation of the research clusters.

Today MINATEC is widely cited as a reference, both for European and American benchmarks. Communication is very important in achieving this result. Rather than spending money on advertising campaigns, we have concentrated a great deal of our efforts on attracting international conferences. Our researchers, who all sit on international committees, have a slogan : 'Every time you hear about an international conference being organised, put up your hand and say that MINATEC can host it.' We have a small team which handles all the logistics necessary for these conferences so that the researchers can concentrate on the scientific programme. Each event organised at MINATEC attracts visitors who come across the site and subsequently become our ambassadors. While they are there, they stay in Grenoble benefiting the local economy. The Grenoble local authorities in turn support us financially. In 2009, we organised 128 events, 720 meetings, 113 visits from delegations, and therefore welcomed in total more than 29,000 people.

The Japanese are very interested in the MINATEC model. They intend to create an innovation campus around Tsukuba, their main scientific city, which already has its own university, the NIMS (National Institute for material science) and the AIST. They have recognised three main positive points in what we do. The first is the emphasis on the acquisition of fundamental intellectual property. We have a platform for intellectual property which facilitates the registration of patents, and in all our industrial collaboration contracts we preserve the intellectual property of these patents : we only give exclusive licences in application sectors which are of interest to the manufacturer. The second important point identified by our Japanese partners is the creation of start-ups as a result of our incubation scheme, and the third is the networks which we have developed abroad.

Next stage : GIANT

MINATEC today employs 4,000 people and it would be impossible to exceed 5,000 employees without completely altering the concept. On the other hand, we can attempt to copy its example in other areas of innovation. This is what we will do with the GIANT project (Grenoble Innovation for Advanced New Technologies) which will include the current innovation campus based on micro and nanotechnologies, a second campus based on energy, and a third based on biology and biotechnologies.

This new development will occupy the entire 250 hectares of the Scientific Polygon, situated on the peninsula between the Drac and the Isère rivers. All this area belongs to the CEA. It used to be an artillery firing range, the French word for which is 'polygone', hence the name that it was given when it was set up by Louis Néel on the site of the Centre d'études nucléaires.

The CEA, under the leadership of Jean Therme, decided to incorporate the people who were already on the campus, or those candidates most likely to set up their businesses on future campuses into this project. They did so regardless of whether they were national research bodies (such as the CEA, as well as the CNRS, with the Institut Louis Néel), well known institutions such as the ESRF (European Synchrotron Radiation Facility), the Institut Laue-Langevin (ILL) which has the greatest source of neutrons in the world, the European Molecular Biology Laboratory (EMBL), or universities and colleges such as the INP Grenoble, the Joseph Fourier University, and the Grenoble Management School.

The project began in 2006 and its governance was put in place in 2007. The first buildings were completed in 2009, and the entire site will be ready by 2020. This project is different from others as it combines a town planning approach with a scientific and technological view. This is a new dimension compared to MINATEC. The site plan was devised by the architect Claude Vasconi, and includes traditional housing as well as student accommodation, sports halls, and even areas for events in an attempt to create a real urban locality. The transport infrastructure will be developed in order to ease travel connections between the train station and the rest of the city. The aim is to bring together on one site the 10,000 GIANT students, 10,000 researchers, 10,000 industrial jobs and 10,000 inhabitants.

DISCUSSION

Adaptability or rigidity ?

Question : *I get the impression that the CEA is very adaptable for a French company. How do you disseminate this culture among your partners ?*

Jean-Charles Guibert : Generally speaking, CEA is thought to be one of the most rigid organisations in France ! Some people even say that it is like the army ! Generally researchers are assessed by their peers. In the CEA, everyone is assessed by his manager, including the researchers. On the other hand, we have a culture of efficiency, and today efficiency in the research world means working together on projects. It is out of a concern for efficiency that we disseminate this culture of adaptability. It happens naturally because, even in the context of projects, people have to work together and talk to each other.

Open innovation and closed science

Q. : *You seem to be pioneers of open innovation with MINATEC in the past and GIANT in the future. How can one reconcile open innovation and closed science, in other words, how does one combine a large number of publications with a large number of registered patents ?*

J.-C. G. : One just has to be organised. Researchers often think that registering a patent is a tedious procedure, with virtually no effect on their careers, because they think they are assessed primarily on their publications. At the CEA, because we put a great deal of emphasis on the need to register patents in order to progress in one's career, researchers come and see our engineers, who specialise in patents, whenever they have an idea. They edit their publication at the same time, and because a high-quality scientific article takes a long time to write, publication takes about as long as registering a patent. Other researchers at MINATEC know that the CEA has a very efficient and rapid development system for industrial property, and they often ask us for help to speed things up.

We try to encourage researchers to spend time creating standards, which are key points for industry. Publications, patents and standards are the three parts of the same strategy.

Development

Q. : *What happens, in practical terms, when a researcher has an interesting idea ? Who is in charge of helping him ?*

J.-C. G. : In 90 % of cases, development is the result of collaboration with a manufacturer. After the initial contact between the laboratory and the company, our legal team joins them to help with negotiations. It helps the laboratory establish simple contracts which the manufacturers can easily understand in order to speed up the innovation process. However, it is the head of the laboratory who handles the negotiation and not the legal team, because ultimately he has to do the work afterwards.

We do not have any business developers to praise the virtues of our research capacities to manufacturers abroad because, in return, it would not necessarily be very easy for them to convince researchers to set up similar programmes. We find it very hard to subdivide development : work really has to take place in-house.

The other option, which is much less common, consists of creating a start-up. My predecessor in charge of development at the CEA was responsible for setting up financing at Emertec. I emphasised the incubation and maturity phases of start-ups. Our incubation teams work closely with the entrepreneurs for 12 to 18 months until they create their company. Their first task consists of telling the entrepreneur that there is little likelihood that it will be he who will manage the company. It is important to make him aware of this very early on in the process, because, if not, he will start calculating how he is going to divide up the capital between himself and the members of his family, and the start-up will de doomed from the beginning. The incubation team is also in charge of validating the intellectual property on which the project is based.

The entrepreneur then gets totally involved in the incubation phase. The incubation committee carries out a review of the project every six months. This committee consists of the head of the original laboratory, members of my team, members of the incubator, and outside experts, in particular Bernard Maître whose remarks are intended to bring a critical eye early on in the project.

When it is time for the discussion phase with the investors, we ask the start-ups if they want to be part of MINATEC Entreprises : firstly, by having a letter box – and therefore an address – at MINATEC ; then an office about 10 square metres ; and finally a small laboratory. The companies thereby have the opportunity, through contacts with researchers from the LETI, the LITEN, and other laboratories, to continue to benefit from the fundamental and technological research.

When a start-up nears commercialisation, it has the 1st generation of its product, but it is the 2nd generation and subsequent generations which will really generate business. However, it does not have the means to continue developing its product while it is creating its own structure. It is the responsibility of our laboratories to ensure that this development is in place. The day that the start-up is recognised by the market, it will have new products to sell and will be able to attract investment.

The SATTs

Q. : *What do you think of the establishment of SATTs (sociétés d'accélération du transfert de technologie : companies to speed up technology transfer) ?*

J.-C. G. : We do not think that taking the development of innovation outside is the best solution. Researchers will find it hard to believe that consultants, whose salaries are much greater than theirs, will come and take their good ideas and use them to make money. My personal salary is on the same scale as that of researchers, lawyers and marketing managers at MINATEC. Our legal chief comes from Salomon, a company which was bought by a Finnish company. She agreed to cut her salary by a third and to give up a company car in exchange for exciting work and being able to stay in France. If one wants to develop a development culture for researchers, one has to do all one can to keep the development structures in-house.

The role of local authorities

Q. : *What was the role of local authorities in the creation and development of MINATEC ?*

J.-C. G. : The various local authorities, such as the city of Grenoble, the metropolitan area, the *département* or the region, gave us vital financial support. The Isère *département's* council was in charge of supervising the construction of the buildings which ensured a degree of architectural homogeneity. The buildings were then handed over to the various institutions.

The Isère council has always supported MINATEC, but has asked in return that the CEA help it to develop research-innovation in the region. This explains our participation in the creation of the Institut national d'énergie solaire (National Institute for Solar Energy) in Chambéry, using the model for innovation campuses which applied to MINATEC. We have also taken part in the creation of an optical research centre in St-Étienne, and we are preparing a project in Valence with the Grenoble INP in Radio Frequency IDentification (RFID).

The choice of the GIANT name

Q. : *Why did you choose a new name, GIANT, when MINATEC's name was already well known ?*

J.-C. G. : I spent twenty years of my career at the LETI and I did my best to promote the LETI name. When MINATEC was created, many researchers at the LETI were worried to see the name of their laboratory disappear, but they had no need to be concerned. The two names co-exist very well today. As well as the LETI and MINATEC names, there is also the CEA name which is very well known internationally and which we use at the same time. Everyone present on the MINATEC site has a two-fold visiting card, with MINATEC on one side and their company name on the other.

In the site's current development phase, we thought it would be advisable to find a new name. The authorities like funding new projects and each new project has, by definition, a new name. We chose GIANT, but this will not necessarily be the definitive name. Abroad, it is Grenoble which is best known and it will certainly appear in the final choice of name. Whatever the outcome, in the future it will be clear from which body each employee has come (GIANT, MINATEC, LETI, CNRS, CEA, and so on).

Legal status

Q. : *You explained that MINATEC did not have any legal status. What about GIANT ?*

J.-C. G. : On the MINATEC site, each company signs its contracts or registers its patents in its own name, regardless of whether it is the CEA, the CNRS, the Grenoble INP or a company. It will be the same for GIANT. The advantage of an innovation campus is that it increases one's recognition and appeal, but for all aspects which require a legal structure, each entity is independent.

The number of students

Q. : *You set yourself a very ambitious aim of attracting 10,000 students to GIANT. How do you think you will reach that target ?*

J.-C. G. : At present MINATEC has 1,000 students. Grenoble INP has already set up one of its schools there and intends to set up two more on the GIANT site, one specialising in energy and the other in biology. We are also going to welcome the Grenoble Management School and the École nationale supérieure de création industrielle which already has a small unit including about fifteen students in the LETI. Together with these, we will then have between 5,000 and 6,000 students. We also hope that French and international universities will come and set themselves up on our campus. For example, we are currently in discussion with the Georgia Institute of Technology in Atlanta. We are also envisaging creating 'work-study' schools. Once we have reached an optimal number, people will be automatically attracted.

What about Minalogic ?

Q. : *You have presented MINATEC as a research cluster ahead of its time, but you have not talked a great deal about Minalogic. What is its role in this ecosystem ?*

J.-C. G. : We have an excellent relationship with the Minalogic cluster which is in the centre of MINATEC. The advantage of research clusters is that they bring together a number of people to work on collaborative research projects financed by the FUI (Fonds unique interministériel : inter-ministerial single fund), and they have played an essential role in certain regions. Having said this, if the FUI no longer existed, who knows what would happen to the clusters ? Innovation campuses such as MINATEC would still exist.

The plateau de Saclay

Q. : *In the light of your experience in Grenoble, what do you think of the development of the plateau de Saclay (a geographical area about 20 kilometres south of Paris which is the site of many research centres and universities) ?*

J.-C. G. : The main problem with the plateau de Saclay is its size and that there are several rival sites on the plateau. Regardless of the infrastructure one wants to create, there are always several institutions which demand that it be built near their own structure. There is also a logistics problem for exchange and communication. Finally, there is little space available for construction : if it were possible to build on the entire plateau de Saclay, then one could imagine the creation of a Silicon Valley or the equivalent of Tsukuba. Currently it would be

impossible, but maybe this is what will happen in the next twenty years. In the meantime, a leader has to be found : a person or a company which embodies the governance of the plateau de Saclay. At the moment, this is not the case. Decisions are taken by consensus, and the consensus is often weak…

Presentation of the speaker :

Jean-Charles Guibert : graduated in 1981 from the Montpellier Institut des Sciences de l'Ingénieur (the university of science and technology in the Languedoc region), and in 1983 from the École d'Application des Hauts Polymères (the Louis Pasteur University in Strasbourg). In the 1980s and 1990s, he was in charge of lithography and then microelectronic programmes at the CEA and the LETI, one of the main research institutes in the field. In 2000, he was asked to take part in the project concerned with micro and nanotechnology innovation campuses which would become MINATEC. In October 2004, he was appointed CEA development director which includes being in charge of marketing, contracts, patents and the creation of start-ups. He has been the director of MINATEC since June 2008, and is in charge of making the MINATEC innovation campus an international point of reference.

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