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CLEANTECH, OPEN INNOVATION : THE VEOLIA INNOVATION ACCELERATOR PROGRAMME

by

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Overview

For the past ten years, innovation in the field of environmental services has been booming rapidly all over the world. This has resulted in the emergence of numerous start-ups which in turn are benefiting from cross-fertilizations between ecotechnologies, nanotechnologies, biotechnologies, and ICTs (Information and Communications Technologies). In 2010, Veolia Environnement launched the Veolia Innovation Accelerator programme whose aim is to detect and source the best technologies from the industry's most innovative start-ups and those actively involved in the Cleantech ecosystem.

TALK : Marie-Anne Brodschii

I started working for Veolia Environnement 13 years ago in the group's energy department. My interest in the ecotechnology sector began in 2007 when I took part in the development of the Veolia Innovation Accelerator (VIA) programme which enabled us to look at innovations outside the group. It was set up in February 2010 to develop operational partnerships with start-ups in the field of ecotechnologies.

Ecotechnologies

Ecotechnologies (or 'cleantechs') are technologies which manage resources more efficiently or, in other words, do more with less. They exist in a number of areas including energy, transport, water, air, the environment, the soil, agriculture, raw materials, industrial processes, waste and waste recycling.

The aim of ecotechnologies is not only to protect the environment, but also to ensure the sustainability of areas which need rare raw materials. Take for example the lithium-ion rechargeable batteries : for the most part, lithium is found in China and Bolivia, which may result in being dependent on these countries.

A good indicator of the interest shown in ecotechnologies is the amount of investment made by venture capitalists in this sector. In 2010, 7 billion dollars was invested, in other words, 25 % more than in 2009, which, by all accounts, was an *annus horribilis* in economic terms. Ecotechnologies have become the leading investment sector for venture capitalists (followed by information and communication technologies (ICTs) and biotechs) whereas in 2003, they did not account for more than 3 to 4 % of venture capital investments.

If one adds up all the private investments made in 2009 in ecotechnologies either in the form of venture capital, private equity, financing projects or market flotations, it comes to 145 billion dollars. There are also pro-active policies led by governments to bolster this sector, in particular with regard to the production of renewable energy. Sums of money invested by China, Korea, the US or European countries in ecotechnologies are colossal.

The Veolia group

The Veolia group's activities are in the field of water (from the production of drinking water and its distribution to the treatment of waste water), waste management (collection, treatment, recycling), energy (urban heating systems, cooling networks, renewable energy, energy management in buildings), and transport (especially urban transport systems). It is a service company which explains the fact that it employs more than 300,000 people in 74 countries. The turnover is almost 35 billion Euros.

Veolia employs 850 people in research and innovation. Its aim is to develop technologies, processes and work methods either internally or externally. This enables Veolia to offer a better service to its clients in water or heat distribution, a reliable urban transportation system and a more efficient system of waste treatment.

Today, our group is faced with a certain number of global challenges including those created by the boom in innovations and the penetration into technologies, in particular in environmental services.

Global challenges

The current rapid process of global urbanisation has led to difficulties accessing water and energy resources, and problems raised by waste recycling.

In India, there will be 600 million urban dwellers in 2030, double the current population of the United States. Indian cities are already too crowded. In 2025, China will have more than 200 cities each with one million inhabitants. This situation will pose enormous problems with regards to air quality, access to water, hygiene and transport. We are faced with a new economic situation where scarcity will be the main problem. We must change from a paradigm based on volume selling to a paradigm where we have to sell efficiency, in other words an ability to use less water and energy, and to recycle our waste.

Very ambitious ecotechnology programmes developed by China do not only take into account climatic change issues, but most importantly aim to guarantee the security of energy supplies. China has no oil resources and wants to limit its energy dependency which is why it is investing massively in renewable energy. Today, China has become the leading global producer of photovoltaic cells.

The boom in innovations

The Industrial Revolution began in the United Kingdom in the 19th century, spread to Europe and then to the United States. About forty years ago, ICTs started in the United States, and then spread to Europe and south east Asia. Today, innovations and creativity are emerging in ecotechnology simultaneously in many countries (such as China, India, Europe and the United States) and are spreading rapidly throughout the world. In order to be competitive, ecotechnology companies must realise that the scale of their business is global.

When one compares the duration that companies remained on the Standard & Poor's 500 index[1] in the 1920s with today, one notices that the turnover has greatly increased. There has been an increase in newly-created companies, but they disappear more quickly than before, either because their economic model is not viable or because they have been bought out by other companies.

Costs associated with developing a company today are greater than before. Twenty years ago, the formation of a production site was estimated to require, on average, an investment of 30 million dollars. Today, the figure is closer to 3 billion dollars. Twenty years ago, the development of a new product cost, on average, 10 million dollars, whereas today it is 50 million dollars. As for the development of a drug, the cost has increased more than tenfold from between 50 and 60 million dollars to 800 million today.

Finally, twenty years ago 75 % of research was concentrated in the hands of large groups. Today, a large part of creativity and R&D has been handed over to SMEs (small and medium-sized companies) and micro enterprises.

Infiltration of technologies

Three large sectors of technology have entered the field of environmental services and made a large impact. They are also likely to become prominent in the future. These sectors are the biotechs, the nanotechs and the ICTs.

The biotechs

Nowadays we know how to use certain enzymes to speed up the deterioration and treatment of waste water or disposed waste in order to produce more biogas. Being able to produce enzymes which are perfectly adapted to a given need, enables us to make progress in improving the efficiency of our processes.

We already knew how to transform 'green' waste into biofuels. Now they will be transformed into different chemical products. For the time being, the processes still have to be improved in

[1] Index based on the leading 500 companies quoted on the US stock exchange.

order to become economically more profitable and promising. This needs to be part of a deep-rooted movement spearheaded by new companies in these markets. Currently, a water treatment plant treats about 50 % of the products present in waste water. In the future, all the products will be recovered and treated. Water treatment plants will become small bio-refineries and, in so doing, will produce energy themselves.

Solazyme, an American company, uses algae to develop three product families : biofuels (intended for the American Navy), cosmetics, and foodstuffs. Visitors to the factory are invited to taste cookies made with oil produced from microalgae. This would have been difficult to imagine thirty or forty years ago.

Nanotechs and advanced materials

Nanotechnologies also enable ecotechnologies to increase their efficiency considerably. For example, for some years, new membranes of water desalination, including nanotechnologies, have enabled us to treat larger quantities than was possible in the past using the same amount of energy.

Nanotechnologies are used in the design of photovoltaic cells and help to increase productivity and energy efficiency considerably. It is possible that one day the cost of production of solar energy may equal that of electricity produced from fossil fuels.

Thanks to nanotechnologies, important progress has been made in materials. They have become lighter and more resistant, and this has made the installation and maintenance of the water, heating and cooling distribution networks easier.

ICTs

ICTs are increasingly in biotechnologies, nanotechnologies and the entire field of ecotechnologies, including the management of infrastructures and processes.

To increase efficiency in the management of infrastructures, one must, above all, be able to measure what one does. This involves being able to design and install sensors which collect data, and then to transport, store and analyse this data. 'Smart grids' (electricity networks that can integrate the behaviour and actions of all users connected to it in order to deliver efficiently sustainable, economic and secure electricity supplies) control different parameters in the whole chain of production, distribution and use. They are the answer to a particularly vital issue in the field of electricity, namely the need to balance production and consumption in a network which includes nuclear power stations, coal-fired power stations, windfarms and photovoltaic power stations. They can also be used in the water sector to help measure parameters such as quantity and quality very accurately, thereby increasing efficiency.

To manage consumption in a district or a town, one must be able to devise consumption models. This requires considerable mathematical ability. Consumption has been growing exponentially for the past fifteen years so that today we can devise systems which we would never even have dreamed about a few years ago. This is why the ecotechnology sector is attracting more and more companies from the ICTs sector such Google, Cisco and IBM.

ICTs are also used in the transport sector. Transport users can now be informed in real time of the current state of the urban traffic system, including bus or tram timetables, by information relayed to their iPhones. GPS systems enable members of the public to inform others where traffic is most dense. This sort of information enables travellers to optimise their journey and journey times.

A convergence of interests

Veolia, which was founded 150 years ago, must constantly increase its creativity if it wants to meet certain challenges. Newcomers, such as Cisco, can innovate and develop rapidly, differing from our economic models which are based on the management of infrastructures and characterised by long cycles. Companies which produce electricity are also faced with the emergence of new companies which are very creative.

The need to create partnerships

In view of the speed of innovation, no single group, even on a global level, will be able to respond to all the challenges and become the market leader. The only solution is to bring together all the complementary talents and devise a common solution. Smart grids, for example, are created by groups of electricians and ICT specialists who have pooled their different expertise. We should therefore be capable of working with the most successful and innovative start-ups in the market.

The requirements of start-ups

New companies in the field of ecotechnologies are faced with two important difficulties. Once they have devised a technology in a laboratory, they must test it in the field with users who are likely to adopt and use it. They must then find clients in a sector which is significantly decentralised. In the United States, for example, there are more than 100,000 companies which manage the production and distribution of water. If a start-up develops a technology which can ensure greater efficiency that that of a water treatment station, it then has to find a huge number – maybe 100,000 – potential clients and convince each one of its potential. This is very different from the Twitter economic model which attracted 50 million users in a very short space of time.

What appears to be lacking in new companies in the technology sector is not so much the means of financing the technology as the ability to test their technologies, gain access to a market and deploy them.

Two examples

NanoH2O is a North American company which developed a desalination membrane including nanotechnologies which enable it to increase its efficiency considerably. We created a partnership with this company to test the membrane in different oceans. We know that the results vary according to the degree of salinity and the geographical location of oceans. If the tests are conclusive, the company will immediately find a market either in the installations we are already using or in future power stations. As far as we are concerned, using this innovation will allow us to increase the operational efficiency at our current sites and enhance our offer to clients.

RecycleBank, another North American company, developed a system which made it advantageous for the end user to reduce his own waste production. Veolia's Environmental Services UK and RecycleBank worked together on an invitation to tender, and devised a proposition which integrated the end user in the waste management process in order to guarantee greater efficiency. For RecycleBank, it is an opportunity to expand outside the United States by working with a group which already has a strong presence in Europe.

The creation of VIA

The Veolia Innovation Accelerator (VIA) programme was set up in response to these various expectations. It is an operational platform intended to detect the most innovative companies in fields where we exist, and helps these companies progress from the development stage to the testing stage, and finally to the market launch.

How the VIA works

The VIA programme was launched in the United States in February 2010 and in Europe at the end of April 2010.

Looking for candidates

To find companies which are likely to bring us interesting technologies, we turn to trustworthy partners, such as venture capitalists which want to accelerate the development of their start-ups, or public and semipublic bodies which want to promote young, innovative companies in their country or region. We also ask our colleagues throughout the world to draw our attention to young companies which have developed products or interesting processes. Finally, we have created a VIA page on the Veolia website and have set up an online application form for candidates.

A single contact

We know that large groups may appear intimidating to small companies, and so we have established a way of dealing with candidates so that each one has his own Veolia contact who accompanies him from start to finish.

The 1-4-12 promise

SMEs require decisions to be made quickly. Rapid decision-making is not a characteristic of large group culture, and because of this, we have devised a timetable with the start-ups called the 1-4-12.

1
We promise to review a company's application in one week and decide whether it conforms to our area of activity or not.

4
We work over a period of four weeks with our research teams and technical departments to check if the proposed technology or solution is credible, and sufficiently distinctive. We also analyse the company's finances and the composition of its management team.

12
The final stage lasts twelve weeks and is spent in discussions with the operational departments about a possible partnership. At the end of this period, we decide whether we will enter into a partnership or not.

A large range of possible partnerships

The VIA programme does not expect a share-holding structure for Veolia in the start-ups. This is not Veolia's line of business. In the past, Veolia's method of collaboration with young companies could be regarded as 'all or nothing' which meant either we bought the company or no collaboration at all was possible. Today, our involvement has widened, ranging from implementing simple tests to buying and applying technologies, and also includes making specific adaptations of technology to correspond to the needs of our group.

DISCUSSION

What are the advantages for the start-up ?

Question : *What are the benefits for a start-up which has a breakthrough technology in a partnership with Veolia if Veolia does not take a stake in the company and does not allow the start-up to benefit from Veolia's distribution network ?*

Marie-Anne Brodschii : For the NanoH2O company, it is crucial to adapt the desalination membrane precisely by testing it on different types of installations and in different oceans. The company needs to find an operator who accepts the risk associated with the test phases, and is ready to help it to do these fine adjustments. By working with the world's leading desalination operator, NanoH2O hopes to achieve a very important market access.

Q. : *In this type of partnership, does Veolia ask for a period of exclusivity ?*

M.-A. B. : We define areas where we can help corresponding to geographical areas or to areas of interest to the clientele, but we do not forbid our partners from working with other operators in the market. The priority is for the product to be manufactured and sold in large quantities so that unit costs remain low. One has to find the right balance between securing our own market share and allowing our partners to achieve a foothold in the market by working with other clients.

A warm welcome within the group

Q. : *How do you manage to keep to the 1-4-12 timetable ? Such short time periods are unusual in large groups. Do you have special contacts in the various divisions ?*

M.-A. B. : Each company is allocated a project manager who helps the start-up through the different stages. Within each of our four big divisions, we have technical, commercial and strategic departments but we can also rely on other people who are welcome innovation, who are a driving force in the approach, and adopt a sort of 'big brother' role in the project. Finally, and this is crucial, we have the support of the group's chief operating officer and a certain number of important operational bosses.

Q. : *I imagine that the negotiations between you, the business teams, the in-house R&D and the start-ups must be extremely meticulous. Start-ups are often sensitive about the core of their technology ; researchers at Veolia may consider that some areas are their preserve ; business teams have to pay attention to what might appear to be a comparative advantage. How do you manage relations between all these people ?*

M.-A. B. : A great deal of interest was generated by the launch of the VIA programme, especially by our researchers who did not show any signs of the 'not invented here' syndrome. They already have opportunities to meet young companies, and this sector is not new to them. Furthermore, as I said, Veolia is a service company. As far as our group is concerned, technologies are just a means to improve the efficiency of what we provide. There is not the same ambiance at Veolia as there is in other groups which are based purely on technology. Finally, researchers are personally motivated to adopt new solutions if, for example, these allow them to reach their project goals more quickly.

The programme was also welcomed by the operational units because our group has a tradition of invention in all fields whether it be technology, processes, organisation, staff management or economic models. It is often the case that operational units launch certain projects in the field before the corporate management is aware or interested in the project.

Obviously one cannot convince 300,000 people simultaneously, but one can find solutions using people who are willing and known to make projects succeed. Ultimately the methods used will be judged and adopted depending on whether the results are positive.

Convincing the operational units

Q. : *I imagine that there are examples when working with an SME is not a problem for operational units. But when the new product or process envisaged upsets the usual methods of working, there may be a lack of enthusiasm. In such situations, do you have the means – in spite of everything – to enforce a partnership ?*

M.-A. B. : Veolia is a very decentralised group where trying to enforce a programme like the VIA would be likely to fail. This approach can only work if it is really shared. It is therefore up to the operational managers – and only them – to make the final decision. However, we can play the role of facilitator. For example, an operational manager can say to me 'this project looks interesting, but could you help me to develop it correctly and define the rules of the game ?

Q. : *In general, when the signs are propitious, the adoption of a new technology does not pose a problem. The operational managers are much more reluctant when the signs are still weak. Can the R&D department suggest and determine a new direction without having an important, strategic meeting ?*

M.-A. B. : For most projects, we start with a test phase using a bench test, and we inform the operational managers of the results. If the experiment is conclusive, we move on to the next phase which consists of testing the product on an operational installation. This allows everyone to recognise the advantages of the new solution. Of course, this often involves a great deal of discussion, explanation, and also support from the local representatives who are particularly open to innovation. The aim is that if the project is rejected, at least it will not be for the wrong reasons.

Towards industrialisation ?

Q. : *The system seems very costly in terms of time. Is there a possibility it could be industrialised, or is it destined to remain in a relatively unrefined state ?*

M.-A. B. : The style of this programme is not set in stone. We proceed, case by case, moving forward in line with our partners' method of working. In two years' time, I will be able to tell you if we have managed to establish typologies and to industrialise certain models. For the time being, I do not think it is useful spending time creating them. Our priority was to deploy the programme and to manage the volume of requests by trying to meet the deadlines that we had set ourselves.

Q. : *How many projects are currently being reviewed ?*

M.-A. B. : We are currently working with 150 companies which are at various stages of development. If there were too many, our partners would help us to regulate the proposals of new applicants.

How does one attract the best projects ?

Q. : *How do you manage to attract the best projects ?*

M.-A. B. : Some of our partners are venture capitalists who are very active in the ecotechnology field. They choose companies for us which show a great deal of technical talent. We also have public and semi-public partners who are capable of carrying out efficient mediation in order to give us access to the most interesting companies. I was agreeably surprised to see that among the unsolicited applications, very few companies were outside our defined field.

Q. : *Have you thought about investing in venture capital funds in order to have access to emerging start-ups ?*

M.-A. B. : Every important group asks itself whether it should invest in venture capital funds or create its own fund. We noticed that in the ecotechnology sector, the financing question did not cause the greatest problems. We realised that we were able to suggest something which was more interesting – integration into the ecosystem of cleantechs by means of tests, and then providing access to the market. This is why we have refused to take shares in companies either via a corporate fund or by taking shares in other funds.

Intellectual property

Q. : *What is your policy on intellectual property with respect to the VIA programme ?*

M.-A. B. : It all depends on the maturity of the projects. If the technology already works, a licensing agreement or a technological joint development agreement is a possibility. It may also depend on the way in which the company wants to sell its technology or its solution. We do not have an a priori judgement.

Research into human science

Q. : *In order to reach their objectives completely, ecotechnologies need users to rally round and to change their behaviour. Do you also carry out research into human and social science ?*

M.-A. B. : It is crucial to motivate the end user who may be a public or private company or a private individual. For example, on a technical level, we are perfectly capable of producing drinking water from waste water. We have a client who is a high technology manufacturer in Singapore who needs very clean water. We have two types of problem : regulations which in general do not allow us to operate, and a kind of psychological barrier. This explains the presence of a human and social science section in all our research work.

The VIA team

Q. : *What is your background and that of others in your team ?*

M.-A. B. : I started my career in building and civil engineering, and I worked in the Middle East and North Africa. I then joined Veolia Environnement in sales development, and after three years in France learning the profession, I worked in Central Europe, South America, Southern Europe, the United States and Asia. When I was in the United States in the summer of 2001, I realised the potential of the extraordinary creativity of ecotechnologies, and how Veolia could try to acquire this creativity and use it to its advantage.

The VIA team is very small. There are only about ten of us. We rely on the research teams and technical departments of the divisions which are really the core. Our team is made up of people who have open and enquiring minds, and have the necessary talent and tenacity to develop projects and to create ties between the group and small companies. Most people in the team are trained engineers. One of them joined us from the transport sector and also worked in exports. Another came from the water sector. Some have personal experience as entrepreneurs. They all want to breathe life into a new sector in the group and are extremely humble in the face of the huge talent necessary to create a company.

The arrival of people from ICTs

Q. : *Despite problems associated with data processing and smart grids, new ICT companies such Cisco and IBM are obviously trying to get hold of the added value to the detriment of companies in the field like Veolia. Last August, just before the increase in electricity prices, a manager at Cap Gemini wrote in the 'Le Monde' newspaper about all the wonders that one could expect from intelligent networks with three conditions of which the first was 'to have the political courage to increase prices'. In other words, it was imperative to tax users in order to guarantee markets for Cap Gemini. Two days later, electricity prices rose.*

Veolia's approach is very different. Veolia is very close to its clients, and Veolia realised that it was possible to increase productivity and to allow clients to lower their consumption while at the same time continuing to develop the company. Those in the energy sector or ICTs seem to think that the only way to make a company expand is to ask the regulator to increase prices.

M.-A. B. : We live in a competitive world, and it is clear that the prospect of having to collect, transport and analyse new data to make a management tool is likely to interest companies like Cisco, IBM and Cap Gemini. Perhaps my vision is a little North American, but as far as I am concerned, I think that it is very positive to be in competition with new companies. It will help us to improve and to speed things up.

Q. : *Do you realise that in the future they will be your competitors in your business ?*

M.-A. B. : Competitors or partners. Will it be more interesting to try to manage a new service on one's own, or to develop platforms with partners ? It all depends on the speed with which we will be able to take a share of the market thus increasing our profitability. One thing is certain : a single company alone will not be able to corner the entire market.

Presentation of the speaker :

Marie-Anne Brodschii : graduate of Sciences-Po Paris and HEC business school, participant in the Stanford Executive Program. She is Veolia Environnement's director of innovations. Between 1997 and 2009, she occupied several managerial positions at Veolia Energie in international development and worked in Europe, the Americas and Asia. She began her career in 1994 with Bouygues in the Middle East and North Africa.

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