THE **AGILITY** EFFECT
MAGAZINE

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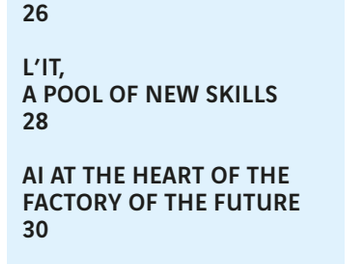

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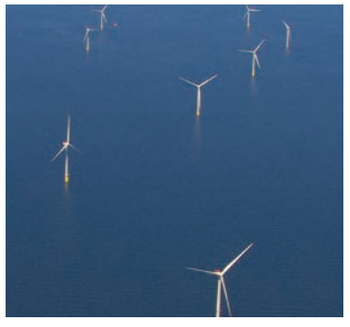

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EDITORIAL

The energy transition and the digital transformation, which are both crucial to the many changes currently under way, can not be achieved without the women and men whose expertise and skills make them possible. More than ever, human capability lies at the heart of the world of the future.

The title of the feature article in this fifth issue of The Agility Effect Magazine is "The new jobs at the heart of the transformation".

New jobs are now coming on stream, others will emerge in coming years, and some will change to accommodate these major technological challenges. We have entered the era of smart cities, high-tech buildings, smart grids and the artificial intelligence at the heart of Industry 4.0.

Within companies, this constant, increasingly fast-paced disruption has generated new requirements and prompted a search for new skills against a backdrop of labour market pressure in these advanced sectors.

At VINCI Energies, adaptation to change is a central focus of our agile organisational structure and our business activities.

We are therefore forging close relationships with engineering schools that offer curricula preparing students for the new digital transformation and energy transition jobs.

Our world is on the move, the technological tools used by companies are evolving and jobs are being transformed. We need to support these changes, ensure their human focus and prepare the future, day-by-day.

Bernard Latour

General Manager, VINCI Energies Europe

A THIRD EYE FOR THE EXPERTS

With its superior speed, efficiency, safety and cost-effectiveness, the drone is an instrument that is particularly suitable for inspecting critical structures and facilities located in sensitive or difficult-to-access areas, such as high voltage lines in the Saudi Arabian desert. To inspect them, power transmission experts at Omexom Saudi Maintenance (VINCI Energies) recommended and implemented the state-of-the-art technology along nearly 900 km of transmission lines in the Persian Gulf area as a powerful performance driver, and are using it as what amounts to a third eye.

ENERGY ACCELERATION

NO BREXIT FOR SUPERGRIDS

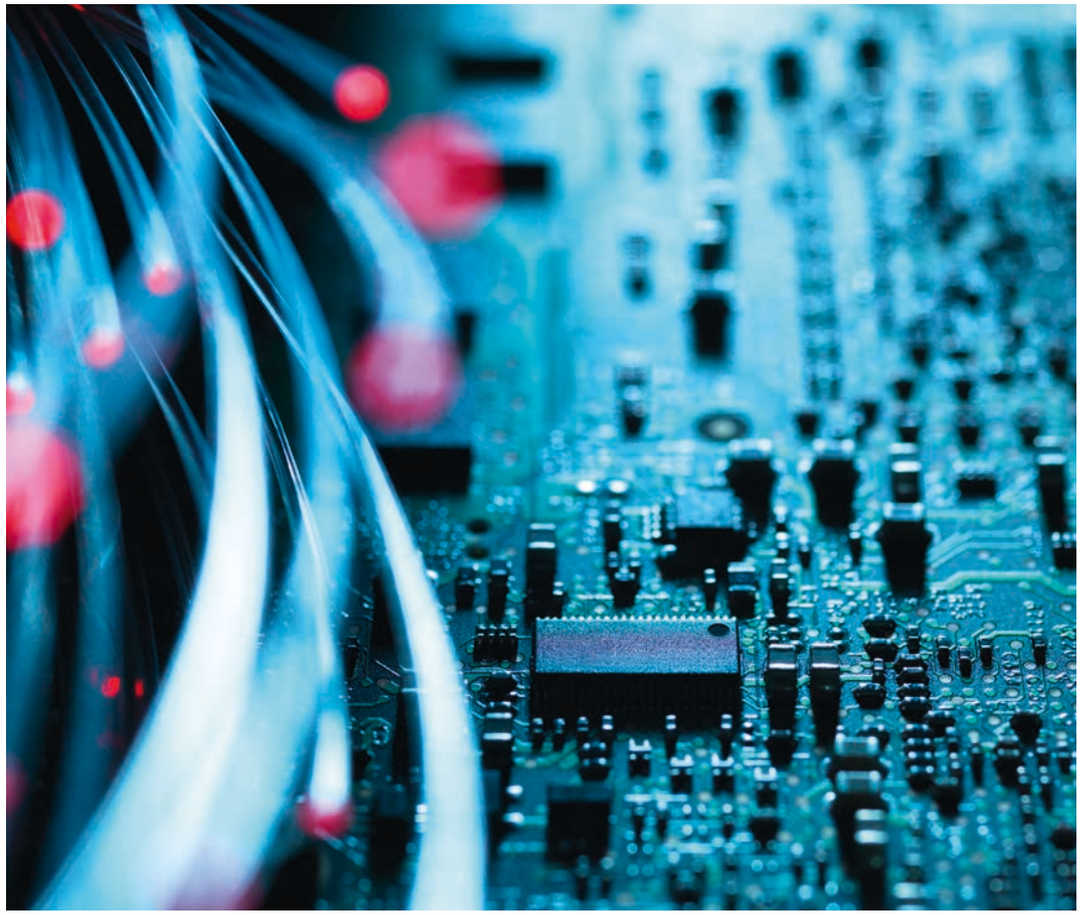
The increasing share of renewables in the energy mix is prompting Paris and London to create very high capacity grid interconnections. VINCI Energies is responsible for a part of the infrastructure.

The U.K. and France are planning to strengthen their energy ties by building a powerful electricity grid interconnector. The high voltage direct current (HVDC) undersea link will begin operating in 2020. This supergrid will operate at ± 320 kV DC and have a transmission rating of up to 1,000 MW between the two countries.
"One gigawatt is equal to the capacity of a nuclear power plant, enough to supply 500,000 households," says Arnaud Gautier, Business Unit Manager of Omexom Major Projects (VINCI Energies), which is in charge of building part of the infrastructure.
Arnaud Gautier explains that interconnection is being stepped up to accommodate the increasing generation of electricity from renewable sources of energy. Solar and wind energy sources may lie a long way away from the places where the electricity is consumed. Furthermore, he says, "Generation from renewables is by nature irregular and less predictable than generation in conventional power plants. There is therefore a need for energy highways to rapidly transmit electricity generated from renewables in order to ensure continuity of service for the consumer."

The 230-km interconnector between southern England and northern France will be able to transfer large amounts of electricity as needed. On the French side, Omexom Major Projects is responsible for building the AC/DC converter station. The business unit brings together the full range of expertise required for the VINCI project, in which VINCI Construction is responsible for civil engineering and VINCI Energies TTE (energy transformation and transmission) for electro-technical works.

Comprehensive coordination and local teams

Project manager Guillaume Romano emphasises the role of Omexom Major Projects as an



integrator able to comprehensively coordinate a project on this scale, calling on the VINCI Group's full existing range of local expertise and human resources. RTE, the French transmission system operator, working with its British counterpart, National Grid UK, to build the IFA 2 interconnector, particularly appreciates the use of locally-hired labour.

In addition to design-build turnkey construction of the building, VINCI is also in charge of the full implementation of the conversion process for our customer ABB. The large-scale project will use BIM (Building Information Modeling) to enhance efficiency, says Guillaume Romano. "VINCI's BIM model is shared by all participants. In the design phase, it will enable us to identify interface issues between the many trades working on the project and subsequently it will facilitate monitoring via the DIGITAL SITE application". The IFA 2 project also offers an opportunity to apply the Lean Management methodology, which optimises each stage of the works, in a large-scale project. For VINCI Energies TTE and for Omexom Major Projects, the Cross-Channel project, which calls on the complementary expertise of the VINCI Group, will make it possible to "capitalise on experience to benefit future energy transmission projects currently on the drawing board in Europe, Africa, the Middle East, and beyond," says Arnaud Gautier. The sun never sets on the supergrids.

> The 230-km interconnector between southern England and northern France will provide large-scale electricity transmission capacity when required.

ENERGY TRANSFORMATION

HYDRAULICS, KEY STONE OF THE NEW ZEALAND ENERGY MIX

Nearly 80% of the electricity produced in New Zealand is from renewable energy sources. Although wind power continues to progress, water remains the main source.

New Zealand relies mostly on renewable energies to produce its electricity. Water from dams provides the most part, with 57% of the whole amount of energy produced. A ratio that reaches 98% in the South Island where the large dams are grouped together. Geothermal energy, which is aided by the situation of a country that sits on the Ring of Fire, the Pacific Ocean's volcanic arc, represents 16% of the energy mix, supplemented by the 5% of wind power, with the proportion of this green source of electricity continuing to rise. The Te Āpiti wind farm built by public operator Meridian Energy in conjunction with Electrix (Omexom network), the first farm to feed into the New Zealand grid, produces up to 90.75 MW, enough to supply nearly 40,000 homes. A noteworthy performance yet nothing in comparison with that of the hydroelectric dams. With its six 90 MW-turbines, the Benmore Dam totals a capacity of 540 MW, the equivalent of supplying nearly 298,000 homes. To produce the same volume with wind power, it would be necessary to build a wind farm the size of 4,285 football stadiums!

Efficiency ratio

The difference in capacity isn't the only aspect distinguishing water power from that of wind. Neil Matheson, Business Unit Manager at Electrix, notes that "the efficiency ratio of wind remains much inferior to that of hydraulics". Yet this ratio, which measures the relationship between the theoretical power of an installation and the power effectively produced, at 45% in New Zealand, is still particularly high for wind power compared to the performances of French wind farms (less than 30% on average).

Ultimately, where operators usually supplement the energy mix with thermal power (coal, gas, oil), New Zealand can make a nearly 100% renewable range, by turning to hydraulics and geothermal energy. Through the accumulation of water, the hydroelectric dam constitutes an energy storage system. A sort of "natural battery", that contributes heavily to making New Zealand one of the lowest CO_2-producing industrialised countries and a leading seller of carbon credits.

ICT ACCELERATION

CÔTE D'IVOIRE SPEEDS UP ON THE INFORMATION SUPERHIGHWAY

Axians, the VINCI Energies information and communication technologies brand, is helping to install the optical fibre backbone that will enable Côte d'Ivoire to accelerate the roll-out of Information and Communication Technologies (ICT) throughout the country

The goal is to lay 1,920 kilometres of optical fibre throughout. Côte d'Ivoire within two years. "A huge project," says Hicham Mghazli, the Axians Telecom West Africa project manager on the spot. "We had to hire and train nearly 70 people to supervise the implementation of this project. We also used local subcontractors. Altogether, about 500 people are working on the project."
Axians is building the bulk of the symbolically-named cross-country "information superhighway" that this 7,000 km backbone (the nerve centre of a high-speed broadband network) represents. "It will connect remote villages with the rest of the country via information and communication technologies," says Hicham Mghazli with pride.

Launched at the end of 2016, the Axians project covers two zones: the area between Abidjan, Oumé and San Pedro in the east; and farther west the area near Guiglo and the border with Liberia. Telecommunications operators will install mobile telephone access points and then roll out Internet and digital television along the fibre, "which is installed in loops to secure connection continuity," says the Axians manager. Paradoxically, Africa's delayed installation of infrastructure handicapped the development of fixed-line Internet service and fostered the popular mobile service that now puts the continent in a good position to leapfrog a stage of development and go directly to high-value-added mobile services.

Connected citizens

The Ivorian government has planned to connect all prefectures and sub-prefectures so as to set up electronic governance, which will enable connected citizens to remotely carry out administrative formalities such as responding to the census, paying taxes and energy and water bills and filing requests for building permits.
Ivorians are also expected to be able to access e-healthcare services and e-training, which will be gradually rolled out. The goal of the public authorities is to connect healthcare and education facilities to the optical fibre network.

Telecommunications operators will install mobile telephone access points on the optical fibre installed by Axians and then roll out Internet and digital television services.

Broadband to the home

Once the technical issues have been covered with the fibre roll-out, the issue of mobile user solvency remains. Observers agree that telecommunications operators and banks will have to invent new economic models to take account of wide disparities in the standard of living.
The construction of pylons and antennas for mobile service will form the first phase of fibre operation, says Hicham Mghazli. "Following that, urban loops will be installed, from which telecommunications operators will be able to offer FTTH, in other words broadband Internet service to the home," says the Axians manager - a high-quality connection that many European Internet users can still only dream of.

ICT | INNOVATION

OPTICAL FIBRE GETS A NEW LEASE ON LIFE

With the support of Axians, deeptech company CAILabs is developing a new technology that increases the data rate of multi-mode optical fibre by a factor of 400.

Constantly increasing network data rates are rendering the transmission capacity of aging optical fibre obsolete - particularly the multi-mode systems used to communicate over short distances, for example on campuses.

Three French optics researchers at the Kastler Brossel laboratory in Paris, Nicolas Treps, Jean-François Morizur and Guillaume Labroille, have found a solution. They have developed a technology that reshapes the light beam to increase multi-mode fibre capacity by a factor of 400.

"We give a network a new lease on life for - at most - only half what it would cost to re-cable, and we do so without disrupting the customer's activity by installing a passive module directly at the fibre arrival point," says CAILabs CEO Jean-François Morizur who, together with Guillaume Labroille, founded the start-up in 2013.

> "A very beneficial solution, especially for universities, hospitals, urban transport systems, and office buildings."

VINCI Energies ICT brand Axians identified the new CAILabs range of products, called Aroona, during the 2016 VivaTech show and has now made it an integral part of its solutions and services offer. "We roll out fibre for our customers with budgets that cannot be expanded, and Aroona is proving to be a very beneficial solution, especially for universities, hospitals, urban transport systems, office buildings, and industrial facilities where re-cabling work requiring production to shut down would be problematic," says Juan Lopez, Technical Director at Axians Communication & Systems France. Aroona is a solution derived from Proteus, which has existed since the company was founded (whereas Aroona only began in 2015).

INNOVATION

WILLIAM ELDIN, TECHNOLOGY SERVING EMOTION

This serial entrepreneur has been developing the XXII company, which specialises in artificial intelligence, for the past three years. The company's vision focuses the technology squarely on the human being.

Make no mistake about it, this 30-something founder of a start-up focused on artificial intelligence is not a true believer in a rosy technological future. He would be more likely to claim anti-geek status. William Eldin, co-director of the XXII company, advocates his own vision of a return to basics. "Our company's vision," he says, "is to augment the human being and his perceptions in order to develop a form of emotional quotient that we seem to have lost to some extent. Technology is there to handle all the routine issues of life in society so that we can pay more attention to ourselves."

A fan of Daft Punk, William Eldin and his partner and childhood friend Damien Mulhem gave the company the name of an electronic music group that he founded at the age of 14. He is a serial entrepreneur. After setting up a network of stores to sell highway radar detectors in 2005, he joined forces with Fabrice Pierlot, the founder of Coyote System, a specialist in radar warning and driver assistance systems. After eight years, he sold his shares and in 2015 invested €1 million in XXII and the artificial intelligence adventure, encompassing artificial intelligence, gaming, nano-sciences and marketing.

At the intersection of science and engineering

Rather than AI, William Eldin prefers to talk about "deep technology", a concept "at the intersection between science and engineering," which is aimed at "helping companies apply very sophisticated algorithms to their own specific needs."
But priority is given to the human being. "People don't come to us to work on an algorithm for a single use," he says. "They come to look at a wide variety of issues. This means putting on our boots and going to look at a worksite to see what the actual concrete issues are. Someone with a PhD in artificial intelligence who spends his time in front of a computer never does that. Our work straddles science and execution."

"Our company's vision is to augment the human being and his perceptions in order to develop a form of emotional quotient that we seem to have lost."

This approach is what prompted VINCI Energies to present XXII to its network (business units and customers) at the most recent Viva Tech event, held from 24 to 26 May. "Industry, building construction, energy and artificial intelligence touch on the full range of our activities," says Julien Guillaume, Open Innovation and Collective Intelligence manager at VINCI Energies. "The advantage of William Eldin and his team is that their highly pragmatic approach never leaves out the human aspect, the way in which the human being uses the technology."
"This approach brings us together around our 'Human Beyond Digital' credo," says Julien Guillaume, who adds that William Eldin also brings "a passion for communication and a talent for education."
The young entrepreneur, who now heads a team of 60 employees in Suresnes, France along with six people in Shenzhen, China and two in a recently-opened office in Seattle, Washington, works with large companies such as BNP Paribas, Bouygues Telecom, Clear Channel, Dassault, Google, Groupe M6, GRDF, Havas, L'Oréal, Netflix, Novartis, Samsung, Sanofi, SNCF, Shiseido, and TF1.

"The point of view of the human being"

"We developed this artificial intelligence capability starting from the point of view of the human being," says William Eldin. "Our learning method is simple: we start by looking at people and objects as they interact, as case studies."
The entrepreneur adds, by way of illustration, "For example, in an airport, a passenger arrives with a piece of luggage and both are given the same identifier.
If the intelligence behind the CCTV camera sees the passenger move away from his luggage, beyond a certain distance and a certain amount of time this information is reported to the control centre so that action can be taken as needed. At Paris-Charles-de-Gaulle, there are 12,000 cameras and it is impossible to watch them all at the same time."
What is William Eldin's secret? Managing agility and... risk. "Agility is first and foremost a culture, the culture of speed. At XXII, we regularly organise 'serious games' on rapid response. But we always accommodate risk, because in our company people have the right to make mistakes. We do individual interviews every six months and if a person hasn't failed at least twice or three times, he or she has not taken enough risks." Managing slip-ups is a must for the former Coyote manager.

NEW JOBS AT THE HEART OF THE TRANSFORMATION

Half the jobs that will exist ten years from now do not yet exist today.
This universally acknowledged fact brings the transformation now taking place into sharp focus. The radical change now under way, to a greater or lesser degree, in organisations, processes and whole sectors of activity is well documented.
Its somewhat less well-known impact on skills, jobs and profiles deserves the full attention of businesses, because the digitalisation cannot achieve its full potential without the men and women who are and will be implementing it.
Augmented reality, virtual reality, artificial intelligence, increasingly complex algorithms, big data management and storage technologies are just some of the skills that are already in high demand and will be increasingly important as time goes on. In the new job environment now taking shape, energy, buildings, cities, industry and of course the new communication technologies will be in the forefront of the transformation.

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TRANSFORMATION

A PARADIGM SHIFT FOR COMPANIES

Digital technologies are reshaping employment. New jobs with a strong technology focus, which call for new skills, are emerging. Companies are now coming to grips with the dual challenge of training their employees and hiring new profiles.

Data scientists, robotics experts, application developers, human-machine interface designers, load management specialists, and artificial intelligence and cyber-security experts are just some of the talent required today and in the future. People with these profiles are in high demand in the labour market, and companies – especially those that, like VINCI Energies, work in the infrastructure, building, industrial solutions, engineering, and maintenance sectors – must attract and retain them in order to remain competitive.
The "Future of Jobs 2018" report by the World Economic Forum (WEF) addresses these issues in detail. It identifies a score of these emerging jobs, all of which have a strong technological focus.
In the infrastructure sector, these jobs currently account for only 16% of the total worldwide, but the percentage is expected to rise to 19% by 2022. Conversely, the proportion of labourers, engineers and mechanics is expected to fall from 38 to 30%.
In the energy and utilities sectors, the percentage of digital transformation experts such as data scientists and big data specialists is expected to double over the next several years, rising from 16% to 32% of jobs in the sector by 2022. Meanwhile, the proportion of mechanics and workers as well as inventory managers employed by power plants, refineries, and factories is expected to decline from 34% to 24%.
For companies, these statistics reflect a paradigm shift.
The re-definition of skills and jobs will require a major effort to train employees and an active recruitment policy. For example, the WEF experts estimate that all French employees should be given an additional 101 days of training between now and 2022.

"Upskilling"

Investment in upskilling is crucial, at a time when industry and engineering in the broad sense of the term are finding it difficult to attract talent. However, companies in the building, energy, and infrastructure operation sectors have a competitive advantage in the recruitment battle: at a time when the younger generation is anxious to serve the public interest, these companies build structures and facilities that are not only designed to last, but are increasingly environmentally-friendly thanks to new standards. The Boston Consulting Group experts, who notably took part in the World Economic Forum's "Shaping the future of construction, an action plan to solve the industry's talents gap" report, encourage companies to undertake image campaigns to stress these positive aspects.
"In the infrastructure, building, and engineering sectors, your work is practical: the building or bridge you helped to put up is tangible," says Romain de Laubier, Partner and Managing Director at the Boston Consulting Group (BCG). "This is an advantage in an increasingly virtual world."
The introduction of new industrial process technologies is a further way to attract talent, provided the change is well managed in a sector in which working methods have changed very little over the past few decades.
The "Les dirigeants face à l'industrie 4.0" (top management and industry 4.0) study, carried out by Mazars consulting firm together with the Opinion Way Institute, shows that training and skills development is the second greatest concern of top managers, just after cyber-security: 70% fear a shortage of in-house advanced technology skills and 68% are worried about being able to attract qualified employees.

New methods

"The so-called conventional production and maintenance jobs will not disappear. But AI, big data, and robotics will profoundly modify them. Decision-makers are going to have to take these new working methods on board," says Vincent Saule, partner and change support expert at Mazars.
Pay is important, but it is not the only decision criterion.
"What attracts talent is the quality of the project. Young people want their work to be socially useful."

"What attracts talent is the quality of the project. Young people want their work to be socially useful."

If the company can succeed in involving employees in a positive project, they will stay. Companies in the construction sector are the new cathedral builders, and they must call attention to that fact."
Mazars Partner Juliette Decoux adds that "Groups must also develop CSR (corporate social responsibility) projects, for example in the energy transition sector, with which young people can identify."
In the drive to invest work with meaning, train employees in the new technologies, and recruit the right profiles for the present and the future – to redefine skills and transform jobs - the focus is more than ever on the human being.

TRANSFORMATION

"TOP-DOWN MANAGEMENT IS A THING OF THE PAST"

Patrick Lebrun, Deputy Managing Director of VINCI Energies, analyses the changes taking place in expertise and business activities as well as the new aspirations of young talent and the ways in which companies must adapt.

Could you tell us about the new business activities, new expertise and new profiles that are now taking hold and emerging?

Patrick Lebrun. Half of all the business activities that will exist in 10 years' time do not yet exist. The activities that are emerging and taking root are in fields such as augmented reality, virtual reality, energy storage, increasingly complex algorithms, artificial intelligence, big data utilisation, image processing and very precise geo-location. They cut across VINCI Energies as a whole: industry, "the industry of the future" or "Industry 4.0", which is increasingly digital, energy and transport infrastructure, with smart grids, buildings, public facilities, cities, etc.
But there is a caveat: technology, algorithms, digital activities and so on only make sense if they serve people. This vision was reflected in our participation at the most recent Viva Technology, held in Paris in May 2018, where we focused on the theme "Human beyond Digital".

How would you describe the job market in the main countries where VINCI Energies operates?

P.L. All of our job markets are under pressure. For one thing, the economy is improving virtually everywhere, which is good news. For another, our markets are promising in the long term in both transformation and acceleration. It is true that some countries and some skills are under more pressure than others. There is over-employment in Switzerland, the Netherlands and Germany. In France, unemployment remains high, but the skilled jobs required in VINCI Energies' technology-focused segment are under pressure in most of our markets.

For today's young graduates, pay is no longer the only criterion...

P.L. True. Workplace atmosphere and quality of life, work content and interest, values, management, personal development and work-life balance are also important. Three decades ago, people aimed for a career. Now they look for a workplace experience that offers fulfilment and meaning.
All these aspects have become very important, and not just for young people. But pay is still a factor. It is an "all at the same time" expectation, if I could coin a phrase.

> Three decades ago, people aimed for a career. Now they look for a workplace experience that offers fulfilment and meaning.

What practical changes has VINCI Energies made in this respect?

P.L. We are doing a lot of work on our tools and our premises, on employee skills development and on the management of our business units, for which the cornerstone is what we call our "shared budget/strategic plan". Top-down management is a thing of the past and today's talent wants a more participatory, collaborative approach.
Our business model based on networked human-scale business units lends itself to the development of a 21st century style of leadership. Working on it helps us recruit talent, but, to repeat, it also helps us keep our promise of offering meaningful, motivating and fulfilling long-term careers.

What about women at VINCI Energies?

P.L. We still have far too few (13%, across all activities, functions and levels)! One of our major goals is to hire more women for our teams, if only because women constitute half of humankind and thus form a talent pool we would be foolish to neglect. In addition, many of our customers and partners are making progress in hiring women, and we must follow suit to keep pace with them. Lastly, it is now crystal clear that better gender balance has a very beneficial effect on companies' creativity, growth and performance, on the quality of life of their teams, on their ability to weather crises and on their corporate social responsibility.

In your recruitment policy, how important are soft skills compared to technical qualifications?

P.L. Soft skills are crucial, especially in service activities, where people work in teams and in project mode. Attentiveness, generosity and solidarity help build collective intelligence. Today, you can't succeed with hyper-individualistic whiz kids. In fact VINCI based its most recent recruitment drive on soft skills, encouraging those who are "too ambitious", "too bold", "too creative", "too curious" and "too generous" to submit a job application. But here again, we have an "all at the same time" expectation. In a group like VINCI Energies, which includes a wide range of technologies in all its solutions and services and operates against a backdrop of accelerating transformation, we also need people who are well versed in state-of-the-art technologies.

With technologies, skills, business activities and markets changing constantly and at an ever-faster pace, how does a business unit rise to the challenge?

P.L. The keyword is "agility" and it reflects VINCI Energies' organisational structure.
Our group employs 75,000 people and generates revenue exceeding €10 million by a wide margin, but our trademark and one of our success drivers is our special structure, which we have managed to retain: a flotilla of small boats, rather than a huge aircraft carrier; autonomous business units on a human scale that are flexible, responsive and agile, and that operate close to our customers. The key lies in being agile, accelerating our innovation processes, integrating new work and management methods and fostering relationships with our suppliers, who are also substantially innovating. But there is another very important factor: skills development and ongoing training. We are providing more training than ever, but we will no doubt have to further step up our efforts, with the support of the new forms of learning that are now emerging. We must make all our business units into learning organisations, in which every employee is constantly learning and acquiring new skills, including in his or her day-to-day work. This is prerequisite for our success going forward.

CITY | TRANSFORMATION

NEW PROFILES FOR THE CITY OF THE FUTURE

An increasing number of smart city projects are prompting collection of massive amounts of data that must be checked, processed, and secured in a complex process calling for special skills.

The new challenge facing urban areas is to connect the city with users of infrastructure, transport systems, buildings, and energy in order to make the city more efficient. But the smart city is often held back by the separation of municipal services, which impedes the collaboration needed for city digitalisation.
"If the mayor is a visionary, he grasps that this change is more a source of progress than a loss of control over city administration," says Thierry Czech, technical and innovation manager at Omexom (VINCI Energies). For this reason, providers seek specialists in such fields as urban planning to help them better understand the issues faced by the customer. "We operate increasingly as a partner of the city and not just a supplier," says Thierry Czech. Three Omexom entities already have urban planning type capabilities.
The smart city requires big data, and the first requirement is to aggregate data to improve the operation of services. Data collection requires installation of electronic sensors, for example to monitor urban traffic. This change has generated a need for people such as data scientists, who have skills that did not yet exist just a few years ago. These various experts are able to organise data collection and transmission, and manage data storage and processing. The work continues with statistical analysis and then, by accretion, evolves towards predictive vision; these tasks use artificial intelligence algorithms.

Properly defining needs

Another skill sought by suppliers of smart city solutions is cyber-security to ensure the integrity of the data collected. But Thierry Czech warns that "We must be careful not to over-engineer security and to design protection systems that match the value of the data.
The task of determining the end-to-end security level must be jointly performed by the customer, the project manager, and the encryption specialist." Previously, no IT precautions were needed to manage a public lighting system. Today, the messages displayed on connected message boards can be intercepted and altered, as happened recently in Paris during the 2017 French presidential election.
To attract such specialists, providers are developing a variety of measures and taking initiatives ranging from start-up incubators to calls for projects via hackathons. These measures also appeal to AI specialists, who can operate the algorithms that process the masses of data collected from the public space, and who are also very much in demand.
"The world has become virtual. This fosters innovation but also generates substantial complexity. It is only when you implement these programmes that you can tell whether they are genuinely efficient," says Thierry Czech. The most recent emerging job that can help the suppliers of smart city solutions is the social media specialist who can oversee the new communication tools.
"In calls for tender, we are increasingly seeing a requirement for participatory applications, which must be managed" says the Omexom technical and innovation manager.

Singapore, a smart city laboratory

The city-state of Singapore (population 5.8 million) presents itself as a smart city laboratory. The multi-ethnic (75% Chinese, 14% Malay, 9% Indian) city has invested heavily in data collection and processing to improve such things as traffic flow, safety, and location of day-care centres.
The government's Smart Nation programme was launched in 2014 and the city hosts the annual World Cities Summit.

ENERGY | TRANSFORMATION

ELECTRICITY SUPPLIERS ENERGISED BY BIG DATA

The digitalisation of electrical infrastructure calls for new skills. Big data expertise is at the heart of this transformation.

According to the International Energy Agency's Digitalization and Energy 2017 report, digital tools will enable electricity suppliers to improve their productivity and reduce their costs. Digital technologies can make electricity grids smarter and reduce operating and maintenance costs as well as capital investment.
In predictive maintenance, connected sensors can be used to repair equipment before a fault occurs. The data generated by the sensors can also be used to adapt the use of the equipment to its capacity and to grid requirements. In infrastructure management, new technologies such as drones can facilitate maintenance of pylons – though of course, expertise in piloting the small flying machines as well as processing and exploiting the images they capture is required!
In all these cases, big data is at the heart of the transformation, and electricity sector jobs must adjust to the new circumstances. "The first phase of the digital transition, which may seem basic, is to digitise all paper documents used on worksites. This does not revolutionise the job of the field technicians, but it does directly affect the way they work.
We therefore need people who are able to understand the specifics and limitations of our activities and to engage in dialogue with the developers of these digital solutions to ensure that they are adapted to our needs and therefore adopted," says Omexom digital innovation project manager Benoît Kieffer.
What is needed is people who understand the business activity as well as IT architectures and database management. Example: digital innovation manager.

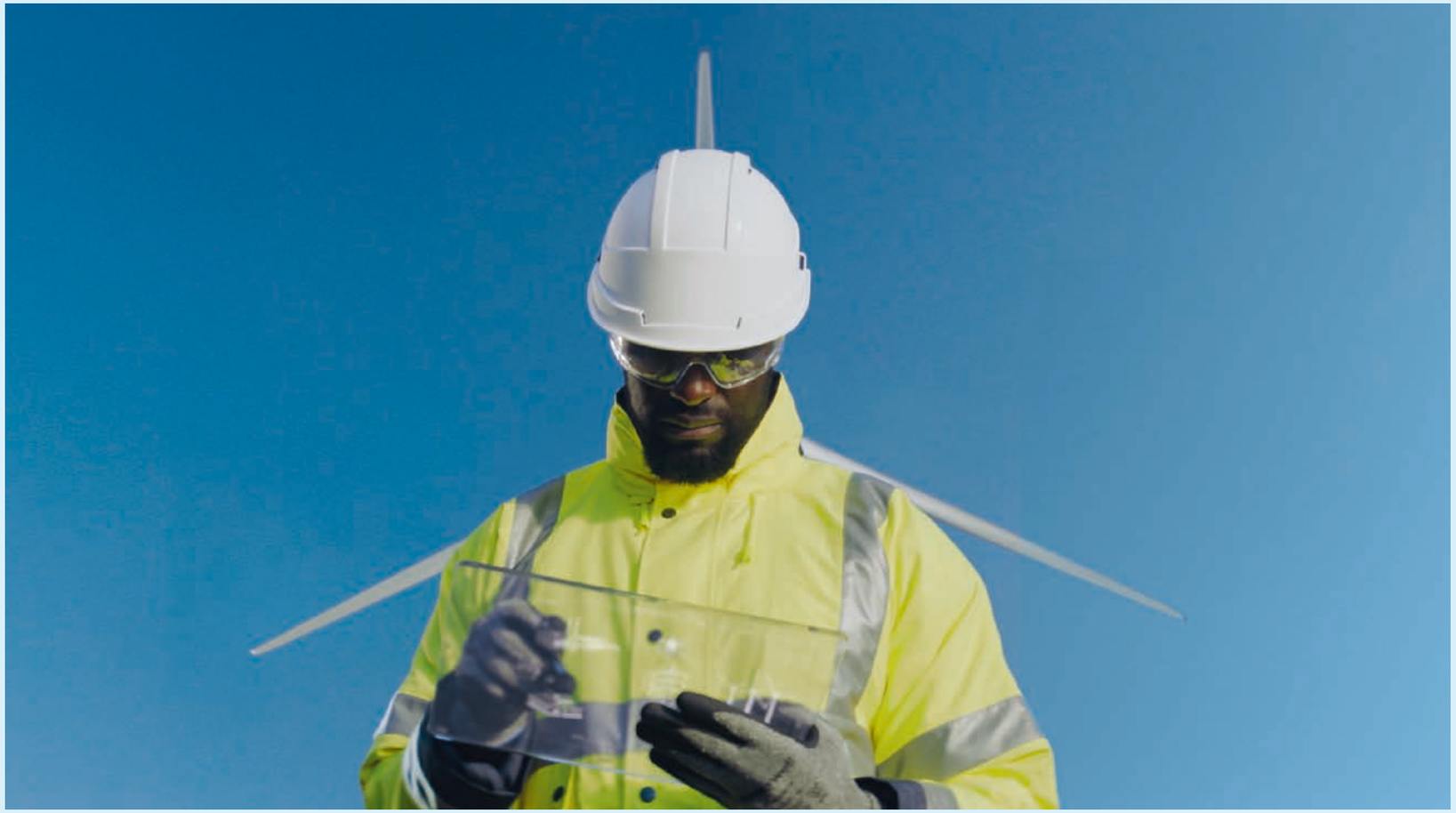
Attracting the big data wizards

Alongside the traditional jobs that digital technologies are improving, new skills are emerging in such fields as big data, blockchain, and machine learning. Omexom looks to start-ups to acquire these capabilities. "For example, we are working with Sterblue to carry out electricity pylon inspections using drones. The photos are then decoded using an algorithm trained by our experts," says Benoît Kieffer.

The next step is to develop an automated drone flight and photography programming solution. When combined with the machine learning algorithm, this gains time by preparing the work of the expert.
The Omexom brand business units have to analyse and process an increasing volume of data generated by equipment that is increasingly digital and increasingly connected.
The teams have the expertise to recover and use some of this data but they do not yet have the skills to interpret it more broadly and to make wider use of it.
This means that we must attract data scientists and data analysts - two profiles that are in high demand.

However, the VINCI Energies brand has advantages enabling it to attract these data wizards. "At VINCI Energies, the data scientist is not going to be sitting there coding 24 hours a day, disconnected from reality," says Benoît Kieffer. "His or her data work will be combined with expertise in our sector to achieve concrete results and work up a package solution for a customer. Their job with us is not like the job of a pure data or IT player, who is not always able to understand our industrial customers."

> "At VINCI Energies, the data scientist is not going to be sitting there coding 24 hours a day. His or her work will achieve concrete results."



BUILDINGS | TRANSFORMATION

THE BIM FOCUS OF THE BUILDING

The building industry, long considered conservative, is today integrating an increasing number of technological innovations. The construction and maintenance sector is therefore recruiting and training people to provide the new skills required.

BIM (Building Information Modelling) manager, low energy building technician, EPC (energy performance contract) manager, home automation specialist, space planner: from construction to maintenance, new jobs are proliferating in the building sector as it rapidly introduces digital technologies. Meanwhile, more traditional jobs - such as bricklayer, heating specialist, and electrician - are adapting to the new technologies (networks, IoT) that are now used in heating, climate control and lighting systems.

This two-track change affects both service and technical maintenance (or facility management) jobs. "Hospitality management, for example, brings the quality of service provided by the hotel industry and high-end co-working sites to companies. In 2017, to support this trend, VINCI Energies acquired Opal Group, a company that makes hospitality managers available to our customers and their end users," says Philippe Conus, Director of the VINCI Facilities brand.

Digital technologies have also generated increasingly complex systems for managing buildings. BIM, for example, has given rise to new functions such as customer support in designing the operating BIM system. "In design, BIM managers rely heavily on 3D applications. In operations, there is now a very substantial focus on databases, which is new," says David Ernest, Innovation Director at VINCI Facilities. Three new areas of BIM expertise have been identified: BIM design and expansion; BIM administration (access rights, data integrity); and BIM maintenance (updating of features). "Saint-Gobain recently introduced BIM maintenance in a call for tender," says Philippe Conus by way of illustration.

Ad hoc training

The next step after building information modelling is smart building construction. BAS (building automation systems) and related systems that are used to run installations and infrastructure must also now include digital technologies in their processes. "BAS is looking more and more like IT," says David Ernest. "We are getting to the point where IP (Internet Protocol) networks will be installed in buildings." This involves digital networks and digital devices that produce data, which must then be processed and also protected, since digital technologies always entail a risk of cyberattack. A year ago, VINCI Facilities set up a Facility Management Institute in partnership with the VINCI Energies Academy to train its technicians and engineers. The first sessions started in June 2018, and others are expected to follow soon. "We already have six facility management and building energy efficiency training programmes. In coming months, we will be adding BIM, business IT, etc." says Philippe Conus. Pending the effects of these training programs, there is a need to recruit trained people to handle these new jobs. This type of talent is in very high demand. VINCI Energies, which leverages its attractive and innovative employer image, has just sponsored a class at the École Supérieure des Travaux Publics-Paris (ESTP) engineering school.

The green specialist, a sought-after profile

In the building sector as in other industrial activities, one profile is in growing demand with the increasing attention being paid to sustainable development and environmental footprint: the green specialist. A consulting firm such as Greenfish, based in Brussels with offices in Amsterdam and Paris, can train them and place them with industrial and service companies.

ICT TRANSFORMATION

IT, A POOL OF NEW SKILLS

Information and communication technologies are at the heart of the digital transformation. It is here that the new skills that will supply the other industrial and economic sectors are being developed.

Of course, hardware still exists, but IT resources and infrastructure are distributed in the various clouds or on-site, or even on edge, when real-time processing or data confidentiality requires local data processing. The revolution under way is the digital transformation of ICT, driven by the spread of "software defined" technologies. Software and scripts now manage the fullrange of resources and infrastructure (data centre, company network, telecommunication networks). This holds out huge possibilities: first, the rollout and management of distributed infrastructure and the networks that connect it are now being automated, making it possible to adapt in real time to keep pace with rapidly changing business. "Today, we need to be able to integrate dynamic solutions and architectures controlled by this software. IT is currently being automated and we need teams to programme, configure, and write the scripts. You could almost call it infrastructure 'as a code'," says Olivier Genelot, Director of the Axians brand (VINCI Energies). Moreover, thanks to software-defined technology, the network can identify applications, which makes it possible to better manage them – for example, by optimising quality of service or boosting security. By designing applications with micro-services and using "container" technologies, applications can also be enabled to manage the resources they use. A retail site can, for example, trigger the use of additional resources in the public cloud to cope with peak activity in the run-up to the holiday season. Plus, it can do so automatically and in real time.

Transformation requires changes in jobs and skills

New jobs are emerging, for example that of the "enterprise architect", who defines the company's IT architecture to support automation of the various processes.
The integration teams must master the automation and virtualisation tools, know how to interface the various pieces of equipment using APIs (Application Programming Interfaces) supplied by manufacturers, and be able to design scripts that can operate comprehensive solutions. Artificial intelligence, which optimises or automates a large number of operations, is also accelerating this transformation. "We used AI to automate the error identification and classification process in the IT system of a major bank, which enables us to take a proactive approach to managing the infrastructure."

> "IT is currently being automated and this means programming, configuration, and writing scripts. You could call it infrastructure 'as a code'."

"But this is more an adjustment of job descriptions than the creation of new jobs," says Olivier Genelot. "Most of our team members have a sufficient skillset to support our customers." Extensive training must nevertheless be conducted to keep pace with rapidly changing technologies. International reach is also beneficial. "We assiduously cultivate the international dimension, particularly in specialist areas, and this boosts our attractiveness," says Olivier Genelot, who looks for people who are adaptable.
"We have also created cross-cutting communities that discuss the new technologies and share information in order to accelerate a number of developments." Skills transformation is not limited to technology.
"Customers expect to receive advice to help them clarify their choices," says Olivier Genelot, "because the range of technological options available - cloud, data centre, virtualisation, applications, etc. – is so broad. We are therefore also sharply expanding our consulting expertise and services."

INDUSTRY | TRANSFORMATION

AI AT THE HEART OF THE FACTORY OF THE FUTURE

Big data and artificial intelligence skills are in high demand to operate increasingly high-tech Industry 4.0 production facilities.

Will AI save industry? The Boston Consulting Group's international AI in the Factory of the Future study found that 29% of respondents see artificial intelligence, which can potentially reduce production costs by 20%, as the leading productivity driver. As a result, 87% of factory managers said they planned to install AI solutions in their factories within the next three years.
This revolution raises the crucial issue of who is to manage these machines running on algorithms. Employees must be trained to control and process the big data that fuels AI. The problem is that it takes employees a long time to acquire these skills, while artificial intelligence is progressing at breakneck speed. The alternative is to recruit data scientists. But such experts are in high demand across all economic sectors, and attracting them into an industrial sector that can hardly be said to have an up-to-date image and paying them high salaries in order to overcome the talent shortage is challenging.

However, industrial companies may have some time to prepare. Bruno Nicolas, Director of the Actemium brand (VINCI Energies), believes that despite headlines about its exponential growth, artificial intelligence is in fact only gradually being introduced at industrial sites. "Given the cost of these investments and the need to safeguard the quality of the finished product, digitalisation 4.0 remains narrowly targeted at specific types of equipment where the potential gains are highest. For example, wireless sensors, a data processing system, and a touch screen can be added to an existing automated line to give the operator-technician additional decision-making support. Factories have already been through the automation revolution but have not yet experienced the digital revolution that is now taking place all around us."

As a result of this change in the human-machine interface, operators now serve as technicians and must continuously acquire new skills and even new reflexes. Designer-integrators also need to acquire new qualifications in cobot training, vision systems, predictive maintenance statistics, cyber-testing, and further specialist skills that cannot yet be predicted.

Requalification

"Factory automation entails job requalification," says Valeo Compensation, Benefits and Training Director, Patrick Benammar. The good news is that the disruption is reducing the number of tedious and arduous jobs and replacing them with PLCs and skilled jobs.

"But AI does not necessarily replace the operator. Quite often, it provides the operator with valuable support," says Olivier Genelot, Director of the Axians brand (VINCI Energies). "For example, we set up an AI solution at an industrial site that increases production volume by 10% by eliminating bottlenecks. Data is collected from all machines and the AI system provides each operator with real-time information. They are thus able to manage their production cells in such a way as to optimise the operation of the factory as a whole.

If the interface is well designed, the AI solution is a fairly natural extension of the operator's work and will not require requalification. It is therefore up to integrators to design appropriate AI solutions based on the user's needs and working environment. This means that integrators need to have much broader knowledge than algorithms.

"Factories have not yet experienced the digital revolution that is now taking place all around us."

However, the algorithms that are used do require special expertise. To attract artificial intelligence experts, VINCI Energies offers them challenging assignments and an international work environment. "We provide the geek atmosphere they love," says Olivier Genelot, who says that admittedly there is also compensation pressure in these sought-after jobs.

In Germany, Industry 4.0 learning factories

Training in the new jobs generated by factory digitalisation is a major focus of attention in Germany, where the Industry 4.0 concept was invented in 2013. A score of learning factories are training operators in conditions very close to reality. The radical change is supported by the trade unions. IG Metall, for example, has introduced training programs for shop stewards.

INDUSTRY | TRANSFORMATION

RECRUITING THE NEXT GENERATION OF ENGINEERS IS A MAJOR CHALLENGE

I joined VINCI Energies in 1991, moving to the UK business in 2010, and in that time one thing has been constant – the challenge we and our customers face in finding people interested in the engineering sector and with the right engineering skills. In their latest report on the state of engineering, Engineering UK estimate that 124,000 people are needed to meet demand for core engineering roles every year – but that the UK is falling up to 59,000 short.

There are many reasons for this shortfall, but one of the major causes is that engineering finds it hard to appeal to young people thinking about their future.

To give credit where it's due, institutions and organisations like Engineering UK and the Royal Academy of Engineering recognised the problem several years ago, and their action is starting to pay off.

However, there is still much more to do, especially to attract women into engineering degrees and careers. The challenge, across the board, is to turn this surge of interest into interesting and rewarding careers in engineering.

Successfully tackling this challenge is central to VINCI Energies as a business, and we take the search for the best and brightest new engineers – and developing them – very seriously.

Our values are essential to our offer to people starting their careers in engineering. We trust and empower our employees from day one, and expect people to take on responsibility for projects from the start.

Innovation and entrepreneurship also lie at the heart of our business, and employees quickly gain the opportunity to work with the latest technologies and techniques in tackling business challenges.

This helps our employees build up their professional experience.

Recruiting and retaining

This approach means we are better able to help keep people in our business at VINCI Energies and in engineering in general.

To attract people into the business, we have brought in a new Modern Apprenticeship Scheme, a Graduate Advancement Programme and dozens of internships opportunities in all our Business Units, resulting in a sharp increase in the number of people joining us as they begin their careers. All of these have already made a huge contribution to our business, and in return, we make a huge contribution to their development.

We also recognise there is more to be done in ensuring the pipeline of future engineers remains open.

To this end, we work with the WMG Academy in Coventry and Solihull, and are commissioning work which offers year 11 pupils the chance to work on a 'design and make' project that contributes 50% towards a GCSE Award in Systems & Control.

This approach to attracting and retaining engineering talent has worked for us, and as the businesses we work with adopt their own approaches to address this challenge, we can see a bright future for engineering.

Rochdi Ziyat
CEO, VINCI Energies UK & ROI

INDUSTRY ACCELERATION

THE AUTONOMOUS TRUCK AT THE CROSSROADS OF THE TRANSFORMATION

A decade from now, the autonomous truck will be a reality disrupting the wholesale, retail and logistics sector. The electric, connected truck will both protect the environment and deliver technological performance.

On the road to the self-driving vehicle, the electric car may be overtaken by the truck. A study by PwC, "The era of digitized trucking: transforming the logistics value chain" reinforces the idea that it will take time to resolve the safety issues raised by the use of the driverless car in the city, but that the ignition has already been turned on for the connected truck. In addition, it has an electric motor: Tesla announced at the end of 2017 that it will be introducing a battery-powered truck with a driving range of 800 km. According to PwC, the arrival of the driverless truck in most industrialised countries by 2030 will have an impact on the road haulage market and beyond that on the retail and e-commerce industries. In France, for example, road haulage accounts for 87% of goods transport. Meanwhile, distributors such as Amazon are seeking to control all aspects of delivery. PwC says that "The truck will soon be integrated in the real-time logistics information system that connects the entire goods transport value chain, from the supplier to warehouses, distributors and the final customer."

"The truck will soon be integrated in the real-time logistics information system that connects the entire goods transport value chain."

Cost reductions

The technology disruption is expected to result in a 5% reduction in the cost of logistics and maintenance for transport companies by 2020 and a 10% reduction by 2030. The savings will be primarily due to the two-thirds reduction in the cost of the truck driver. However, "The human being will remain at the heart of the value chain, but will be reassigned to different tasks," says the lead author of the PwC study. The "last kilometre" issue remains, as does the issue of customer contact at delivery. It is expected that new jobs will be created.

"Platooning"

The combination of connectivity and processing of data tracked by sensors of all types is making the conquest of autonomy possible. Connections with fixed facilities such as toll stations and parking areas, as well as with companies, can lead to improved itineraries as well as to optimisation of the logistics chain, with virtually real-time adaptation of supply and demand. Trucks will be connected with each other to exchange traffic and travel time information in real time. This will enable them to form convoys in a "platooning" system that will better control travel and save energy. The arrival of the Tesla truck will dispel the idea that the internal combustion engine is needed for long-distance travel. "Autonomy fosters electric solutions for haulage," says Laura Brimont, a researcher at the Institut du développement durable et des relations internationales.
The autonomous truck will be safer and more environmentally friendly. The digital transformation meets the energy transition – on the road.

INDUSTRY ACCELERATION

COLLABORATIVE INNOVATION IS ACCELERATING 3D PRINTING

The Additive Factory Hub aims to break down the barriers to the industrialisation of additive manufacturing, in the same way as what is being developed by Actemium with the Atelier laser du future (Laser workshop of the future).

In December 2017 on the Plateau de Saclay, several French companies and academic institutions launched the Additive Factory, with one objective: to accelerate the industrialisation of additive manufacturing, the famous 3D printing. An initiative applauded by Thomas Leseigneur, Innovation manager at Actemium (VINCI Energies), for whom "the collaborative approach constitutes the best method to answer the questions that a number of industrialists are asking themselves before bringing 3D printers into their workshops". The collaborative approach is at the heart of the Atelier laser du future (ALAFU) developed by Actemium. This project, which came to be thanks to the joining of forces and experience of several Actemium businesses, has the aim of presenting additive manufacturing as a true high-volume mass production solution and above all as a reliable, sound, and well-managed technology. As Thomas Leseigneur explains, "product qualification, which translates as the decision to make a part using additive manufacturing or in a more traditional manner, is one the workstreams of the 3D entrepreneurs. Characterisation of metal powder is another. It's this powder, deposited in successive layers and treated with laser, that will constitute the material of the final part and what's at stake is to guarantee its homogeneity, grain size, purity, unicity and, ultimately, its reliability." The ALAFU project specifically includes a powder processing facility and a control system for the parts produced, one of the issues of the Additive Factory Hub partners' works. Integrator of production lines but also of additive manufacturing workshops, Actemium has got one foot in future planning and the other in production: recently, for one of its customers the company set up an entire powder processing installation integrating storage, characterisation, distribution, and recycling.

CITY TRANSFORMATION

DIJON COMBINES TRANSFORMATION AND SERVICE

As part of its drive to go green, the city of Dijon (France) called on Citeos to install 150 parking meters equipped with solar cells and wireless communication capabilities.

The change in rules for paid parking in French cities may not be all that popular with drivers, but in Dijon it has led to a significant technological and environmental breakthrough. Indeed, half of the 300 new parking meters installed throughout the city run on solar power.

> Topped with solar cells, the parking meters are self-operated and don't need to be connected to the grid.

Citeos (VINCI Energies) installed the 150 devices "in a short timeframe so as to fit in with the schedule of a project that involves removing existing power lines," says Toni Ferrentino, Citeos business unit manager, before adding that "the works are part of a drive to transition to sustainable energy," a specialism of this VINCI Energies brand. Topped with solar cells, the parking meters are self-operated and don't need to be connected to the grid. Nor do they need cables to communicate with the management system since they are linked via a radio-based wireless network. Equipped with a screen, keyboard, and payment terminal, these state-of-the-art parking meters allow users to pay by credit card, including contactless, and cash. As well as offering various payment options, these smart devices installed by Citeos make people's lives easier. Tickets are electronic so drivers no longer need to display their paper tickets on the car windscreen. Instead, a receipt is issued for card payments, and the new type of flat-rate parking fine ("forfait post-stationnement") can be settled at any parking meter.

CITY INNOVATION

MORE DATA, FEWER TRAFFIC JAMS

To relieve traffic congestion, urban areas are now using cameras and loop counters. In future, "Floating Car Data" (FCD), will enable them to regulate traffic by collecting large volumes of localisation data from moving vehicles. One such system has been set up in Rouen, France, where the local authorities are working with Citeos.

Traffic jams are known to harm the environment but there is less awareness of their economic impact. Traffic jams on roads and motorways cause a major budget outlay for governments. According to INRIX, a supplier of solutions for the transport sector, traffic jams will cost the Western economies €221 billion per year by 2030. In France, the annual cost will be €22 billion, up 31% from 2013. Of all the cities included in the scope of the INRIX study, Paris will experience the sharpest increase (51%).

Combatting traffic jams

Combatting traffic jams is an absolute priority for cities. "Not only is it technically impossible to widen the streets in large cities, but city authorities are now called on to limit the number of cars in order to reduce pollutant emission levels and congestion costs," says Citeos Rouen (VINCI Energies) Business Unit Manager Jean-Marc Raymond.
The most efficient way to do this is to regulate traffic, especially now that cities have an excellent tool for this purpose: "Floating Car Data" (FCD).
Today, most urban areas are investing in algorithm-based traffic control systems.
For example, the Traffic Control Centre (PCRT) in the north-western French city of Rouen can change intersection traffic light loops, utilise information provided by CCTV cameras and sensors installed along streets, disseminate messages to drivers via message boards located near the main arteries, share information on the website, and send motorists text message alerts.

Today, most urban areas are investing in algorithm-based traffic control systems.

Multimodal control

"Current developments in supervision systems make it possible to think not only in terms of the automobile itself, but to include data measurement and processing in a multimodal control approach that includes pedestrians, taxis, public transport, bicycles, and smart vehicles," says Jean-Marc Raymond.
In future, traffic monitoring, still primarily based on data from loop counters embedded in the carriageway, will increasingly use "Floating Car Data".
FCD uses the telecommunication network to anonymously report vehicle geolocation data via GPS navigation systems, radar detectors, and smartphone applications.
This raw data is processed to provide information on traffic speed per section as well as traffic flow and congestion.
"FCD offers several advantages. It is a flexible and responsive solution. It does not require equipment installation (CCTV cameras, traffic loops) or in situ maintenance. In addition, it uses independent equipment, which protects measurement from service interruption," says Jean-Marc Raymond.

BUILDINGS PERFORMANCE

THE “DIGITAL TWIN” MAKES MAINTENANCE MORE AGILE

In Germany, VINCI Facilities offers the “Digital Twin” solution, which displays the full set of relevant data needed to manage a building’s facilities efficiently.

An alert is posted on the campus maintenance department’s internal messaging system, which reads: “fan broken down, office 512, Lavoisier wing”.
The information appears clear, and yet the technician might waste time finding his way to the office only to discover that there are two types of fans and the parts he had brought are not the right ones. This imaginary – yet realistic – scenario will soon be a thing of the past. At least that is the goal of an innovative navigation and documentation solution developed by VINCI Facilities in Germany.
In a building equipped with the Digital Twin tool, developed by the German NavVis company and interfaced with the VINCI Facilities computer assisted management system, the technician will now receive an incident report containing a photograph of the place where the failure occurred, taken by the customer who reported it. Based on this photo, the Digital Twin will locate the office and display it in an environment similar to Google Street View.

The technician then uses the “NavVis IndoorViewer” to conduct a virtual inspection before proceeding to the site. He examines the type of fan to be repaired and uses the photo of the fan to open a documentation window that gives him relevant information such as the most recent maintenance report, a video tutorial, and a nomenclature. This enables him to prepare and optimise his service call. In addition, the building’s digital twin shows him how to get to the location of the alert, thus reducing the time spent looking for it and keeping that needed for maintenance to a minimum.

Better than an indoor Street View

“This solution considerably boosts efficiency,” says Moritz Nelles, VINCI Facilities business unit manager in Germany. “It also gives us a competitive edge in contract awards, especially in contract renewals.”
For business units, the Digital Twin has the advantage of reducing their dependence on local and personal familiarity with the spaces. The solution is particularly suitable for existing buildings that are not equipped with BIM (the building information modelling system designed prior to construction).
It is more than an indoor “Street View”. It is a navigation tool but also a very intuitive way to access building documentation.

The technician can display spaces, directions, and documents provided by building management software such as ERP (Enterprise Resource Planning) and CAFM (Computer-Aided Facility Management) connected to each space.

A “layered” system (in which information is organised in layers that can be superimposed on each other) makes it possible to display only one type of information, such as a heating network, while excluding all other utility systems.
“The phase prior to digitisation of the spaces is simple and easy to carry out,” says the VINCI Facilities manager. A technician without prior training, pushing a trolley equipped with seven cameras and a geo-location system for photos taken at 720 degrees, can digitise some 30,000 sq. metres in a single day. Processing of the captured data and creation of links to the management database takes more time.

VINCI Facilities is currently finalising the development of this innovative solution. A school near Munich, managed by the VINCI Energies brand Facilities, is serving as a pilot. Its electronic twin has already been generated by captured geo-located images and the data is currently being processed.
Starting on 6 April 2018, VINCI Facilities will also use this digitalised school for a customer presentation of an interactive building model showing how facilities are managed using the “digital twin”. The demo will be on display in Frankfurt at the new 300 sq. metres “digital Lab” called “Digitalschmiede”.

CITY TRANSFORMATION

HAS THE SMART CITY SEEN ITS DAY?

Thierry Marcou

Cécile Maisonneuve

Mathieu Saujot

Understanding the destabilisation caused by the emergence of "breakthrough" players in the urban environment; overcoming tensions between the "magical thinking" about smart cities and the reality on the ground in cities; establishing a dialogue between governance and innovation... these are all issues raised in the study "Audacities. Innover et gouverner dans la ville numérique réelle" (Audacities. Innovating and governing in the real digital city), published in April 2018. Its two authors, Thierry Marcou and Mathieu Saujot (from the think tanks Fondation Internet nouvelle génération and Institut du développement durable et des relations internationales, respectively), talk to Cécile Maisonneuve, chairwoman of La Fabrique de la Cité, another think tank.

What was the starting point for the study?

Thierry Marcou. For the Fondation Internet Nouvelle Génération (Fing), the study was the final link in a series of projects focusing on digital cities. The starting point for this was our work La Ville 2.0, plateforme d'innovation ouverte (City 2.0, open innovation platform), which was published in 2006. Twelve years on, we thought it would be useful not to simply record successive urban innovations but to look into what isn't working, to analyse the gap that can quickly appear between the comforting promise of seamless urban services, tirelessly repeated by start-ups and advocates of the smart city, and a confused, problematic urban reality, subject to new tensions brought about by disruptor practices.

Mathieu Saujot. At the Institut du développement durable et des relations internationales (Iddri), we specialise in governance, while Fing covers innovation issues. This joint project provided an opportunity to bring our two areas of expertise together. Without this collaboration, we would probably not have been able, each from our own perspective, to form a relevant critical analysis of the "magical thinking" about the smart city.

Cécile Maisonneuve, do you think that this critical assessment of the smart city and the magical thinking that surrounds it is justified?

Cécile Maisonneuve. Actually, I would say it's healthy! At La Fabrique de la cité, we avoid using the term "smart city". Nevertheless, it has been around for 20 years. What strikes me is that although there is now consensus about the need to reject this "magical thinking", the smart city continues to be the focus of seminars and conferences. It seems that, despite the tensions rightly mentioned by Thierry Marcou and the widely held criticism, the term is surviving when it should be dead and buried. Perhaps that's precisely because innovation is failing to fulfil its promise, while at the same time the situation in cities is deteriorating and the need for discussion, for debate, remains strong.

Start-ups are very focused on techno-solutionism and generally don't have a very well developed institutional culture. That undoubtedly hinders the effectiveness of their solutions.

Cécile Maisonneuve

M.S. Calling the "smart city" term into question is probably not enough. An elected official recently said to me: "Fair enough, we abandon the smart city, but what do we replace it with?" Maybe we need to use such concepts to guide discussions.

C.M. It's an attempt to grasp a complex issue that we struggle to control. The term provides a shared narrative, which is something people need.
The problem is that by adopting weak concepts which gain traction very quickly, we no longer know what they are supposed to mean and we think we're talking about the same thing when we're not. In this respect, I wonder whether the concept of resilience is now taking over from that of smart city, as a kind of catch-all term.

A theme that runs through your work, alongside concepts, is the fact that urban disruptors are blind to the realities in cities. How do you explain this?

C.M. Start-ups are very focused on techno-solutionism and generally don't have a very well developed institutional culture. That undoubtedly hinders the effectiveness of their solutions. Because thinking about democracy means thinking about the effectiveness of solutions over time. And if the time aspect isn't incorporated into discussions about cities, inclusive cities at any rate, then this will lead to failure. Another thing I notice is that the big digital players – Google, Apple, Facebook, Amazon and Microsoft – have been built on the same culture of monopoly (when they enter a market, they don't target a segment but the whole market) and secrecy. Which is the exact opposite of what society wants; people are looking to see greater cooperation and transparency.

M.S. The culture of monopoly and secrecy may work in the virtual world – and disruptors rely on it to lend credibility to their "magical" argument – but it becomes difficult to sustain in real cities. Monopolies cannot withstand the competition from urban public contracts. And as for secrecy, well that can't be maintained for very long in a public service concession.

But aren't start-ups starting to take into account this friction with reality?

T.M. It was disruption that prompted us to work on "Audacities", having observed the increasing influence and the financial clout of companies like Uber, Deliveroo, Airbnb and Amazon. But the way in which things have developed over the past few months is pretty remarkable. Uber is a prime example. The start-up's growth was initially based on a disruptive and exclusive model. Today, we see it striking deals with US cities to support subsidised public transport, as part of its idea to deliver a comprehensive range of mobility services. In France, Uber has clearly expressed its willingness to talk to some cities about supplementing their public mobility services. So dialogue has eventually been established.

Calling the "smart city" term into question is probably not enough. An elected official recently said to me: "Fair enough, we abandon the smart city, but what do we replace it with?"

Mathieu Saujot

C.M. Let's be positive! These players have experienced a reality check. But they've also shone a spotlight on some real issues. For example, "thanks" to Uber et al., we can no longer say that we're not aware of the gaps and limits of our mobility systems, especially our public ones. They are forcing us to confront our own shortcomings in terms of governance.

T.M. This is not a binary issue. On the one hand, despite being attached to the foundations and values of collective systems, we all want to take advantage of these groundbreaking services, even when it means using underpaid bike couriers. On the other hand, there's no denying the fact that Uber, in the Paris region at least, is filling a gap in the public transport network, through carpooling in particular. But when you see the extent to which shared driving is struggling to get off the ground and that solo driving still has force of law, you see what a lot of opportunities have been missed from not wanting to consider these options sooner and from clinging to a stigmatising attitude towards Uber and the threat it posed to the taxi monopoly!

So cities bear some of the responsibility for the difficulty in establishing a constructive dialogue with such players?

M.S. There are also cultural barriers in the public sphere. When a city, faced with 10 carpool start-ups, decides to back them all even though each requires a critical mass in order to grow, then failure is inevitable. In China, cities choose a single champion and fully support it in its growth. In France, we need to strike the right balance between pushing innovation and ensuring equal opportunities. We need to be capable of saying "this is where we want to head" and of giving ourselves the means to follow through.

What is the best way of strengthening the opportunities for dialogue between governance and innovation?

C.M. Politics is a key entry point. The role of elected officials is to provide a vision, to stake out a very clear position regarding their ambitions for their cities – beyond their 6-year term of office. It's interesting to see some cities getting involved in well-structured forward-looking initiatives, when in France forward planning has always been the preserve of the government or very large companies. I'm thinking of the "Bordeaux Métropole 2050" programme.

T.M. I agree absolutely. Innovation is a political matter. So let's have the debate. I expect political candidates to have a personal position on data, on autonomous cars, on the internet of things. However, to move beyond magical thinking and to steer innovation, urban players must develop relevant assessment methodologies and frames of reference. Extensive efforts need to be made in this respect to acquire the necessary tools.
It's also a question of thinking about what scales and alignments are most appropriate in terms of guiding choices. After all, it's within the framework of the C40 network that European cities came together to provide a response to Airbnb…

CITY PERFORMANCE

SMARTER LIGHTING IS GOOD FOR BIODIVERSITY

Faced with a loss of biodiversity, the finger is usually pointed at global warming and rarely at light pollution. Yet the widespread use of artificial light represents a true menace for the ecosystem. Many studies show that it disrupts wildlife reproduction and migration cycles, accelerates the budding of flowers, and increases the mortality of pollinating species.
In urban settings, where this pollution is present, several kinds of measure have been taken to reconcile human activity, which requires lights, with biodiversity.
First, the emergence of a new generation of devices that direct the beam better onto roads and users, and that reduce light emissions towards the sky.
Then, the arrival of LEDs, which improve energy efficiency and reduce waste. Finally, thanks to "colour temperature": it has been discovered that lights that are too white cause more problems, which is why more recent equipment has warmer shades that are closer to yellow.
But above all, optimisation of night lighting means adapting it to human activity: on a winter evening, the demand for artificial lighting is much stronger than in the summer at the same time.
A long-lasting solution therefore implies adjustment of light levels according to needs: this is smart lighting, lighting that is smart because it is autonomous, capable of detecting an oncoming pedestrian or car, and of adjusting the light level from 10 to 100%.
Such dimming policies have started to be integrated into civil engineering projects, and although their cost is higher than standard lighting, the initial cost is soon recouped thanks to the energy savings made.
For once, controlled lighting has the merit of being both better performing and more ecological.
Businesses have understood this and the number of those offering presence detection in lighting contracts is on the increase.
However, for these measures to have an impact on the community scale, public authorities must take a hold on them. This is what some cities are doing by setting up green or blue belts, areas where extra lighting is reduced so as to preserve biodiversity. The city of Niort (French capital of biodiversity 2013) even plans to mark out a black belt, with no artificial lighting whatsoever, in its future lighting plan.

The awareness of the impact of urban development on biodiversity owes a lot to the meeting up of stakeholders from both public (local authorities) and private (lighting companies) spheres, in discussion areas such as the Association française de l'éclairage (French lighting association) or the Cluster Lumière de Lyon (Lyon Light Cluster). Nevertheless, the best means of reducing light pollution is still through intervention of the legislator. Although environmental legislation has included recommendations linked to lighting, it is still missing a legally binding element to enable it to be truly efficient.
Although there is no question of getting rid of artificial lighting, a compromise must be found between the continuation of human activity and a reduction in light pollution. Today new technologies enable a reduction of the impact of lighting on biodiversity, whilst optimising energy consumption.
To enable this, both public and private stakeholders must understand that the investment will be profitable as well as guaranteeing preservation of the ecosystem in which human beings live.

Xavier Albouy
Director
at VINCI Energies

BUILDINGS TRANSFORMATION

THE WORKSPACE REVOLUTION

VINCI Facilities and Bureaux à Partager have joined forces to provide a novel real-time reservation system that can be used to book workspaces and coworking spaces.

Current megatrends – constantly increasing property costs, lengthening commute times in large cities, proliferation of digital tools and interfaces and growing aspiration for better work-life balance – are all converging to bring about what futurologists long ago predicted: a revolution in our work, organisations and behaviour.
This revolution will start with space. The workspace – the single place on which we have built our concept of professional activity – will increasingly become a shifting, multiple and virtual space that is both fractal and fluid. In doing so it will not disappear, quite the opposite – it will expand, integrate added value and become a fully-fledged service offering.

From property management to facility management

Alongside this workspace transfiguration, another revolution is getting under way in the property ecosystem, where property management activities and capabilities are shifting to facility management. The activity is no longer confined to pushing back walls and moving partitions, but instead makes the most of the full potential of spaces to improve the real-time end-user experience according to user behaviour and requirements. To stay ahead of the curve in the transformation of the property activities, Bureaux à Partager, the leading coworking space company, and VINCI Facilities, the VINCI Energies facility management specialist, decided to combine their capabilities to deliver a common range of services focused on real-time reservation of available workspaces and coworking spaces.

Workspace and coworking space catalogue available in real time

Objective: to enable everyone travelling for work or working from home to use his or her smartphone or computer to access a very detailed catalogue of workspaces and the full range of related services and to make a reservation for the amount of time required.
VINCI Facilities brings to the service its expertise in the design, arrangement, management and coordination of corporate work environments for large users and its network of major accounts. Bureaux à Partager brings its experience in the design, arrangement, management and coordination of coworking spaces for SMEs and start-ups as well as its expertise in coworking space creation and marketing.
This novel range of services, which uses Bureaux à Partager's Flex application, will be rolled out among Paris-area VINCI Energies employees to start with. Following that, VINCI Facilities will make it available to its major accounts and partners.

Clément Alteresco
Founder
of Bureaux à
Partager

Philippe Conus
Director
of the VINCI
Facilities brand

THIS IS THE WORLD'S LARGEST OFFSHORE WIND FARM

The world's largest operational offshore wind farm was inaugurated in September 2018 in the heart of the Irish Sea off the southwest coast of England. Its 87 turbines cover a 145 sq. km area and have a combined capacity of 659 MW, enough to power more than 600,000 households. Called the Walney Extension – a reference to the small nearby island – the huge wind farm was built by energy producer Ørsted, formerly Dong-Energy.

AGILITY **PROFILE**

VINCI ENERGIES, ACCELERATOR OF ENERGY AND DIGITAL TRANSFORMATION

In a world undergoing constant change, VINCI Energies focuses on connections, performance, energy efficiency and data to fast-track the rollout of new technologies and support two major changes: the digital transformation and the energy transition.

Keeping pace with market change, VINCI Energies supports its customers by offering increasingly innovative solutions and services, from design to implementation, operation and maintenance.

With their strong regional roots and agile organizational structure, VINCI Energies' business units boost the reliability, safety and efficiency of energy, transport and communication infrastructure, factories and buildings.

The Group's business units are organized around five international brands – Omexom, Citeos, Actemium, VINCI Facilities and Axians – in addition to brands with a more regional identity.

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