THE **AGILITY** EFFECT
MAGAZINE

DOES THE FUTURE OF THE CITY LIE UNDERGROUND?

AGILITY **LEADER**

EMMANUEL VIVIER, PROFESSOR "RESET"

ABOUT AGILITY

HOW DO YOU TEACH TRANSFORMATION?

VINCI ENERGIES

SUMMARY

EDITORIAL

2018 marks 30 years of the Internet. Three decades seem an instant, but also an age, taking into consideration the incredible upheaval the Internet has caused. All new technologies – and the Internet is a new technology – have initially sparked rejection and/or panic, yet clearly their effects and the changes they brought about have benefited human beings.
There were fears that printing would overwhelm the public with information; the railway would injure the body, which could not withstand such speeds; the telephone would make people deaf and e-mail would slash IQ by 10 points. Today, as artificial intelligence impacts our personal and professional lives, it has not escaped such demonization and catastrophic predictions.
AI is having an across-the-board effect on the technologies used in our business activities. It will transform some jobs and eliminate others. What we see in industry - cobotics, cybersecurity, visual and voice recognition, machine learning - is particularly compelling. Ultimately, AI, with its extraordinary computing power and ability to correlate data, will transcend technology and again place the human being front and centre. This will enable us to look beyond technical complexity and concentrate instead on usage, needs and services.
This is what we mean by "human beyond digital" – focusing our business plan on the human being.

Yves Meignié
Chairman and Chief Executive Officer VINCI Energies

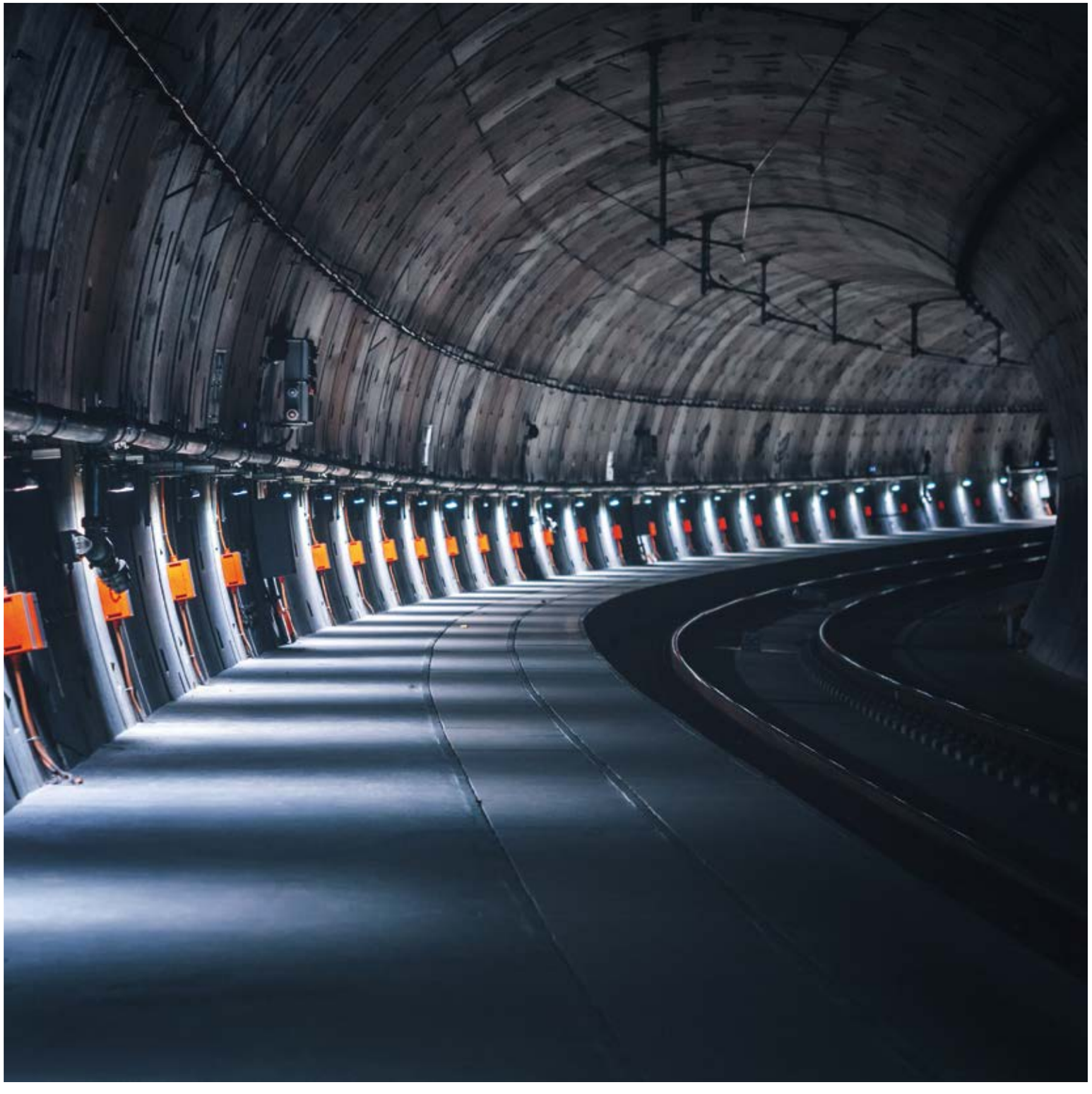
AGILITY **PICTURE**

HEASY, THE ROBOT RECEPTIONIST

Designed by the Lyon-based start-up Hease Robotics, Heasy is an interactive robot kiosk that greets and guides visitors. Equipped with autonomous navigation capabilities, he welcomes and records visitors using an integrated facilities management solution on his large, 19-inch touch screen.
He offers to accompany visitors to their destination and informs the people in the building that visitors are coming to see.
On top of his skills as a hospitality manager, Heasy – currently being trialled at La Factory VINCI Energies, in La Défense (Paris) – also provides practical information and useful services, such as reserving taxis and Wi-Fi access. And he does it all with a smile!

CITY TRANSFORMATION

DOES THE FUTURE OF THE CITY LIE UNDERGROUND?



By 2030, 70% of the world's population will live in cities. The city will therefore have to be re-thought in three dimensions, including underground. How can we use the potential of the subsoil?

"Second boring machine almost ready. Will be called Line-Storm…". On 18 October 2017, billionaire Elon Musk took to Twitter to announce the second generation of TBMs, made by his The Boring Company, which are designed to excavate underground express transport networks underneath large cities in record time. Godot, the first tunnel boring machine made by the U.S. businessman, has already built a demonstration tunnel section in California.

Work on another tunnel with a length of about 16 kilometres is set to get under way soon in Maryland. One still hypothetical idea that Elon Musk's company is looking into would be to eventually connect New York and Washington by tunnel, with cars travelling underground at very high speed (200 km/h), or even to install a Hyperloop pressurised ultra-sonic capsule.

With the world rapidly urbanising and pressure on agricultural land growing, two solutions are self-evident: building above and below the city. The second approach was a focus of attention at a conference organised by La Fabrique de la Cité (VINCI Group) in Lyon (France) in July 2017, at which architects, urban development specialists, and city planners discussed Elon Musk's ideas at length.

For controlled, coordinated development

Beyond science fiction and movies, the underground city is already a reality, as projects carried out in such cities as Montreal and Tokyo

have long since demonstrated. But large-scale development of underground city life must be well thought out.

Not everyone agrees with Musk's approach. "What Musk is doing – suggesting that what you don't want to see on the surface can be put underground – is dangerous. That idea that was widespread in the last century, but that has to change," said Dutch participant Han Admiraal of ITA (International Tunnelling Association) during the discussions in Lyon.

Australian city planner Elisabeth Reynolds is even more critical. She believes that "This idea creates fear of the underground environment and claustrophobia. It is interesting to see that in the illustrations put out by The Boring Company, the underground is a sort of black hole, completely empty." She says that far from this simplistic representation, the underground is varied and complex – as well as vulnerable, with geological, hydrological and biodiversity implications.

Major ownership and data issues

Another issue that must be addressed is ownership. "We may end up with a patchwork of disconnected privately-owned tunnels," said Guillaume Lavoie, a city council member in Montreal, Canada, who believes that concerted involvement of the public authorities is needed. Coordinating the conquest of the sub-soil will call for optimised data and shared digital tools.

> The conquest of the sub-soil will call for data.

U.S. researcher Michael Doyle said that "The available soil and sub-soil data (from underground construction, water systems, energy supply systems, and so on) must be combined to create appropriate mapping tools." Who should hold the data remains to be decided.

CITY INNOVATION

BIOMIMICRY, SHAPING THE CITY OF THE FUTURE

We can draw inspiration from biological processes and systems and the workings of nature to make cities and urban practices more sustainable.

On the one hand, you have rapid urbanisation and its harmful effects on the environment and humanity. And on the other, you have nature, which has been operating in a virtuous manner for several billion years. Why not draw inspiration from the latter to limit the excesses of the former? That's exactly what biomimicry sets out to achieve. It seeks to transfer processes and systems from biology to technology so that sustainable engineering solutions can be developed. Initiatives to make urban plots greener above ground, underground, and on roofs, especially within the eco-neighbourhoods of new cities, may be highly visible but don't in themselves form part of a biomimicry approach.

Zoological observations

However, a number of sometimes surprising variants are being explored on the basis of zoological observations. These include the accuracy of the journey made by ant colonies looking for food, the ability of starling murmurations to move rapidly without colliding, and the way in which elephants stamp on the ground to warn the herd dozens of kilometres away. Such observations have resulted in advances in fields like guidance, traffic management, and signage. Architects, town planners, elected officials, designers, and manufacturers are showing increasing interest in the approach, and cross-cutting strategies are beginning to emerge. The 100 Resilient Cities organisation was set up at the initiative of New York mayor Michael Bloomberg following Hurricane Sandy in 2012 to encourage cities to share experiences – some of which are based on biomimicry. In France, Ceebios has been designed as a national centre of excellence for biomimicry.

ENERGY TRANSFORMATION

THE RENEWABLE ENERGY CHALLENGE IN INDONESIA

Indonesia's largest wind farm, scheduled to begin operating with Omexom in December 2017 in Sidrap, illustrates the renewable energy paradox in the Indonesian archipelago.

In December 2017, 30 wind turbines will begin generating carbon-free electricity on the ridges above Sidrap, an Indonesian city in the southern part of Sulawesi Island. The 78 MW site will be the largest wind farm in a country that is both complex and full of renewable energy potential.
UPC Renewables, the American developer in charge of the project, called on Omexom Renewable Energies Indonesia (VINCI Energies) to design and build the electrical network connecting the site to the national transmission grid, PLN. "Sidrap reflects the various aspects of renewable energy in Indonesia," says Omexom project manager Marc Fischer. The Sidrap site is located on a series of coastal ridges that receive large amounts of wind during the dry season and precipitation in the rainy season, enabling it to supplement and even complement the hydroelectric plants in the centre of the island.

A broad range of energy sources

Sidrap is in that sense representative of the country, which has a broad range of potential energy sources: in addition to wind and hydro, it can produce biogas from agricultural waste, solar energy, and geothermal energy to take advantage of the fact that the islands sit on a string of volcanoes. "Simply by exploiting all its accessible geothermal resources and investing massively in the construction of hydroelectric plants, Indonesia could achieve its COP21 objective of increasing the share of renewables in its energy mix to 23 per cent by 2025," says Marc Fischer.

Sidrap is in that sense representative of the country, which has a broad range of potential energy sources: in addition to wind and hydro, it has biogas, solar, and geothermal potential.

But the broad range of energy sources is not the only focus. As part of its commitment to the transition to renewables, Indonesia is also determined to control its costs. A law enacted in January 2017 caps the Feed-in Tariff applying to the state-owned power utility's purchases of electricity from power producers at 85% of each region's cost of production or at 100% if the cost is below the national average. This method of calculating the FIT forces renewable energy producers to align with the cost of generating electricity from fossil fuels, in a country with plentiful coal reserves, that is the world's fifth-largest coal producer.

Projects put on hold

This law has put a number of projects on hold for the time being (the Sidrap project is an exception, since its Feed-in Tariff had been set with the power utility prior to the enactment of the January 2017 law). Several hundred megawatts of solar and wind capacity are currently in abeyance, says Marc Fischer of Omexom Renewable Energies Indonesia. But the situation can change. "If all the parties involved in a project – developer, public authorities and builder – work together to optimise the financials, it is possible for the project to break even," he says.
Marc Fischer is reasonably optimistic. He notes that the price of coal and oil may rise and that the cost of solar and wind generation – to mention only those renewables – is steadily coming down. Renewable energy is complicated in Indonesia, but it has a bright future!

ENERGY PERFORMANCE

REDUNDANT POWER FOR TRAINS TO ENSURE SERVICE CONTINUITY

In Switzerland, the ETAVIS company (VINCI Energies) installed a redundant uninterrupted power supply system to secure train traffic and ensure continuity of service.

An outage can have serious and even catastrophic consequences in some activity sectors. Hospitals addressed this risk very early on by acquiring generators to ensure that power is continuously supplied, even in the event of an outage. Other solutions, collectively grouped under the heading Uninterrupted Power Supply (UPS), use a number of different technologies to temporarily store electricity that can be made available to the system in the event of an outage.

Computer rooms have "their own" UPS, as do railway networks.
In the case of railway networks, the operating complexity of infrastructure that is coordinated and regulated by information flows increases the need to protect the system from power outages, which can block thousands of passengers, as happened in Zurich in 2005 and Paris in July 2017.

Redundant power supply

In Herisau, Switzerland, the southeast railway operations centre decided to back up its system by providing a redundant power supply. Christoph Preisig, project manager at ETAVIS Grossenbacher, the VINCI Energies electrotechnical subsidiary that installed the equipment, describes how it works: "Previously, if there was an outage in the local grid, the uninterrupted power supply system was immediately switched on. However, it only supplied power for a limited period of time. With the new system, the facilities are supplied by both the ordinary local grid and the separate railway grid, so that if the local grid experiences an outage, the railway grid immediately takes over, and we do not have to immediately resort to the UPS system." If the railway grid experiences an outage, says Christoph Preisig, a set of batteries also enables the railway systems to continue operating over a certain amount of time.

Two challenges

To set up the redundant system, ETAVIS worked under special conditions because the cables had to be pulled alongside the tracks without interrupting train traffic. Dressed in orange clothing from top to toe, the specially trained workers were protected by a lookout in charge of warning them when a train was approaching as they installed and wired the new distributors and the new uninterrupted supply systems.
The second challenge for ETAVIS, says the project manager, was to complete the switchover from the old UPS system to the new one overnight the day before D-Day, without a hitch. The project bodes well for the Swiss railway network's reliability, now that the redundant supply ensures continuity of service.

ACCELERATION

PROFESSOR “RESET”

As a “digital native” from the word go and a digital transformation specialist, Emmanuel Vivier, cofounder of the HUB Institute think tank, is categorical about two things: what is happening is *“a complete game-changer”*; and *“things are moving fast, and we need to adapt”.*

Everything you always wanted to know about the digital transformation is right there behind the Emmanuel Vivier’s signature black-framed glasses.
The globetrotting convention-trade-fair-seminar speaker focusing on the fast-paced revolution now under full steam has been a “digital native” from the word go.
Emmanuel Vivier is an ardent, even obsessive, Web aficionado.
After co-founding the Vanksen Agency and heading it until 2011, he has since then worked with his associate Vincent Ducrey at the HUB Institute. The think tank, which organises the HUB Forum, the major digital transformation gathering in Paris, Singapore and Shanghai, also offers publications (studies, reports, books, etc.), training (“digital days” accredited courses) and consulting services for businesses.
Having chaired a thousand conferences around the world and personally trained more than 10 thousand managers over the past eight years, Emmanuel Vivier is a knowledgeable expert who is still astonished that some companies still fail to grasp the implications of the digital transformation.
The “TransfoNum”, to use a trending Twitter hashtag meaning the digital transformation, “is not confined to web marketing and e-commerce,” he says. “It would be more accurate to call it the “digital disruption”, because it completely changes the rules of the game. If you don’t adjust to the new reality, if you don’t

change your business model and your distribution method and boost your ability to innovate, you are going to have a problem."

> "If you don't adjust to the new reality, if you don't change your business model, you are going to have a problem."

The digital transformation takes time

Emmanuel Vivier addresses that warning to small and medium enterprises "that haven't yet really grasped how far-reaching the change is. They are not ready," he says. "They don't even have the in-house skills they need to adapt and change." Conversely, large corporations "have all got their digital transformation under way. But it takes time – five or seven years – to truly transform a business," he adds. "In France, the collaborative process involving large companies and start-ups got off the ground five years ago with flagship events like Viva Technology and a large number of incubators."
To Emmanuel Vivier, the "reset" cannot take place unless the company starts by defining "its ultimate purpose." Why is it selling such-and-such a product or service? "You have to give work meaning for your employees.
If they, at their level, don't know what they are fighting for, they won't understand the need for an overall transformation of the company."
He therefore recommends an unrelenting focus on training, based on best practices. "Everyone understands that you need to be more flexible, faster on your feet and more agile. But how do you explain to your team what it needs to stop doing and what it needs to do differently? If you don't train people, they may get the idea, but they won't change. But if you take time to explain things to them and present the best practices and tell them how to do things, using design thinking, for example, most people will be happy to use more efficient and effective methods."
This calls for the introduction of incentives "with annual performance reviews that recognise challenge and risk taking."

China is moving faster

Emmanuel Vivier believes that it is especially urgent to face up to the challenge because he has seen with his own eyes, as he criss-crosses the digital planet, how other countries, especially in Asia, are pulling ahead. "When I was last in China, I was truly surprised to see how strong the country is and how fast it is moving on innovation – way faster than Europe and even the U.S."
"By building on the size of their market, companies like Alibaba and WeChat have very quickly developed widespread use of payment by mobile phone," he says. "They have also made a lot of progress on e-commerce and artificial intelligence."
The digital acceleration is a business, and Emmanuel Vivier is one of the main market players in France and beyond. Pending the great gathering at the upcoming HUB Forum in October 2018 at the Maison de la Mutualité in Paris, France, the more proactive and footloose can begin to explore best market practices at Insead in Singapore in June. The sun never sets on the "TransfoNum".

AI, COBOTS, DATA
HUMAN BEYOND DIGITAL

Not only has the digital transformation spawned a wealth of buzz words - cloud, big data, robots, augmented and virtual reality, artificial intelligence and more – it also feeds into the unshakeable idea that it involves competition between humans and machines.
For the apostles of the all-technology approach, human beings only stand to benefit from across-the-board digitalisation that would, it is claimed, liberate them from the daily grind.
Conversely, the alarmists paint a dystopian picture of humans alienated and then subjugated by robots. This binary "man versus machine" vision not only distracts from the reality of research and applications but also precludes a rational and reasonable view of digital developments. "In cities, factories, and buildings, people initiate the move to digital, but they are also part of the digitalisation process," says VINCI Energies Director of Business Development and Innovation Lydia Babaci-Victor.
"So far, only human beings have genuine intelligence," she adds. "Only human beings have a wealth of knowledge with the attendant understanding and "vision" to make the necessary decisions, to step up, slow down or re-direct developments, and to disseminate innovations in a drive to utilise and augment human qualities."

ENERGY PERFORMANCE

USING BIG DATA TO BETTER MANAGE ENERGY

Digital technologies and big data can be used to better control energy consumption, a strategic goal of local authorities, and provide greater comfort for citizens.

Artificial intelligence is spreading to the entire urban space and is now used in streetlights, traffic lights, signage, charging stations, and variable message signs. Thousands of sensors have been installed on urban equipment to collect operational data for analysis and use in drawing up scenarios to support decision-making by public authorities.

For example, public lighting accounts for 45% of the local authority's energy bill. LED (Light-Emitting Diode) technology has already enabled those municipalities that have acquired it to reduce their public lighting electric bill by 75%.
With semi-conducting chips, LED lighting can now be controlled remotely and connected in order to capture data and modulate lighting levels on demand. "Now that the development of low-data-rate networks is making data transmission affordable, sensors will spread fast," says Thierry Czech, technical and innovation manager at Omexom (VINCI Energies).

Decongesting and regulating traffic

Data analysis also supports road traffic regulation. Remote traffic light management and dynamic parking management now make it possible to reduce urban traffic congestion by 30%.
"We now have solutions that enable us to analyse and cross-compare traffic flow, congestion, and parking data to help local authorities decongest traffic and improve traffic flow. We are testing a tool in Rouen that measures the impact of urban decongestion on pollution levels," says Thierry Czech.

The electric vehicle challenge

But addressing the urban energy challenge also involves managing electric vehicle charging. There are several unknown parameters to this equation: what will demand be, where will it be generated, and how fast will automobile fleets change? Will local authority investments be commensurate with the goals? "It takes only 100,000 electric vehicles charging at the same time to cause a blackout on the entire French electricity grid, so there is an obvious need to rapidly plan charging methods and define regulation criteria," says Thierry Czech. V2Grid (Vehicle to Grid) technology is a priority topic to be explored. It supports smart electricity grid management by sending energy stored in the vehicle back into the grid when required.

> "Only the human brain can determine the use to which technology is put."

Here, too, data will play a key role by measuring usage, identifying categories of users, adjusting tariffs and helping operators anticipate the risk of thresholds being exceeded. "The human brain is unable to combine and analyse that much data in real time, but only the human brain can determine the use to which technology is put," says Thierry Czech.

BUILDINGS PERFORMANCE

THE SMART BUILDING, PROMISING SERVICES WITH A HUMAN FACE

As far as the end users of office work spaces and the technical teams responsible for keeping them up and running are concerned, the role of digital technology is and will continue to be to serve human beings.

Will offices in future be open spaces bristling with sensors and overrun by robots? The answer is probably: to a degree, but only to a degree. The smart building is not, primarily, a collection of Internet-connected objects and an algorithm mill, but rather first and foremost a promise of services – services with a human face.
"In relations with end users and in on-site technical maintenance work, digital technologies support the emergence and development of a new generation of qualitative, human-focused services geared to changing building use," says VINCI Facilities Innovation and Energy Director David Ernest.
That in a nutshell is what facility management is all about: designing and developing services focused on people. It does this by painstakingly deciphering the use to which a given environment is put. Space occupation, end user profiles, building traffic, temperature, noise, lighting, and air quality are just some of the aspects of the building that are measured in real time and analysed in the cloud. "Digital technology will not replace the relationship with the building's end user – instead it will strengthen it," says David Ernest.

Digital and human co-production

Business properties will now re-focus on the end user, fostering human interaction based on digital and human co-production of services that can offer real value added because they are based on an analysis of building usage patterns.
Many of these services will not be automated. In fact, they will generate new types of jobs. Two or three years ago, who would have predicted the job of hospitality manager, the key position in facility management?

> "Digital technology will not replace the relationship with the building's end user – instead it will strengthen it."

It is a new skill, and an important one. The hospitality manager is the person in contact with end users and visitors who is responsible not only for making the best use of spaces but also for helping employees get used to their new ways of working – with a "human" touch.
"We tested a robot receptionist, designed to register visitors and then guide them to a waiting room or the office of the person they had come to see. The result was unambiguous: people do not like this type of "dehumanised" service," says David Ernest. Conversely, the service robot comes into its own when it is controlled by the hospitality manager, who decides whether or not to use it. In this case, automation serves – and obeys – people.

"Phygital" alliance

"The alliance between human and digital intelligence, which could be called 'phygital', is also transforming technical maintenance and facility operation and management," says David Ernest.

Some low-value-added tasks can of course be handled by semi-autonomous and self-learning systems. But digital tools such as Building Information Modeling (BIM), the Internet of Things, and artificial intelligence can also enable technical teams to perform tasks more autonomously, take better decisions, and carry out maintenance work more efficiently.

First experiments involving the use of BIM in operations rapidly demonstrated that technicians use the data to support decisions that they make on the basis of their knowledge of the environment in which they are working and its equipment and users.
For the final customer and for the technical teams, the smart building is the place where human services are augmented by digital technologies.

INDUSTRY PERFORMANCE

WHEN PEOPLE REGAIN CONTROL OF TOOLS

Jobs, skills, management, quality of life at work … In the digital age, the future of industry entails first and foremost making the most of the place and role of the operator within the production ecosystem.

Not a month goes by without a further study describing the impact of the industry of the future on future jobs. Is that picture bleak? "There is no doubt that digital technologies are going to transform jobs on production lines. But the digital transformation of the industrial world is first and foremost an opportunity to improve the quality of work and well as the quality of jobs," says Thomas Leseigneur, innovation manager at Actemium, the VINCI Energies brand specialising in solutions for industry.

Indeed, industry has long suffered from a poor image among young people. Its jobs are thought to be repetitive and stressful, it is thought to be noisy and dirty – in short, arduous. The advent of robots, augmented reality, and artificial intelligence promises to improve things. Robots will relieve operators of the most unpleasant tasks; augmented reality, 3D simulation, and motion capture will train robots to perform the right movements and assume the right positions.

There will be greater comfort and fewer accidents. In terms of training and safety, industry will be able to use the potential of the digital twin: a 3D virtual duplication of an environment, with added data regarding a variety of elements (presence of objects, temperature, chronological series) in which operators can be placed to generate unlimited behaviour scenarios.

Another accident prevention technique is hyper-location of connected work clothing, which will make it possible to position an operator approaching a hazardous area very precisely.

Collaborative intelligence

The digitalisation of industry also calls for a new look at management models. Knowledge acculturation goes hand-in-hand with the development of digital interfaces, and as a direct consequence reporting structure and functional boundaries are opened up. Like the rest of society, factories are entering the era of collaborative intelligence.

By increasingly automating simple and repetitive tasks and assigning operators to carry out higher-value-added duties, new managerial practices will also make it possible to concentrate productivity from the design stage onward and thus reduce time to market.

"With data analysis, maintenance becomes predictive. It then becomes possible to determine the probability that faults will occur, and anticipate slippages in product quality, in other words to design smarter production lines," says Thomas Leseigneur.
Ultimately, could digitalisation not also prompt machine and equipment manufacturers to work with their operator customers to devise new business models? "Why not step up the 'as a service' approach and draw up customer-supplier contracts based on use and machine service + qualified operator?" says the Actemium innovation manager. This would close the circle: strong skills via digital technology, and a more efficient, more attractive industry able to support augmented jobs.

"The digital transformation of the industrial world is first and foremost an opportunity to improve the quality of work and thereby the quality of jobs."

ICT PERFORMANCE

IT DEPARTMENTS SERVING THE USER MORE THAN EVER

The role of the Information Systems department is now to support users' digital transformation by providing the technology building blocks that are easiest to use and best suited to their needs.

Those who still think that IS departments tend to impose systems and tools with little attention being paid to the end user need to change their behaviour.
In the age of the digital revolution, new technological innovations start and end with the human being.
In fact, the beliefs, attitudes and needs of business owners are now largely responsible for instigating the new innovations in the first place.
It is the role of the IT department to inspire 'what is possible'. "Within VINCI Energies, business units such as Duality in Germany and Bostec in the Netherlands strive to explore what is feasible in light of the expectations or behaviour of individuals," says Axians Chief Technology Officer Erik Lenten.
These business units have designed and developed co-creation methods like 'gamification, design thinking or IoT discovery workshops". They also help their customers define priorities and related budget requirements.
These working methods are highly efficient, as the example of the large international port of Rotterdam illustrates. Axians, IBM and Cisco created a digital twin of Europe's largest port complex to track ship movement, infrastructure condition, weather, and tides. The ultimate goal is to make ship movements and related operations autonomous.

The "as a service" approach

Innovation is happening exponentially, meaning different technology advancements 'stitched' together create even bigger business opportunities.

Developers and designers take it on board and innovate in turn.
Creation no longer takes place in isolation," says Erik Lenten. "It starts with the right mindset or culture so to speak, using building blocks that are readily available to create your own innovation even faster, but also to give back your innovations for others to use".

> Digital technology is there to help people take better decisions and retain what is important.

This also applies to the Information Systems departments, their role is to supply the technology building blocks that are easiest to use and best suited to user needs, and to help both individuals and companies navigate the digital transformation.
In fact, all IT "consumption" is now delivered in building blocks and 'as a service' made available to those undergoing digital transformation.
Like the individual, who has smart objects (lighting, doorbell, heating, etc.) in the home. Smart objects are developed mostly in isolation and this is also how the individual buys (or 'consumes') all these technologies, nonetheless each person connects them together and creates a specific, personal pattern of use of the technologies available (for example using speech with 'Amazon Echo' or services like IFTTT).

In other words, the Axians CTO gives a resolutely optimistic answer when asked "whether we will be working for robots or whether robots will be working for us": "Digitisation is there to help people take better decisions and retain what is important, although some tend to retain the worst aspects."

"Programmable serendipity"

Among other examples, Axians is working to implement a large number of smart city and smart building projects. The goal is a sort of "programmable serendipity", says Erik Lenten. These projects are rooted in a user behaviour learning system designed to automate certain basic and elementary tasks such as opening the door and switching on the light.
In a nutshell, like it or not the IS department has long since come down from its ivory tower. The end user has taken control, even though this is still just the beginning of the learning curve.

CITY | PERFORMANCE

WELCOME TO THE AUGMENTED CITIZEN

Notwithstanding a number of emblematic projects, the Smart City concept remains blurry in most French cities. Smart City technology appears to offer a promising way to improve cities. The whole range of current and future technologies should be used to serve human beings, in other words to meet the challenges involved in making the city more smooth-running, accessible, breathable, citizen-focused, inclusive, energy efficient, and sustainable.

The city is designed to serve a collective purpose and provide the main components of urban development such as transport, housing, recreation, and energy infrastructure.
By 2050, more than half the population will live in cities. How then, can the "liveability" of tomorrow's metropolitan areas be ensured? The smart city may offer the right solution to this central issue for the future of humankind. "The first challenge of digital technology is to optimise the overall operation of the city by providing better control of its systems to serve the inhabitants and provide a better quality of life," says Simon Coutel, smart city business manager at VINCI Energies and COO of CityZen.

Dynamic urban management

To optimise the way the city works, the first step is to break down the barriers between the services it provides and gain a thorough understanding of the real-time operation of its facilities and equipment. Digitalising the city by rolling out connected equipment provides the necessary data. Digital technologies thus offer a way to collate and cross-analyse data from the city's various services. "This makes it possible to shift from static to dynamic urban management," says Simon Coutel. In practice this would mean, for example, that the city could adjust public lighting according to the presence of pedestrians or cars and adapt traffic light operation to traffic conditions and local pollution levels.

"This first major stage in the implementation of the smart city is already possible, thanks to the availability of new project engineering methods and new digital technologies; we are testing these systems in Rouen (France) with our BIMCity urban hypervision technology. But we are also already working on an even more ambitious objective: to meet individual expectations and make the city more inclusive and more human-focused," says Simon Coutel.

> "The first challenge of digital technology is to optimise the overall operation of the city by providing better control of its systems to serve the inhabitants and provide a better quality of life."

Shifting to the individual scale

Widespread smartphone use now supports the connection between the city and the citizens. It is now possible to determine the use to which urban services are being put in real time and adapt their operation to meet demand and to offer an inclusive city.

The same digital technologies make it possible to consult and, more broadly, to involve the citizen in the life of the city. Digital technology can be applied in this way to achieve a collective and individual optimum.

"The potential of artificial intelligence should be explored with the goal of automating everything that can be automated without losing human value, and freeing human beings to perform higher-value-added tasks to serve people. This is what we are developing with the citizen-focused CityZen application, which provides a ChatBot to facilitate access to city information," says Simon Coutel.

INDUSTRY PERFORMANCE

SMART CAMERAS SET TO PLAY VITAL PART IN ASSEMBLY LINES

Enhanced by artificial intelligence, visual recognition improves robot efficiency in assembly lines by moving closer to zero defects.

"Hey! I think this part has a defect; it's a pinhole-size puncture. Want to take a look and confirm?" At the IBM Watson artificial intelligence centre in Munich (Germany), a robot is talking to the operator in charge of the assembly line. Alerted to the potential problem, the operator checks the part and agrees or disagrees with the robot's interpretation.

Either way, this new information enhances the visual recognition algorithm developed by IBM, enabling the robot to become increasingly intelligent and efficient. According to IBM, the system can reduce inspection times for manufactured products by up to 80% and cut defects by 7 to 10%.

Machine learning and image analysis

To "train" the robot, IBM Watson teams first fed the recognition programme images of all the types of defects usually detected visually by an operator. The system, which includes an ultra high definition camera, then took images in real time of the parts moving along the production line so as to compare them against images of defects. "What's crucial in this type of system is the image analysis expertise," says Thomas Hoffmann, development director at Actemium.

This VINCI Energies brand, which specialises in solutions for the industrial environment, is particularly active in the field of visual recognition. Actemium has developed a solution for a car manufacturer in Le Mans which involves the robot "bin-picking", in other words identifying castings stacked in a crate, grabbing them one at a time however they are positioned, and placing them on a conveyor belt. "Here again, the expertise lies to a greater extent in image processing than in the 3D camera fitted into the robot," stresses Thomas.

Likewise in Poissy, Actemium has designed and produced an automated production line for inflight meal preparation based on image recognition on behalf of airline catering company Servair. In this case, the vision-enabled automated line loads and prepares fresh produce trays with the various components that it is capable of recognising.

Aeronautics sector moves ahead

A French company has already laid firm foundations in the field of part compliance monitoring, an area in which IBM Watson has recently become involved. Actemium Toulouse Robotique et Automation is finalising a solution for an aeronautics company based on the same process as IBM Watson, but which goes even further: here, a photograph of the assembly is compared against its 3D digital model.

It's no longer a case of identifying a scratch or a perforation but of "ensuring a perfect match between the digital master and the part or assembly completed," explains Jérémie Pedros, business unit manager of Actemium Toulouse Robotique et Automation. "The advantage of this approach, which is geared towards the Factory of the Future, is that the compliance issue is handled at an earlier stage and it avoids the algorithm learning phases," he says.

> The expertise lies to a greater extent in image processing than in the 3D camera fitted into the robot.

BUILDINGS PERFORMANCE

HYPERVISION FOR 360° BUILDING MANAGEMENT

The full range of key data required to operate one or several sites and improve their performance can now be displayed on a single screen. And in future it will be possible to do more.

The facility manager's dream is to have a single overview of the full range of key data required to operate one or several sites. Now hypervision is making that dream come true. As smart building developments increase the sources of monitoring, surveillance, management, and optimisation data in spaces and structures, there is a need for a single interface to access all systems.

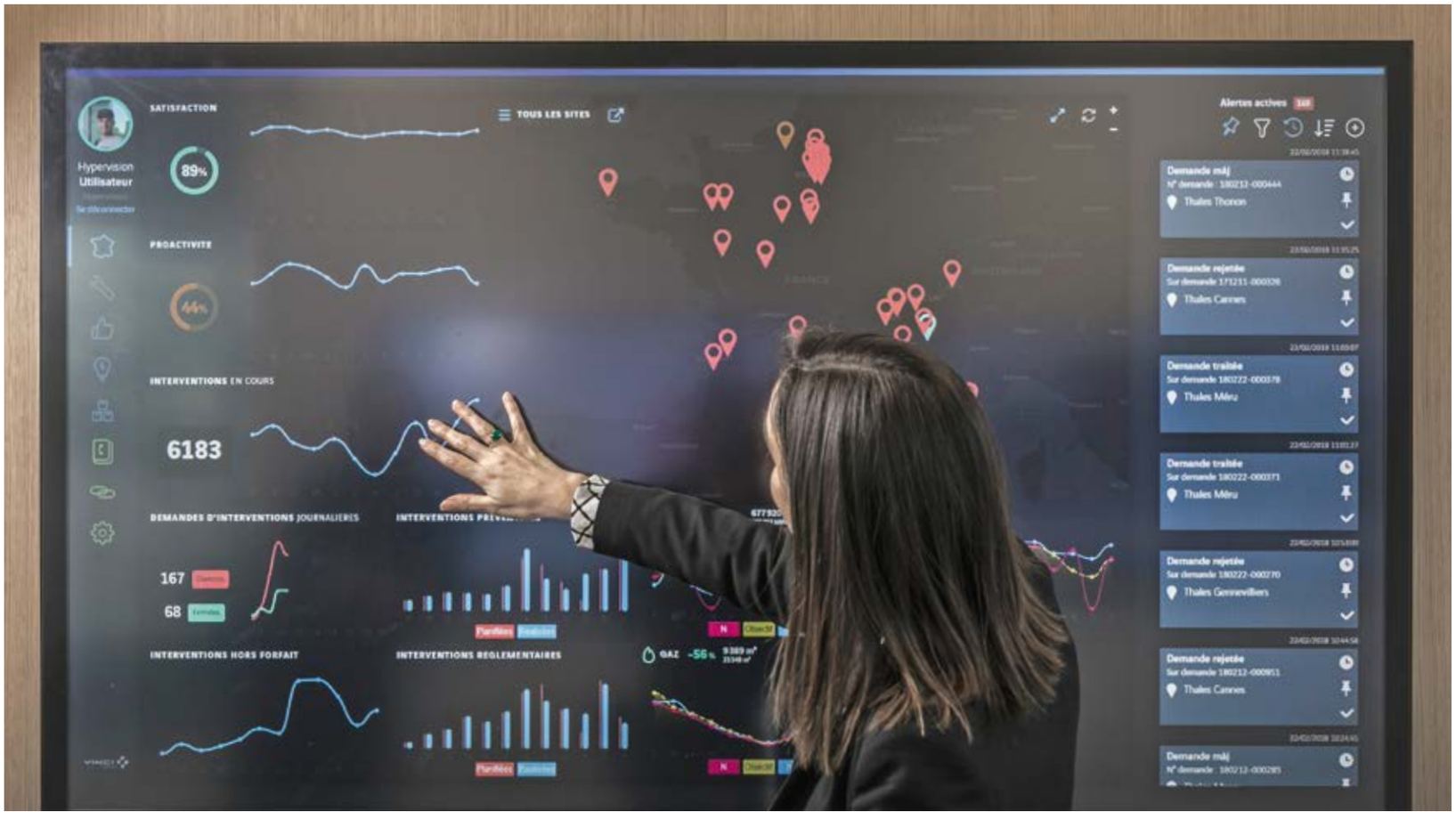
This is the purpose of the hypervisor. Taking a "big data" approach, it broadens the scope of supervision software, delivers a remote overview of the operation of one or several sites, and consolidates multisource data in a single platform.
Because the concept involves control, the term "hypervisor" may be misleading, says David Ernest, Director of Innovation and Energy at VINCI Facilities (VINCI Energies). "Above all, the hypervisor serves to support understanding, management, and coordination. It is configured to facilitate overall smart building performance, activity by activity and application by application – Building Automation Systems (BAS), Building Information Modeling (BIM), Computerised Maintenance Management Systems (CMMS), and Internet of Things (IoT). Operationally, we are not just monitoring the systems but rather optimising the service as we go."
In a customer-focused approach, the hypervision software offers a single data access point while supporting customised interfaces for each user activity.

Concrete applications

That is the concept. But what are the current concrete applications and benefits? "Effective applications are primarily concentrated on CMMS data and on requests for maintenance work. This is already providing substantial benefits including more precise measurement of the time needed for maintenance call outs and better prediction of future maintenance work. Ultimately, it will lead to an improvement in comfort for end users and savings for building operators," says David Ernest.
The second stage, which is imminent, will use real-time data to generate alerts. Pilot systems are already reporting and displaying IoT information (temperature, energy consumption, etc.). The third stage of the rocket will carry data relating to technical facilities. It will be used to better manage maintenance and generate feedback that will support better choice of facilities.

Five uses

The VINCI Facilities Innovation and Energy Director identifies five major uses of hypervision.
1. Large sites covering more than 20,000 m^2 or clusters. The hypervisor is the tool of the site manager, who can bring together his entire team every morning for a "visual management" briefing.
2. Sites covering between 5,000 and 20,000 m^2. The supervisor compensates for the absence of shift technicians by providing a shared remote support service once or twice a week.
3. Small networks of sites covering less than 5,000 m^2. The manager of the multi-site contract uses the supervisor to report key indicators, with the goal of optimising remote management and managing maintenance work and travel.
4. Large multisite networks. The hypervisor provides valuable support for less weighty dynamic reporting, which gives the customer the main indicators in real time, enabling him to discuss with his provider what decisions to take within a short time frame.
5. Public private partnerships (PPP). The hypervisor can be used to monitor compliance with commitments to control overall costs by the full range of parties involved.



BUILDINGS PERFORMANCE

BIM FOR AGILE AIRPORT EVOLUTION

Provided all participants share it from the design stage onwards, BIM optimises management of facilities throughout the building life cycle. Airports are a case in point.

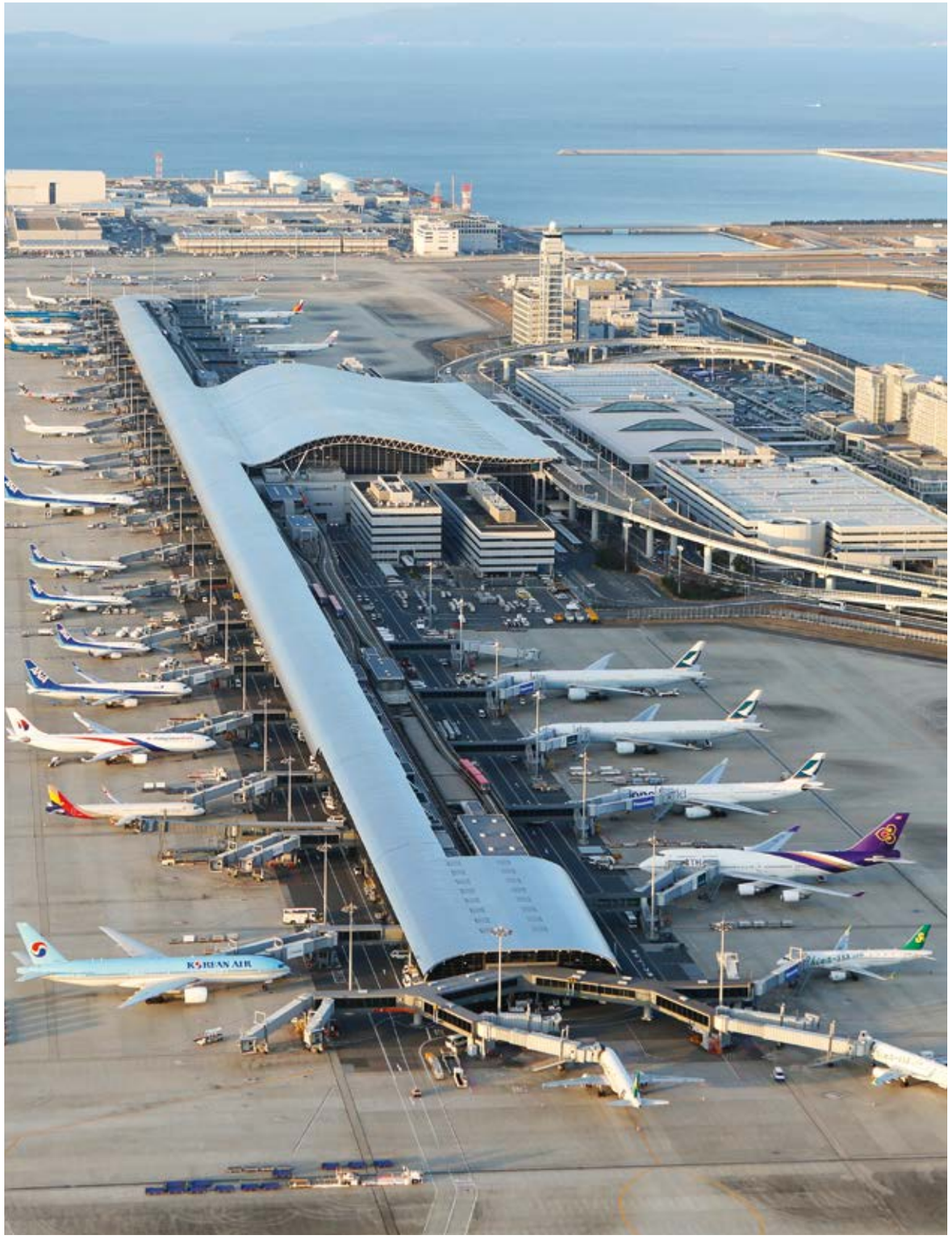
Previously, the quality of a building referred to its construction and functions. "But quality now includes a third dimension: the building's digital systems," says Jean Peyrucq, Maintenance and BIM manager at VINCI Airports (VINCI Group). "BIM quality has an impact on operation, maintenance, and ultimately the life cycle of a building or installation," he adds. The quality of all aspects of BIM (Building Information Modeling) is crucial in airport concessions, which typically cover a period of some 30 years, i.e. the full life cycle of a facility that will change and evolve over time. "BIM-evolution can be used, for example, to meet a request to transform a space," says Jean Peyrucq. "An airport is constantly evolving. To facilitate the successive changes in this type of infrastructure, the concessionaire can use BIM to gain a comprehensive overview of the volumes to be restructured and the utility systems to be reconnected. This will bring down the overall cost of the project."

Like a video game

Another aspect of Building Information Modeling, BIM-operation, has similar practical applications that exceed technical issues. Acting on behalf of the State, VINCI Airports is responsible for firefighting and is required to provide firefighters with high-quality detection equipment. "We can use the information contained in the BIM system to do things like guide firefighters, using BIM like a video game in which the player moves in a realistic 3D environment," says the VINCI Airports manager.
Olivier Bardet, Business Unit Manager at Actemium Maisons-Laffitte (VINCI Energies), also stresses such outstanding precision in listing the benefits of using BIM in maintenance. "BIM makes it easier to locate faults and provides the maintenance technician with effective guidance more rapidly. The technician will no longer have to look at a 2D map and wonder whether the equipment he is to work on is on the ground, in the air or half-way up the wall."

Santiago, a model BIM

BIM tools have become so crucial to airport operation that "buildings are now being retroactively "BIM-ed" after they have been completed," says Jean Peyrucq. VINCI Airports did this in one of its concession buildings in Santiago de Chile. But ideally, BIM should be taken on board in the design and construction phases. For this reason, says the VINCI Airports Maintenance and BIM manager, "it is very important to develop collaborative BIM." When the needs of all participants are taken into account, "the digital quality of the airport can be ensured."
Mathieu Rigaud, BIM project manager at VINCI Facilities (VINCI Energies), also stresses the "need to think BIM," not only "throughout the design and construction process but also throughout the entire facility life cycle." For this reason, VINCI Facilities, which works with VINCI Airports, is involved in the project from the very beginning through to handover procedures and operation.
This "ensures that the BIM model complies with the as-built file, and it improves operational excellence."



"If the BIM is integrated, the digital quality of the structure will lower the overall cost of operating it."

The Santiago airport is an invaluable testing ground for VINCI Airports. The Group, which serves as both concessionaire and programme manager for the 200,000 m² of new installations, is careful to ensure that the BIM is built collaboratively, which guarantees the quality of the buildings and installations, and also supports optimum operation and evolution. "If the BIM is integrated, the digital quality of the structure will lower the overall cost of operating it," says Jean Peyrucq.

ICT PERFORMANCE

DOES THE FUTURE OF INFORMATION SYSTEMS REALLY LIE IN THE PUBLIC CLOUD?

Veolia's spectacular announcement of its decision to migrate its entire information system (IS) to the public cloud raises the issue of the ideal information system model for companies. Axians believes that the right solution is a hybrid public-private model.

Are private data centers, which concentrate a company's information systems, intellectual assets and valuable data, obsolete? Should a company abandon its own servers and transfer the full range of its data and applications to the cloud in a move to modernise? Veolia's decision, announced at the end of 2017, to undertake a radical migration, shifting its entire information to Amazon Web Service, exemplifies this approach. But does the move set an example that other companies should be following? For Veolia's Chief Information Officer, quoted in L'Usine Digitale, "the public cloud alone offers the group's business lines the best way to meet the increasing need for agility and innovation." He added that there were two further objectives driving the strategy: "changing the security paradigm" and "reducing costs."
"Unquestionably, in some cases agility and innovation do call for the Public Cloud," says Yves Pellemans, CTO of Axians, a VINCI Energies brand focused on ICT.

"Therefore Axians recommends that customers adopt the public cloud for some purposes, such as business development, mobility, web portal access, etc."

Made up of server networks open to any company wishing to rent space and functionalities, the public cloud enables the customers of a company as well as its employees to easily access services from a smartphone or tablet. Additionally, the increasing number of cloud servers make it particularly easy to manage peak activity, says the Axians CTO, adding that "the public cloud has substantial scalability for expansion."

Hybrid model

But wait, cautions Yves Pellemans, this doesn't make the public cloud a panacea. The cloud cannot meet all the company's needs. It is not suitable for specific business applications because "it does not meet all the very high data availability (at least 99.99% at Axians), system auditability or even security criteria."
It is easier to ensure optimum data protection (of the company's intellectual capital) in a private cloud, i.e. a next-generation data center, than in Amazon servers that are "wide open to the entire world," says Yves Pellemans.

As for costs, they may be higher than expected when a public cloud operator ends up building a VPC (Virtual Private Cloud) for the customer in order to meet the customer's availability, security, and software corrections management requirements, warns the Axians CTO. The public cloud is like a hotel, which is fine for spending a few nights a year in (easy to access and without commitment) but not to live in full time (unsuitable, too expensive, too risky).

The right solution, he says, is to "take the best of both worlds," to have the benefit of scalability and server farms that pool all resources. "You can move 20% of the information system – the part that constitutes the 'front-end' – into the public cloud in order to rapidly innovate and enable the user to easily log on.
And you keep 80% of the IS in a data center that you transform into a private cloud (Automated Datacenter) in order to protect the company's intellectual capital

> The public cloud does not meet all the very high data availability or even security criteria.

and sensitive information. Axians considers the 80/20 split to be the ideal hybrid model that all companies should aim for going forward.

ICT INNOVATION

AGILE TECHNOLOGY IMPROVES THE 3D SURVEY

Omexom's universal, rapid Nomad Mapping System technology is used to perform highly operational topographic surveys for companies.

Google and its Maps and Street View tools have given the public at large an understanding of the benefits of geolocation and visual display of our everyday environment. The same capabilities are game-changers for industrial undertakings and businesses increasingly keen to obtain extremely precise topographic data and 3D displays.
Lasers carrying out measurements from a helicopter or a car have to some extent replaced yesterday's surveyors. A new technology provided by Omexom (VINCI Energies) called the Nomad Mapping System (NMS), is now, in turn, replacing cumbersome airborne solutions that cannot be used in such configurations as building interiors.

Sylvain Pejean, a project manager at Omexom Atlantique Ingénierie, describes the combination of technologies that underpin the NMS: the system, contained in a backpack, comprises a GPS, an inertial unit (a navigation tool with a variety of precision sensors), two laser scanners, and five video cameras.

Interfaced with a powerful computer, the tool can collect impressive amounts of data as the operator moves around the area to be mapped: every 125th of a second, five photos covering 180° and associated with a "point cloud" locating them within the area are added to the "technology gleaner's" bag.

> Because NMS is easy to use and can perform surveys inside buildings as well as outside, it can be used in a very wide variety of applications.

"By laying the point cloud over the photos, the NMS and associated computer reconstruct the path taken by the apparatus and deliver an extremely precise 3D survey that is far more comprehensive than a conventional survey and completed far faster," says Sylvain Pejean.

Another advantage of the solution is the wealth of data collected, which make it possible to correct a survey after the fact.

"If you ask a surveyor to survey the left-hand side of a road then change your mind and decide to use the right-hand side instead, the surveyor has to start back from scratch; whereas the NMS data and photos give you all the information you need to make the change," says the Omexom Atlantique Ingénierie project manager.

From BIM to industry

Because NMS is easy to use and can perform surveys inside buildings as well as outside, it can be used in a very wide variety of applications.
Made available to the various VINCI Energies business activities, "it enables Actemium to offer its customers more efficient surveys in an industrial setting, and VINCI Facilities to carry out even more detailed building information modelling in facilities it manages," says Sylvain Pejean.

The NMS has already been used in optical fibre projects, both in cable laying operations and in determining where connection boxes should be installed on facades. Lastly, the Omexom tool is suitable for drawing up a 3D map of a movie theatre with very complex design, including the frame, inclined surfaces, and stairs. In another example, NMS was used to map the 250 km of national highways in Guadeloupe, with a nod to Google Street View.

Walter BAETS

Eddy VANDERSMISSEN

HOW DO YOU TEACH TRANSFORMATION?

In an increasingly complex and constantly changing world, one key objective is to provide ongoing training for employees, with a special focus on management staff. To achieve this, we need to explore new methods and unusual or rarely used training strategies. This is what thecamp, an innovation and acculturation structure opened in Aix-en-Provence, France in December 2017, proposes to do. VINCI Energies is a founding partner of thecamp. Walter Baets, Advisory Board member of thecamp, discusses the issue with Eddy Vandersmissen, Director of the VINCI Energies Academy.

VINCI Energies is a founding partner of thecamp. How do the two of you see your respective contributions to transformation support?

Eddy Vandersmissen. The world is undergoing an upheaval. Transformation is central to VINCI Energies' mission of ensuring that the energy and digital transition takes place smoothly. What connects us with thecamp is transition and transformation. Our management staff, and more broadly all our employees, have received very good initial training, but the analytical approach taken by business and engineering schools and other educational institutions is now proving insufficient. If our people are to innovate and be disruptive, they need to acquire additional skills.

Which ones?

E.V. Skills that are more typically associated with designers. They have to be able to think intuitively. That, I think, is what thecamp can bring to a company like VINCI Energies.

Walter Baets. Are we really teaching transformation? With all due respect, I think it would be more accurate to say we are transforming. That is where thecamp takes a unique approach. I remember what one CEO said when thecamp was being set up: "My managers are well educated. But if you can get them to move, to change, to live in this new, complex, and uncertain world, you will have succeeded." What companies need is a software change, a change of mindset. That is what thecamp proposes to do.

Analytical thinking is no longer sufficient, you say. But is analytical thinking not an impediment to the mindset change you are advocating?

E.V. Analytical and intuitive thinking are not antithetical. We need to develop both. Analytical thinking has enabled companies to make enormous progress, get better organised, improve profitability, and be competitive in a globalised world. But the business model is now coming up against its limits. It is preventing companies from truly innovating, trying out new things and taking risks. Intuitive thinking will enable them to begin moving forward again. Companies that can combine analytical and intuitive thinking will have a greater chance of succeeding.

"The analytical approach taken by business and engineering schools and other educational institutions is now proving insufficient. If our people are to innovate and be disruptive, they need to acquire additional skills."

Eddy VANDERSMISSEN

W.B. What is needed, we at thecamp believe, is a systemic, integrated approach. For too long, people saw different organisational models, methods, and thought processes as mutually exclusive. Change will come through systemic training. Systemic training means understanding the context, technologies, and disruptions; it means being able to innovate faster and being more agile; it also means self-transforming – being capable of critical introspection; and it also involves helping make the world a better place.

E.V. Starting out with good self-knowledge is key in a transformation process. I agree entirely with that view.

Your intentions are clear. But how do you share them with others in the day-to-day operation of a company? Constantly adapting to a complex world is exciting, but it also generates stress...

E.V. And digital technologies are sometimes frightening, as we know. A good mix within a team can often help to overcome these obstacles: the young people bring agility and the older ones a measure of realism based on experience. It is mutually beneficial.

W.B. The right mix of generations and profiles is a good idea. But you also need to mix people at different stages in their careers, and you need to de-compartmentalise training, learning, and work. The key is to learn at work and by working. You learn as you work and you work as you learn.

E.V. At VINCI Energies, we have developed what we call a "digital passport" – an application created by the Academy's Digital Lab that provides a one-and-a-half hour course spelling out all the words related to transformation that people are scared of. This is one way to support the transformation – get everyone to overcome fear and come on board.

Many methods are used to navigate a complex world, and one is active teaching, which thecamp stresses. What is it and what are the benefits?

W.B. The problem with learning is that you don't know what you don't know! You find out what it is when you need it. That is why it is so important to create situations in which people discover what they don't know and go looking for it. Project mode is perfect for that purpose. Active teaching consists in giving the trainee an opportunity to acquire the knowledge he or she needs when he or she needs it. The approach is individualised, tailored to each person's needs rather than "averaged" to fit a common denominator within a group. New technologies now make this possible, with application modules that can be downloaded as needed. This extends well beyond MOOC.

In a company like VINCI Energies, does that concept work in practice?

E.V. We need to give responsibility for learning to the learner. And I am counting on our collaboration with thecamp to move in that direction and enable all our employees to get the benefit of these new methods.

What about the famous silos that need to be broken down? Are they in the organisation or in people's minds?

E.V. They are both in people's minds and in organisational realities, and have been for a long time. We were talking about silos 30 years ago! Breaking down silos and making room and time for collaboration is easier said than done.

W.B. Conventional management thinking focuses on organisation, control, and efficiency. It simplifies things to set up ad hoc units – in other words silos. But to cope with a complex world, it is necessary to let go and relinquish control. That takes courage.

Is that realistic, in terms of organisational efficiency?

E.V. That is an issue. But it is all a matter of balance and moderation. At VINCI Energies, we set up La Factory, an innovation space, to foster collaboration and horizontality. What do we observe? We see that it generates a lot of traffic, people coming in from the outside – this initiative was designed to break down silos without demolishing everything. Another example is our working groups, which are always made up of people from different sectors and different departments. It works because it is a shared endeavour with everyone working together. There are two prerequisites: trust and autonomy.

W.B. Innovation occurs most often around the periphery of companies, with accelerators, incubators, stakes in start-ups, and so on, and not enough inside the companies. There is still too much intrapreneurship. Things are just beginning to change. It is a fairly simple roadmap. All you have to do is avoid making innovation into one more silo!

How can training some 15 managers at thecamp actually transform the company, as opposed to just giving the trainees a pleasant memory?

E.V. We need to set up a process within the company in which others can share what the trainees experienced during training and the trainees become ambassadors. Disseminating the skills learned in training throughout the company is a key part of the project. Each company must define for itself how to do that.

W.B. Transformation takes time. In a "transformation journey" – which can take months, or even years – there is the time spent at thecamp, of course, but the process has to continue within the company. One way to do that is to continue working on a project started at thecamp, or else start a new project. That is crucial.

"Change will come through systemic training. Systemic training means being able to innovate faster and being more agile; it also means self-transforming."

Walter BAETS

How are new technologies and artificial intelligence transforming training?

E.V. This is just the beginning of a wide-ranging change. I think we need to watch the market, observe, take our time and not rush things, because I am afraid rushing things would make training very costly.

W.B. The past is prologue! "Machine learning" and "deep learning", the so-called exponential technologies, will enable us to create courses that are truly on-demand and truly customised.

CES 2018: CONNECTED TECHNOLOGIES ARE REACHING MATURITY

The Consumer Electronics Show (CES), the annual gathering and global stage for innovation and start-ups, took place in Las Vegas in January 2018. This year's event saw several trends emerge and others confirmed.

Ecosystem
First observation: the connected technologies market has passed a milestone, reaching a degree of maturity with the advent of new business models and the development of industrialisation phases. Against that backdrop, industrial companies have made a paradigm shift by abandoning their proprietary standards and adopting open ecosystems instead, with respect to both the major web players and to start-ups. Everyone seems to have at last understood the need for interoperability if innovations are to spread. This calls for stronger partnerships between industrial companies and pure IT players to develop the broadest possible end-to-end solutions.

Cybersecurity
Today, everything is interconnected and that will be even more true in future. Cybersecurity must therefore be an increasing focus of attention for everyone. Yet the topic had a relatively low profile at the CES exhibition.

Artificial intelligence
Unsurprisingly, artificial intelligence and conversational tools were ubiquitous in Las Vegas this year. The novelty was the strong presence of AI participants from outside the U.S., starting with China's Alibaba Group, which has ambitious goals and presented strong innovations.

Voice
Voice is becoming the best way to interact with technology. The stars are two platforms that are probably the most developed in the field now: Amazon's Alexa and Google Assistant. Another is Apple HomeKit.

Mobility
Connected and self-driving vehicles were as present as ever at the event. This year the focus was on connectivity with infrastructure, the prerequisite for this new stage of development. This is causing a major reshuffle in the value chain, giving the automotive suppliers greater weight as well as newcomers such as nvidia, which confirms its goal of positioning its processors at the heart of the connected car. French auto supplier Valeo presented noteworthy connectivity innovations including an astonishing dashboard that is in fact a large interactive screen. Along the same lines, another interesting topic is the issue of the supply chain, which inspired a large number of presentations of delivery shuttles and autonomous mobile shops. The Ford and Domino's Pizza self-driving delivery car is a textbook example – albeit still experimental – of the test and learn process.

Smart City
On this topic, there has been a growing awareness among the players, with each asking how to use big data to offer new services via the Internet of Things. Here again, Alibaba made a splash with its City Brain artificial intelligence platform, a city monitoring service using multiple sensors.
One disappointment at CES was the relative lack of focus on the Smart City. It would have been nice to hear more about it.

France
As we have often said in previous years, France again took a high profile at CES this year, coming in second only to the U.S. in terms of number of start-ups represented. More important than the number as such, France's presence again demonstrated the momentum of the French tech scene, which was further amplified by the Viva Technology event at the end of May.

Lydia BABACI-VICTOR
Director of Development
and Innovation at VINCI Energies

THE INDUSTRY OF THE FUTURE: TO START WITH, A MANAGERIAL REVOLUTION

Mechanical engineering is a crucial part of all factories and mechanical engineers are to some extent their architects. The digital revolution holds out huge potential and represents a great opportunity for France to re-enter a race it dropped out of in the 2000s. Obviously, there are many building blocks involved in the digital revolution. But the first thing that awaits us is a managerial revolution.
An operator now has access to the same data and information as a foreman or an engineer. Work is increasingly networked and carried out in project mode. Each person has increasing responsibility in his or her work unit. Improved quality of work and enhanced engagement are improving productivity.
In this new context, the old hierarchical pyramid-shaped organisational structure has become obsolete. Companies such as Michelin, Toyota and VINCI are at the forefront of these changes.

Human-machine reconciliation

Technology is making this revolution possible. Previously, people were there to serve the machines, which set the pace. Now the human being is reconciled with the machine and the two work together in harmony. The development of the cobot is now gradually eliminating most of the arduous, repetitive tasks. The Internet of Things and a wide variety of sensors are making machines smart and even sensitive. Meanwhile, it is changing business models by providing access to precise data on products and the way customers use them.
Some jobs are disappearing, but new jobs are emerging. However, while jobs are being reinvented, some must not be lost. Specific skills and basic knowledge must be preserved if we are not to become dependent on technology. Clearly, industry is now aware of the need to modernise.

The entire sector is involved, notably through the initiation of the "Alliance for the Industry of the Future" in July 2015, with a new temporary additional depreciation incentive applying to investments in productive assets. Such signs, albeit weak, show that France has decided to take action.

Talent takes priority

This year, our priority focus will be on talent, the all-important factor driving our competitiveness. Young people have been turning their backs on industry. We of course believe in artificial intelligence and new technologies, but we believe first and foremost in the men and women who will be engaged in our companies and drive the success of French industry.
In 2018, our other priority will be to enhance the skills of our top industrial managers via our "accelerators", the training sessions introduced in 2016 with Bpifrance (Banque Publique d'Investissement France) and a number of elite engineering and business schools, which are designed to disseminate the new practices.
Once again, a managerial revolution will pave the way for a revolution – a digital revolution - in industry.

Bruno GRANDJEAN
President of the French Federation of Mechanical Engineering Industries (FIM) and Chairman of the Redex Executive Board

AGILITY **PICTURE**

ROTTERDAM, A FUTURE “SMART HARBOUR”

The port of Rotterdam is planning to transform itself into a “smart harbour”, maintain its status as Europe’s largest cargo port and win market share in the global competition by providing such facilities as connected met stations, sensors and communication tools to coordinate cargo ship movement, software using operator data to reduce berthing times and 3D printers to facilitate production of parts on demand in shipyards.
The port has undertaken this transformation in partnership with Axians in the Netherlands (VINCI Energies), which alongside Cisco and IBM won the contract to design, roll out and operate the IoT platform that will be used to manage the port and its infrastructure with agility.

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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