

THE **AGILITY** EFFECT

MAGAZINE

PARIS
LA DÉFENSE,
ARENA

AGILITY LEADER
ALEXANDRE CADAIN,
“AI FOR GOOD”

ABOUT AGILITY
TO WHAT EXTENT SHOULD
WORKSPACES BE SHARED?



DIGITAL TRANSFORMATION
ENHANCING
THE EFFICIENCY
OF HOSPITALS
AND HEALTHCARE
SYSTEMS

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EDITORIAL

As the pace of change picks up in a world of great promise but growing complexity, VINCI Energies draws its strength from the business model and company culture shared by all its employees. Building on its values of entrepreneurship, empowerment, responsibility, solidarity, and trust, VINCI Energies has expanded across all continents without relinquishing its roots going back to 18th century Paris. Our group, a subsidiary of VINCI, now operates in more than 50 countries and generates more than half its revenue outside France. The streams of its origins have become a powerful river as the group has worked to support the technological (r)evolution under way over the decades.

Our unique, expert and multi-local organisational structure encompasses 1,800 business units operating within five global brands – Actemium, Axians, Citeos, Omexom, and VINCI Facilities. Our structure enables us to innovate and work close to our customers to put the promise of the digital transformation and the energy transition into practice. But like the changes taking place in the hospital sector – the topic addressed in this sixth issue of The Agility Effect Magazine – our activities always have a strong human focus, in both the way we work and the goals we work to achieve.

We hope you enjoy this issue.

Hervé Adam
Managing Director of VINCI Energies France



AGILITY **PICTURE**

A SOLAR FARM AT THE GATEWAY TO THE DESERT

Ouarzazate, the gateway to the Sahara in southern Morocco, is becoming a pathway to clean energy in the 21st century. Called Noor ("light"), the solar farm has thousands of animated mirrors over a surface area greater than that of Paris, and by 2020 it will have a 580-Megawatt (MW) capacity, enough to supply one million households. The country will then derive 42% of its energy consumption from renewable sources according to public authorities, who plan to add further solar, wind, and hydroelectric capacity to increase that percentage to 52% by 2030. In the near future, Morocco could export part of its green electricity to Europe and the Arab world.

PARIS LA DÉFENSE ARENA, A COMBINATION OF TECHNOLOGY CHALLENGES

To make the spectator experience at Europe’s largest concert hall something exceptional, VINCI Energies business units first had to meet a number of technological challenges.

Paris La Défense Arena, the 40,000-capacity concert hall inaugurated in October 2017 in the Paris suburb of Nanterre, is all about the spectator experience. Everything in this mammoth project has been designed around a concept, which constantly places the spectator at the heart of a concert or match while delivering maximum comfort. Immersed in an environment of light, sound and image, the audience, who expect always-on connectivity, can engage at any time with the stage and tap into a wide range of services.

Creating a unique experience

To provide the ultimate audience experience, “several VINCI Energies business units combined their skills and put them to use, each in its own field, to meet real technological challenges,” explains Antoine Grand Dufay, project director at VINCI Energies. For instance, Lefort Francheteau (VINCI Energies) implemented a patented supply air ventilation system, renewing the concert

hall’s 750,000 m³ volume of air once per hour. This means that in an enclosed, 40 m-high venue, a temperature variation of less than 1°C is recorded wherever the spectator may be. “For the Rolling Stones concert, the venue was heated before the public arrived, then once the 40,000 spectators had filled the pit we switched to cooling mode. After two hours of intense concert, the temperature had reached a pleasant 24°C,” says Grand Dufay.

Synchronising light, sound, and video

To illuminate the concert area, Santerne IDF (VINCI Energies), in partnership with Philips, deployed 266 outside LED projectors with a light output of 1,800 lux, three times more powerful than that used for an operating table. “The technology implemented makes it possible to plunge the hall into darkness then to turn the LED projectors back on at full intensity to create an electrifying effect for

the public,” states Grand Dufay. “This feature is used extensively,” he adds, “to build suspense in the venue before players come out onto the pitch for a rugby match, say.” The installation also means that high-definition images can be captured, allowing for remarkably precise slow-motion footage and instant replays, and that “light, sound, and video can be fully synchronised and played around with to enhance the fan experience,” adds the project director. As for the venue façade, a lighting system with 620 giant aluminium and glass scales was installed and calibrated by Santerne IDF in partnership with

Ecce’Lectro. Backlit by 3,000 LED tube lamps, the scales feature a range of 16 million colours aimed at bringing the façade of this unique concert hall to life.

Immersed in an environment of light, sound and image, the audience, who expect always-on connectivity, can engage at any time with the stage.

Full Wi-Fi coverage

The thrilling spectator experience is rounded off by full Wi-Fi coverage, provided in partnership with Orange. The 400 Wi-Fi hotspots installed by GTIE Tertiaire (VINCI Energies), responsible for communications and data installations, were designed to enable 15,000 spectators to connect to the internet simultaneously at a speed of 1 Mbps. This boosts convenience as it means that numerous services are available to attendees such as video viewing, interaction with the stage, public voting, and even access to the buffet. Indeed, the option





to order beer and sandwiches was on the “full Wi-Fi” menu trialled by Orange during the Euro football championship in France in 2016. As the brains behind the ticketing service, the site’s 400 video screens, the CCTV and telephony and Wi-Fi

systems, “the IT network is one of the focal points of the project,” stresses Antoine Grand Dufay. To secure the network, GTIE Tertiaire and Axians (the VINCI Energies ICT brand) deployed a fully redundant system with two data

centres, where one automatically takes over from the other if either goes down. Delivering a rich experience for spectators at Paris La Défense Arena of course also means ensuring that no bugs or power cuts occur.

BUILDINGS

TRANSFORMATION

DIGITAL TECHNOLOGY SET TO DRIVE DEVELOPMENT OF GREEN BUILDINGS



On the front line in the fight against global warming, the building sector will act as a bridge between investment in digital technology and environmental challenges.

The building sector accounts for 44% of France’s energy use, far outstripping the transport sector at 31.3%. And since it generates more than 123 million tonnes of CO₂ emissions per year, it represents a priority in the fight against global warming.

The obligation for buildings to go green is not new. France’s 2012 Thermal Regulations (also known as RT 2012), which were introduced to meet the requirements of the Grenelle environment forum, seek to limit the use of primary energy in new buildings to no more than 50 kWh ep/m²/year, reducing by a factor of three the maximum level of energy use set by the previous regulations, RT 2005. This additional condition makes RT 2012 among the most ambitious sets of rules in Europe.

In the race to control and cut emissions, digital technology acts as both starter and accelerator. “It allows for infrastructure and equipment pooling and for convergence via open systems, thus minimising the risk of duplication which can lead to extra costs, excessive energy use, and further impact on the environment,” says Sébastien Matrat, Greenaffair business unit manager. The development of increasingly smart digital networks will make buildings themselves key players in



the transition to sustainable energy. Indeed, such networks can already be seen throughout buildings: electricity distribution, IT, lighting management, CCTV, HVAC monitoring and so on. Accompanied by room sensors and smartphone apps, these digital networks aren't simply aimed at enhancing user comfort but also at improving a building's energy performance. They measure, analyse, and regulate the environmental impact of the building's everyday functions in terms of energy use, CO₂ concentration, water consumption, waste, air quality, humidity, and temperature.

Grid-interactive buildings are on their way

If a sensor records an unnecessarily high temperature in a certain area, then the digital network

automatically sends an alert to a control system that decides whether a technician needs to be called out. Or if a long period of

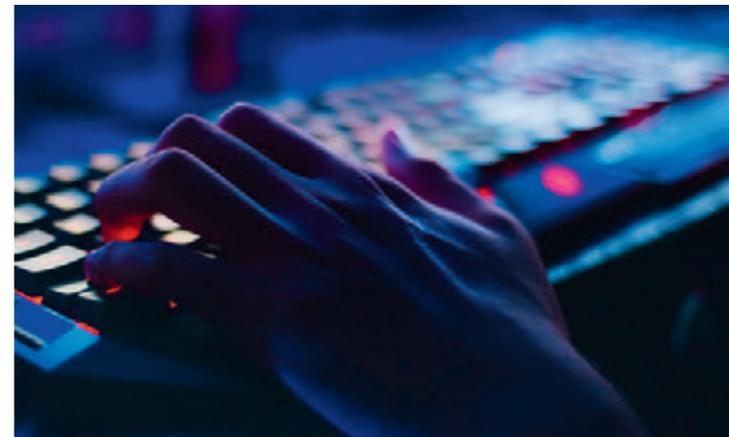
The development of increasingly smart digital networks will make buildings themselves key players in the transition to sustainable energy.

time is registered between two noise level readings, indicating that a meeting room is underused, then the network actions an adjustment of the areas of energy expenditure and programmes the intervals

between cleaning operations. And better still, by using digital tools, buildings will soon have a hand in balancing the power grid. "If, going forward, we want buildings to interact with public distribution networks via a building-to-grid system, we need to take steps today to make them smarter both during the operation and design stages," says Matrat.

It's all the more urgent for the building sector to contribute effectively towards curbing global warming as the pressure it faces will only intensify when the "Bâtiment Responsable 2020" regulations come into force... regulations which focus on positive energy buildings – in other words buildings that offset all of their heating, ventilation, air conditioning, lighting, and hot water use. These five areas of energy expenditure are set to be supplemented in time by two further power guzzlers: IT and electric vehicle charging.

SD-WAN, THE SUPERPOWERED VIRTUAL NETWORK



SD-WAN virtual networks installed over a conventional WAN infrastructure can increase the agility and flexibility of companies using cloud-based applications.

The WAN - which stands for Wide Area Network - is a conventional company IT network, made up of machines, servers and physical circuits, that tends to lack the flexibility required when the company decides to extend it to cover external sites or far-flung subsidiaries. But upgrading it to meet a company's growing connectivity, mobility, and data access needs can prove complex

and costly. A new technology, SD-WAN (Software Defined Wide Area Network) has come on stream at the right time to meet these flexibility and acceleration needs, and companies have been quick to embrace it. Gartner Consulting predicts that by the end of 2019, nearly one in three companies will have rolled out the virtual network over its physical network.

Cloud first

SD-WAN is a software overlay technology, says Chris Gilmour, Technical Practice Lead at Axians UK (VINCI Energies). It operates

independently from the physical network and enables applications to be accessed by remote sites using underlying infrastructures as diverse as generic Internet connectivity, 4G/5G, and MPLS via a secure tunnel without using a gateway. "Disconnecting the application traffic from the underlying infrastructure generates substantial flexibility," he says. He defines SD-WAN as a "transformation accelerator that creates an application-centric "cloud first" model.

SD-WAN's ability to combine several connectivity technologies supports a good level of bandwidth management. This in turn enables the network to handle applications differently according to pre-defined criteria.

"In addition," says Chris Gilmour, "this technology provides extensive application visibility, granular reporting, and better network management." Lastly, even though this is not the main reason companies install an SD-WAN network, the Axians UK Technical Practice Lead points out that "Data management and storage can also be made more flexible and more agile," since it constitutes one of the network's applications.

EXTRACTING VALUE FROM BIG DATA

Data should not only be used to drive a company's performance; it should also challenge its business model. Frans Feldberg, business innovation professor at the University of Amsterdam, explains how.

"As with the discovery of the microscope, data analytics opens up access to new worlds." This in turn necessarily leads to value creation, says Frans Feldberg, professor of business innovation at the school of business and economics at the University of Amsterdam. According to the expert, who is also a director of the Amsterdam Centre for Business Analytics, the time for businesses to be wondering whether to take action on data is past. Delay, and they are likely to be left behind by their competitors.

Furthermore, data-driven organisations are much more successful than businesses that don't use their data. "It sounds like nonsense, but thanks to algorithms Facebook sometimes knows what you want better than you do yourself, based on your behavioural data. Data analytics helps us discover



what we don't yet know," adds Feldberg. He goes on to warn that too many businesses use data simply to improve their business performance, whereas the most valuable innovation – achieved by monitoring data – involves calling into question their business models.

Exemplary washing machine

Feldberg takes a Wi-Fi enabled washing machine as an example. On the face of it, the Wi-Fi connection can help optimise the use of the machine, enabling it to be operated remotely. But delve a little deeper, and you find that the connection delivers a wealth of data that can be of interest to maintenance companies, offering the opportunity for them to develop predictive maintenance programmes.

Such data can inspire new business models, incorporating services created on the basis of the value of the data. In the case of the washing machine, these services might include advice about how to optimise planned laundry jobs and about which programme to choose to achieve the best result at the lowest cost and with the lowest possible impact on the environment. "Run the risk of experimenting and innovating!" says Professor Feldberg. In the field of data analytics, visibility may be limited and the next step may be difficult to foresee, but "there is always the risk of being taken by surprise in your sector by the next Uber."

MORE VHS RADIO, LESS DIGITAL DIVIDE



To help communities in France resolve the issue of "not spots", areas without internet coverage or a mobile phone network, Axians is rolling out 4G fixed broadband networks.

In today's agricultural economy, having access to internet in

the fields is not simply a desirable feature or comfortable option for reading emails in the countryside – it's crucial for farmers who now rely on apps and the cloud. However, "many farms located in not spots still don't have any connectivity," says Serge Osorio, sales manager at Axians, the VINCI Energies brand specialising

in networks and information and communication technology. While urban areas enjoy access to broadband (8 Mbps) or even superfast broadband (30 Mbps), it's a different picture for sparsely populated regions, where connection costs deter operators from rolling out fibre. Aware of the damage caused by



Axians provides local authorities with agile solutions that enable superfast broadband to be rolled out cost-effectively.

this digital divide, which can disrupt society, drive away business, and accelerate the depopulation of "not spots", the French government has set up several programmes aimed at boosting coverage.

These include the "rural community not-spot programme", which involves installing a shared mast, financed by local authorities, for the four telecommunications providers who are obliged to deliver high-speed connections to these areas with no connectivity. But "the scheme doesn't provide a solution for very sparsely populated areas," stresses Osorio.

From engineering to operation

To fill these "not spots", which are particularly difficult to develop, Axians provides local authorities with inventive and agile solutions that enable superfast broadband, or 4G fixed broadband, to be deployed cost-effectively using specific radio frequencies

allocated by Arcep, the French telecommunications regulatory authority, in a way that will help bridge the digital divide. Axians covers the entire process on behalf of local authorities, from engineering and infrastructure deployment through to operation, installing private networks which are then linked up to an internet service provider. "The benefits of the solution are clear for not spot municipalities," claims Osorio. "They get a quick resolution to their connectivity and regional attractiveness problems, and the financing is achieved through a combination of internet access fees, specific public funding, and the very low cost of the frequency made available by the regulatory authority."



“**BOLD TIMES ARE DRIVEN BY BOLD PEOPLE**”

SAMANTHA DAVIES
 SKIPPER OF THE INITIATIVES-
 CŒUR SAILBOAT.
 VINCI ENERGIES,
 PERFORMANCE PARTNER.



Digital transformation and energy transition accelerator, VINCI Energies boost the reliability, safety and efficiency of energy, transport and communication infrastructure, factories and buildings.

GIVING MEANING TO OUR COMMITMENT AND LIVING OUR VALUES EVERY DAY!

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AGILITY **LEADER**

INNOVATION

ALEXANDRE CADAIN ADVOCATES “AI FOR GOOD”

This young and multi-talented French entrepreneur wants to see disruptive innovation transforming business and society as a whole, thanks to artificial intelligence.

His head may be in the stars, but his feet are on the ground – and they’re making rapid strides. Twenty-nine-year-old Alexandre Cadain is a young man with no time to lose and a mind-blowing CV. A graduate of HEC business school, the École normale supérieure (ENS) Grande École and the Sorbonne University, he already has an extensive professional track record: founder of an art gallery set up during his studies, responsible for a while for the development on the French side of Hyperloop Transportation Technologies, co-organiser of the “Post-digital” seminar at

ENS, ambassador for the XPRIZE Foundation, rapporteur to the UN’s AI For Good commission, and co-founder in 2017, together with Amir Banifatemi his former boss at the XPRIZE Foundation, of the Anima innovation laboratory. In unlocking the mysteries of teleportation, it would appear that Alexandre has acquired the ability to be everywhere at once! Indeed, this is a subject he touched on during his involvement in the Hyperloop project, a means of transport devised by Elon Musk for travelling at over 1,000 km/h, and as part of the latest Avatar project run by

the XPRIZE Foundation. But the American entrepreneur's crazy dreams don't seem to have convinced Alexandre. "To go faster, you have to go straight ahead, in a blind tunnel which stops you from seeing other possible pathways; in the end, you make the world smaller," he said at the TEDxParis talk entitled "What comes after the future?" which he gave in Paris on 6 November 2017.

Since then, he and his company Anima have preferred to explore other, collective rather than individual, pathways that serve the common good instead of concentrating on the superhuman. "For example, we are currently creating the AI Commons platform to enable economic and social players to share their data with artificial intelligence labs or other problem solvers in a decentralised way. This will help meet some of the challenges relating to the Anthropocene era that have become too complex for human analysis alone," explains Alexandre.

Filling the gap

His mantra today is about contributing towards developing "artificial intelligence for good", in other words "intelligence which opens up multiple pathways and which enhances us rather than reducing us to machines." "Beyond the contradictory discourse on artificial intelligence, which is either negative and dystopian or positive and idealistic, there is a gap in which AI can have an immediate and positive impact. That's what we're working on, for instance by looking at ways with the UN to meet the 17 Sustainable Development Goals, something we tackle each year with 33 agencies and dozens of labs," he adds. But as well as organisations like the UN, it's businesses that Anima

is targeting first and foremost. And here again, the young boss wants to see disruption replacing linear innovation: "The capacity to move from one stage to another by leapfrogging an intermediate stage – like a country moving from an agricultural economy to a digital economy without experiencing the industrial stage – is also very interesting to observe in a business environment. In a context of rapid changes and pressing environmental challenges, it must become standard practice for organisations to radically rethink their business activities in a way that contributes to a positive future."

"Beyond the futuristic and extreme discourse on artificial intelligence, AI can have an immediate and positive impact."

To execute all this, Alexandre is focusing on the moonshot technique, in which Paris and Los Angeles-based Anima specialises. A moonshot is an exploratory project that aims to produce a massive positive impact on society, involving one billion people, and that is carried out without any expectation of short-term profitability. The concept basically means addressing a meta-problem using a radical, creative approach that

often relies on groundbreaking technologies. Hyperloop, Coursera, and Wikipedia are examples of moonshots.

Renaissance versus Singularity

"Anima is a moonshot studio. We produce breakthrough innovations that transform business and society as a whole, using technologies like artificial intelligence. Our work spans the preparation of the moonshot, from its conceptualisation right through to its design, architecture, and even implementation. Our core business involves determining the most appropriate partners and laboratories, for example for working on health prediction issues," explains Alexandre. He has been building up and honing this expertise since 2016 within the XPRIZE Foundation as Europe ambassador for the IBM Watson AI XPRIZE project, an international competition aimed at developing new AI-related solutions. Although the young entrepreneur's portfolio of partners and clients already includes the Centre National d'Etudes Spatiales (National Centre for Space Studies), thecamp, La Poste, Chanel, Framestore, and Ubisoft, he hasn't abandoned the ideals of his early days when, between 2013 and 2014, he travelled across Africa, Asia, and Latin America with three friends as part of an HEC social entrepreneurship programme, supporting projects relating to microcredit, solar power, and professional training. In a speech given by Alexandre at the HEC business school at the start of the 2017 academic year, he summed up his approach as: "Using technology for the good of humanity and its environment, based on a philosophy closer to a European Renaissance than Californian singularity."



The consensus diagnosis is unequivocal: throughout the developed countries, healthcare systems face the enormous challenges of aging populations and the rising prevalence of chronic illnesses. These new issues are calling existing institutions and organisations into question – and foremost among them, the hospital at the heart of the system.

The hospital, a major source of progress in the last century, is a place like none other. The building itself, its operation and its environment are subject to specific, particularly stringent requirements in terms of quality of service, maintenance, energy performance, technical, and technological infrastructure and safety.

In all these areas, technological progress helps to improve the operation of healthcare facilities with respect to expenditure and human resources. If the healthcare system and healthcare facilities are to successfully transform themselves – as they must – their objectives and their operation must be focused on the human being.

SUMMARY. The hospital, centrepiece of the healthcare **system overhaul**, p. 20... FM breathes new life into hospital **maintenance**, p. 22... Reducing costs, enhancing **comfort**, p. 24... The human being, the best **performance** guarantee, p. 26... The hospital moves to **customised IT**, p. 28... How **Belgium** is overhauling its hospital system, p. 30

THE HOSPITAL, CENTREPIECE OF THE HEALTHCARE SYSTEM OVERHAUL

The French healthcare system will have to overhaul its organisation to meet the expectations of users who aspire to more autonomy and support and of public officials keen to achieve greater overall efficiency. The hospital's importance, configuration and role are set to change considerably.

The diagnosis is now broadly accepted. The French healthcare system faces enormous challenges, first and foremost the aging of the population and its direct consequences – the increasing prevalence of chronic illness and multiple pathologies. These unprecedented challenges necessarily call the existing healthcare system into question. At the heart of the system, "The hospital was a major source of progress in the last century. But its organisational model, which goes back to 1958, is powerless to respond efficiently and equitably to the future expectations of users and to the new economic realities facing the healthcare system," says Loïc Chabanier, Healthcare IT Project and Strategy manager at the EY consulting firm. Hospital reorganisation is a recurring

theme in the strategic plans published by officials in recent years. It is again front and centre in the "Ma Santé 2022" plan launched in November 2018 with a budget line of €3.4 billion.

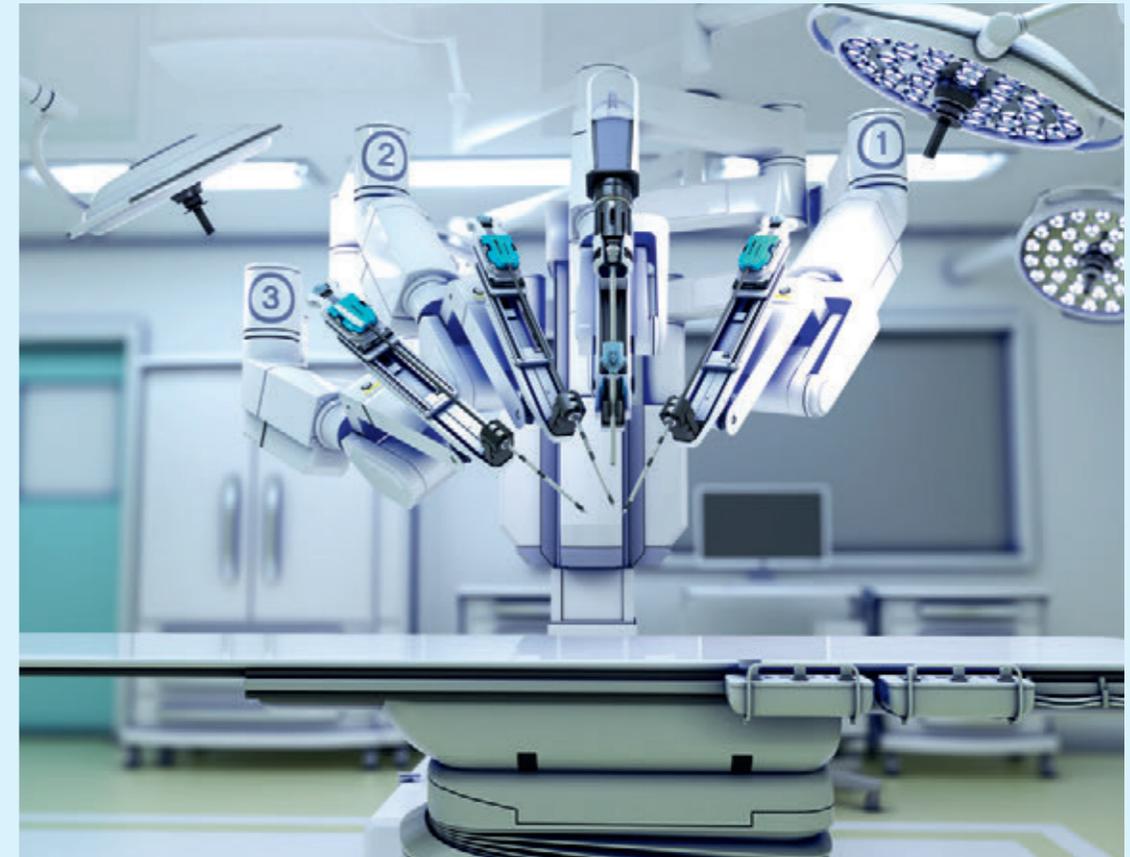
"The operation and organisation of hospital governance are more complex than those of a company."

"One objective is to reduce the share of the hospital in overall care provision," says Élisabeth Hachmanian, associate responsible for Public Sector and Healthcare

Consulting at PwC. "The hospital, which was the centrepiece of the system, is set to become one part of the chain, with a clear repositioning of enhanced skills, in other words the most advanced medical skills, given the strong progress in artificial intelligence technologies."

Towards better coordination

Medical centres will thus become "hubs" built around a core set of advanced expertise – the hospital itself – requiring suitable, state-of-the-art equipment and surrounded by a galaxy of local services dedicated to first aid, preventive medicine, rehabilitation and coordination linked to medical practitioners, nurses and other healthcare staff, health and social services, laboratory technicians and pharmacists.



"Hospitals will work with the healthcare providers within their areas," says Mr. Chabanier. "The approach based on competition between hospitals and with private practices is a thing of the past. The healthcare sequencing and gradation concept now requires better coordination between facilities and removal of the separation between the private, public and social sectors." The goal is to facilitate the introduction of personalised, preventive and predictive medicine, among other things via the development of telemedicine; to improve the care pathway; and to pave the way for control of healthcare costs, notably by reducing the length of in-patient hospital stays. The expanded use of outpatient care, a major economic goal to

enhance the healthcare system's efficiency, has become a de-facto national priority for the public officials. Currently 52% of surgical procedures are performed in this way and the goal is to raise that proportion to 66% by 2020.

Secure data sharing

But the two-pronged barrier removal and care pathway approach assumes that all the system's participants can communicate on the basis of common standards and reliably and securely share data. The accelerated pace of digital transformation in healthcare facilities and the tightened requirements governing data structure and sharing are the core focus of the "HOP'EN" programme, the new five-year

(2018-2022) hospital information system roadmap covering the entire country.

The hospital is a special centre for experimenting with advanced technologies, robotics and algorithms. They are primarily considered centres of innovation in serial care and improved management of healthcare facilities, but the development of digital technologies and artificial intelligence also raise legitimate questions regarding the role of human personnel in providing and supporting care.

"The operation and organisation of hospital governance are more complex than those of a company," says Ms. Hachmanian. "The hospital is a distillation of social, political, cultural and organisational complexity, centred on serving the patient and the patient's interest."

BUILDINGS

TRANSFORMATION

FM BREATHES NEW LIFE INTO HOSPITAL MAINTENANCE

The widespread use of data is changing the approach to hard FM in hospitals, which are increasingly looking at how occupants actually use the buildings and taking those patterns into account. The trend is paving the way for new services.

“When we guarantee a certain room temperature in a hospital whose technical services we’re managing, it’s not the heat at source, in other words the boiler, that we’re talking about, but the actual temperature at the patient’s bed – and by that I mean each individual bed!” says Stéphane Bretin, business unit manager at VINCI Facilities, the VINCI Energies brand dedicated to facility management.

This distinction illustrates how digital technology is changing hospital maintenance practices, the drive for ever-greater efficiency and a focus on how occupants, whether carers or patients, actually use the buildings.

Previously, facility managers would stay put in hospital plant rooms, whereas today, “technicians get out and about; they are in contact with users,” adds Bretin to demonstrate the extent to which the services supplied to hospitals have evolved. Whether contact is direct or through data sent by various sensors, it delivers insights into actual use patterns: windows left open, heating left on too long, and so on.

Facility managers not only guarantee energy performance, they also play an increasing role in health & safety and regulations.

Water and air quality is a major constraint that requires facility managers to ensure hospitals comply with standards comparable to those of the pharmaceutical industry.

“They are now called on to support hospitals when they appear before health & safety committees,” states Bretin. During audits by health authorities, FM managers act in an advisory capacity, for instance producing monitoring protocols that prove the absence of airborne infectious diseases.

A specific aspect of the world in which hard FM managers operate is water and air quality. The risk of legionella makes this a major constraint, requiring facility managers to ensure hospital compliance with standards comparable to those of the pharmaceutical industry.

Monitoring buildings and facilities

Constantly monitoring buildings and facilities helps not just to make the patient pathway smoother but also to optimise the use of space in a way that enables management to meet its financial targets. Economic constraints are an ongoing reality on this new playing field.

Hospitals want fixed prices to apply both to building-related expenses and energy bills. To meet this demand, VINCI Facilities relies on “excellent knowledge of processes” and takes a proactive approach to developing user awareness. To implement these new solutions, VINCI Facilities leverages a number



of digital tools available in a single dashboard, or hypervisor. Integrating data from the BMS (building management system) and the CMMS (computerised maintenance management system), the hypervisor is used to carry out a fine-grained control of all equipment and to establish a predictive maintenance programme – invaluable in

facilities which operate around the clock and which cannot disconnect the power supply to perform repairs without taking specific precautions.

As far as digital technology is concerned, VINCI Facilities works in hospital environments alongside a major player in ICT services, Axians, another VINCI Energies

brand. Responsible for maintaining communications networks in most public hospitals, Axians is involved among other things in interconnecting networks, as a result of the hospital merger provided for in the French Health Act. Axians’ goal ties in with that of facility managers: to improve the coherence of the healthcare pathway.

BUILDINGS TRANSFORMATION

REDUCING COSTS, ENHANCING COMFORT

Energy-guzzling healthcare facilities are implementing programmes to make their buildings more energy efficient. And they're paying off!

With its 6,000 healthcare facilities and 30,000 health and social care centres, France's health sector alone accounts for around 12% of the service sector's energy use in the country and up to 2% of national energy use, says Ademe, the French Agency for the Environment and Energy Management. It therefore follows that hospitals, strongly encouraged by their supervisory authorities, are gradually getting involved in a drive to reduce consumption. In 2013, the Réunion university hospital was the first to achieve ISO 50001 certification (an international standard that defines the requirements for implementation of energy management systems), followed by Poitiers university hospital in 2016, and the Saint-Louis, Lariboisière, Fernand-Widal

hospital trust in Paris in 2017. Energy performance in healthcare facilities covers two types of impact. The first is economic, and the objective here is to reduce energy expenditure in buildings. This primarily concerns heating and air conditioning, which account on average for 65% of energy use, but also water, since 400 to 1,200 litres per day are required for a single bed.

Win-win contract

In the Isère department in eastern France, the Groupe Hospitalier Mutualiste de Grenoble hospital awarded VINCI Facilities a maintenance and energy performance contract. After four years and some €400,000 of works, the client saw a reduction

of 10% in its electricity bill and savings of 40% in its gas consumption.

“Measuring and controlling energy impact during facility operation and maintenance activities is a real prerequisite.”

This was a win-win situation for both parties: “Beyond the 15% performance improvement in gas expenditure, the contract provided



that two-thirds of the savings generated would go to the hospital and the remaining third to VINCI Facilities,” explains Cyril Carlin, manager of the VINCI Facilities Dauphiné Savoie business unit. But energy efficiency is not just an economic issue. “Measuring and controlling energy impact during facility operation and maintenance activities is a real prerequisite,”

stresses Stéphane Bretin, manager of the VINCI Facilities Greater Paris business unit. “It’s about ensuring health security in the hospital environment and the patient’s well-being,” he adds. There is a wide range of practical and easy-to-use applications for occupants (whether health professionals, patients or visitors): surgeons can regulate water

flow in operating theatres using touchscreens, the temperature in lounges can be adjusted according to occupancy, and lighting can turn on automatically when entering a room. All of these features are possible thanks to developments in digital technology. In hospitals more than anywhere else, energy performance begins with monitoring building intelligence.

THE HUMAN BEING, THE BEST PERFORMANCE GUARANTEE

Neither the healthcare system nor healthcare facilities will succeed with their revolution if they do not manage to focus their objectives and their operational model on the human being.

Regardless of how hospitals are configured in the future and even if they meet the objectives set by the public authorities with respect to expanded outpatient services, they will have to contend with demographic change. INSEE, the French National Institute of Statistics and Economic Studies, reports that people over 75 will account for 12.2% of the French population in 2030, up from 9.1% today.

This will mean increasing numbers of ill and dependent people and caregivers. But it will also mean an increasing number of people working in the healthcare sector, which could account for 1.7% of the labour force by 2030.

Of course, these jobs will not be concentrated in hospitals. But they will be an integral part of

the healthcare system and will have to meet all the requirements of responsible management.

“The ability to focus the ecosystem on the human being is THE major challenge to be tackled.”

“The ability to focus the ecosystem on the human being is THE major challenge to be faced by all

participants. Everyone, within his or her scope, must make it a priority,” says Philippe Caillière, Director at VINCI Energies Building Solutions Grand Ouest.

There have been many discussions and initiatives in recent months. One example is the “+ de vie” (more life) programme initiated by the Fondation Hôpitaux de Paris-Hôpitaux de France, which has already inspired 14,000 projects: restaurants, cafés, libraries, exhibitions, concert halls, kitchen gardens, and even interior streets within the healthcare facilities.

The promise of innovation

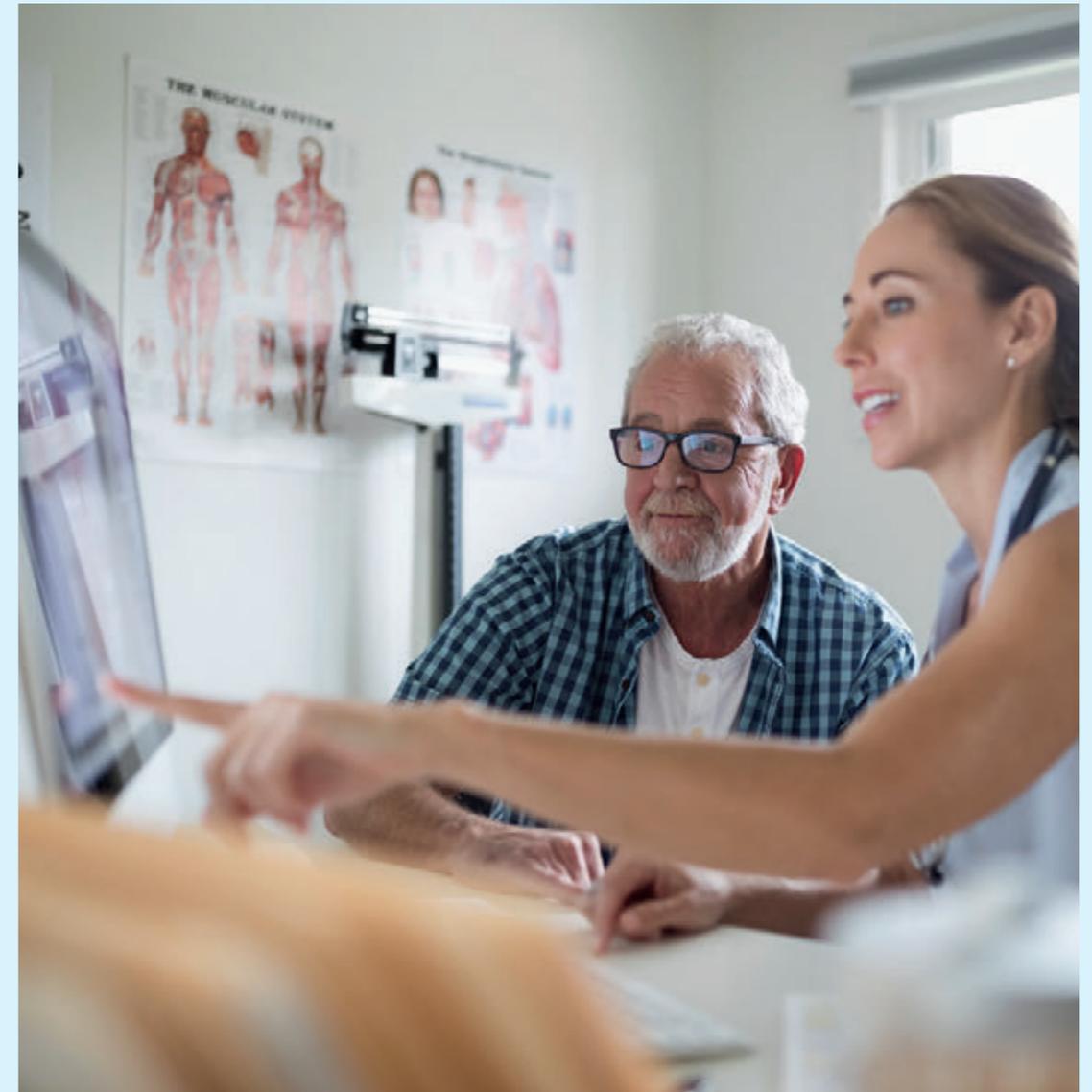
Digital technologies and algorithms harbour a risk of dehumanisation but they also offer unprecedented

opportunities for providing patient comfort, preventing drudgery for healthcare personnel, and boosting the performance of the healthcare system as a whole. Technologies have major potential. For example, VINCI Energies has just designed a connected headboard for beds that is equipped with a movement sensor. The innovation was initiated following a discussion with the Normandy regional healthcare agency about ways to limit stress

for healthcare personnel, improve their working conditions, and reassure the families of patients.

The system is easy to install. It provides a diagnosis of patient behaviour and sounds an immediate alarm if the patient falls. “This system can limit the frequency of rounds during the night shift, enable personnel to more efficiently respond to sometimes inadvertent patient calls, and ensure a rapid

response when needed,” says Philippe Caillière. The innovation was first tested in a retirement home, and can also be used in maternity clinics and hospitals. It is just one example of how artificial intelligence can boost quality of service in healthcare facilities. Several studies have reached similar findings that the combination of artificial intelligence and human personnel delivers results that are more reliable than either one used alone.



BUILDINGS CUSTOMIZATION

THE HOSPITAL MOVES TO CUSTOMISED IT

The specific requirements of healthcare facilities call for ad hoc IT infrastructure and can involve technical proposals that can be directly operational in the medical sphere.

Hospitals, clinics, nursing homes, and other healthcare facilities must meet very stringent requirements, notably in terms of uninterrupted service and confidentiality. IT infrastructure is therefore a sensitive issue that must be tackled very broadly. "Public and private sector healthcare facilities operating in the same geographic area are called on to work with each other so must therefore be interconnected. This is one of the major goals of the healthcare strategy in France and the creation of the GHT (Groupements Hospitaliers de Territoire – regional hospital groups)," says Jean-Pierre Cariteau, Healthcare Project Manager at Axians. One good illustration of this geographical issue is the Nord-Ardennes GHT, for which the VINCI Energies ICT brand optimised IT infrastructure security (LAN, WLAN, firewall, URL filter, etc.) in the various group hospitals, as part of the harmonisation of their information systems.

The spread of telemedicine, tele-expertise, and many day-to-day services (appointment scheduling, visitor orientation, hospital bed management, etc.) are areas in which the new information and communication technologies can bring substantial improvement. "We are in constant touch with our customers and can provide customised solutions, for example to help them manage human resources in hospitals," says Eva Dauw, Branch Manager Healthcare & Public Services at Axians Belgium.

An obligation to ensure uninterrupted service

But one central parameter must be addressed: the obligation to have a recovery and service continuity plan in a hospital environment that must be available around the clock. Other substantial obligations are a high level of data security for information processed in the network, rigorous authentication procedures for

medical staff with job-related access, the requirement for a mobility strategy, and availability of healthcare staff services across the entire area covered. These requirements call for storage capacity specific to the healthcare system (service continuity, data sharing, etc.) and therefore for substantial bandwidth between sites. "To address these requirements, Axians builds on its more than two decades of experience in the hospital and healthcare sector and provides a team of specialist project managers who share best practices across the various European countries," says Charline Moreau, Marketing & Development Manager Healthcare at Axians. This shared expertise enabled the VINCI Energies brand to recently win the "Online Pomeranian Healthcare" project in Poland. "This project will set up interoperable, integrated online healthcare systems covering six hospitals and will cover a variety of tasks including the creation of electronic medical records, an information system for patients and

their families, information exchange platforms, and patient satisfaction surveys," says Bartosz Urbański, Project Manager at Axians Poland.

Close to needs

Axians offers a broad range of solutions, from network infrastructure to data storage and analysis technologies. The example of Uroviva, a specialist Swiss urology clinic that works with ten medical practices in the Zurich region, is a perfect illustration of this ability to meet the needs of local customers. "Because they work closely with us and are very familiar with the details of our organisation, the Axians teams were able to integrate the new IT infrastructure without requiring us to make organisational changes in our operations," says Danja Flury, Practice Manager at

Uroviva. The Axians Cloud solution is what our employees wanted and it has motivated them and freed up their time so they can focus more attention on essential responsibilities: patient contact and care." Thalia Cohausz, Chief Clinic Operational at Uroviva, adds, "Thanks to the transfer of our IT to the Axians Cloud and to the comprehensive Workplace package, we were able to recover the flexibility and reliability that had been cruelly lacking. Our physicians and employees are extremely satisfied with this tool."

Ad hoc technical solutions

Axians' detailed knowledge of the market enabled it to develop ad hoc technical solutions in certain countries. Examples are MyHealthbox (online appointment

scheduling and patient file management) and My Registration (autonomous secure registration) in Belgium, and Vidavi (purchasing, logistics and financial management) and an SAAS application customised for psychiatrists in the Netherlands. "But beyond the conventional network infrastructure, we also offer advice based on an analysis of the customer's processes and generate specific, long-term technical proposals for ways to solve purely medical issues," says Charline Moreau. For the Ommelander hospital in the Netherlands, Axians made it possible to better regulate patient flows in the Accident and Emergency unit and the entire intensive care chain, thus making it possible to optimise utilisation of the operating theatre. From network expertise to operational advice, Axians is thus helping to design the hospital of the future.



HOW BELGIUM IS OVERHAULING ITS HOSPITAL SYSTEM

The Belgian government has launched a major overhaul of its hospital system, involving mergers, upgrades and savings. Something that should result in large contracts for construction and maintenance professionals in the medium term.

The major changes shaking up the healthcare system in France – in other words the ageing of the population, the increase in chronic diseases, developments in medical technologies, and the depletion of public resources – present a challenge to most European public policies. In Belgium, for example, the government took up the issue in 2014, launching a reorganisation of its hospital landscape and a reform of healthcare facility financing. “The government is committed to setting up 25 ‘loco-regional clinical networks’, bringing together private, public, faith-based, non-faith-based, university, and general hospitals according to geographic coverage criteria,” explains Marc Lemaire, CEO of VINCI Energies Belgium, an active player in the health sector and involved in almost all of the country’s hospital projects.

Fewer beds, more theatres

The merger and upgrade programme, in place for the past

5 years, seeks to meet two main objectives. First, to streamline a hospital network with a number of ageing facilities. And second, to ensure that the network, parts of which are heavily loss-making, returns to financial equilibrium. Driving this strategy – in a country that has a higher bed-to-population ratio than many of its neighbours – is the development of outpatient care. Hospitals are set to become operating machines. Those that used to house 1,000 beds and 10 operating theatres will in future have 500 beds and 40 theatres.

“This trend inevitably goes hand in hand with more technically complex requirements throughout the special building technology service chain: air conditioning, ventilation, heating, sanitary plumbing, electrical services, maintenance, and of course digitalisation (data flow and medical record management),” stresses Fabrice Montesi,

managing director for the buildings sector within VINCI Energies Belgium.

Smarter, more comfortable hospitals

Energy performance requirements (combined heat and power, heat loss limitation, monitoring) must also incorporate a user-friendly dimension in hospitals: rooms and lounges equipped with smart technology, air conditioning and modular options that can be operated centrally and by the users themselves.

For example, the maternity unit of the Grand Hôpital de Charleroi (GHdC) hospital recently added ultra-connected rooms, with access to HDTV, video games, the internet, medical information, an automation system, lighting that follows the circadian sleep-wake cycle, and a wall bed allowing friends or family to spend the night with a patient.

Energy transition,
digital transformation,
more on
theagilityeffect.com



GREEN STORAGE, HELPING TO ACHIEVE THE ENERGY TRANSITION

To store electricity generated from wind or photovoltaic solar sources, the industry will have to develop environmentally-friendly solutions.

The energy transition, which is aimed at replacing fossil energy with renewable energy sources, is currently driven by grid capacity and increasingly by energy storage. The latter solution is sometimes indispensable in order to place solar energy generated during the daytime, or wind energy generated during hours when electricity demand is low, in reserve for future use.

Of course, energy storage is not a new issue. To meet peak demand in the winter months, energy is already being stored, 98% of it in hydroelectric dams. But dams cannot solve the problem of the mismatch between energy generation from an unpredictable source and energy consumption. In this respect, the smart grid can provide fine-tuned management of the match-up between irregular electricity production and its consumption. In Denmark, where the share of renewables in the energy mix exceeds 40%, such fine-tuned management of the grid results in "additional storage not yet being needed," says Marc Jedliczka of NegaWatt, an organisation that

promotes the energy transition. NegaWatt reports that current grid infrastructure is sufficient to handle up to 50-60% variable renewables in the mix.

"Electricity storage makes sense in commercial terms, but sustainable storage makes even more sense."

But grid management has its limits, says Simon Innis, Director of Omexom UK (VINCI Energies), who believes that "the smart grid is primarily a way to achieve efficiency, not a solution to the storage issue." The British expert says that the battery – and particularly lithium-ion technology – is the appropriate solution, "

at least over the coming two years." Several photovoltaic solar plants are already using lithium-ion battery systems exceeding 100 MW today, to store part of the energy generated during the day.

Towards the green battery

But beyond 2020, other technologies are expected to take over, says Simon Innis. These technologies will face the further challenge "of storing energy in an environmentally friendly manner." "The issue of the second life of lithium-ion batteries has not been resolved," he points out, calling

attention to new storage systems such as hydrogen flow (Redox) batteries, gravity-based systems, and liquefied air.

To meet the requirements of the grid and manage irregular energy production from solar or wind sources, "electricity storage makes sense in commercial terms, but sustainable storage makes even more sense," says the Omexom UK expert. Sustainable storage for both environmental and commercial reasons is the focus of the "Alliance in Europe". European automakers belonging to the alliance are determined not to abandon the battery market to Asia.

In a move to avoid competing on cost alone, the Alliance has opted for an "ecological battery" development strategy, with the support of the European Commission since September 2017.

The Alliance presented its roadmap in February 2018. The plan is focused on reducing the carbon footprint of the industry and on a more ethical approach to raw materials supplies. The future green battery is consistent with the sustainability objective of fostering development of renewable energies and it can also provide a commercial advantage in the race for storage.



THE DAM AS A STORAGE SYSTEM



The rapid growth in the use of intermittent renewable energy sources has focused attention on energy storage. Hydroelectric power offers strong development potential.

At a time when public authorities, investors and industries are shifting massively to renewable - especially solar and wind - energy, one source of energy is too often neglected: hydroelectric power. This despite

the fact that it is the only source of energy that is both renewable and storable. Dams (13% of French electricity production) can provide an alternative to intermittent solar and wind power, which disrupt load balancing in the grid and are prompting growing interest in renewable electricity storage. There are a variety of storage solutions. Thermal techniques using superconducting materials or large capacitors are still in the

experimental stage. Electrochemical technologies (fuel cell, battery, hydrogen vector) for their part are still costly and have volume limitations.

Then there are mechanical storage solutions, the main one being hydroelectric power using dams and pumped storage technologies. A pumped storage facility is made up of two reservoirs at different altitudes. Water is pumped between them during off-peak consumption periods and then released to a turbine during peak periods. France currently has 5 GW storage capacity using this technology, and the country's goal of increasing its energy storage capacity is primarily focused on hydroelectric potential.

"Pumped storage technology is highly advantageous because it is very flexible and can be adapted to the needs of the grid. It is based on Francis-type reversible pump-turbines," says Emmanuel Membrut, project manager for sales development at Omexom Hydro Services (VINCI Energies). The Omexom network of business units specialising in hydroelectric generation is standing by to meet the challenges of developing this source of energy in France.

IN ROUEN, THE INTERSECTION IS NOW SMART

A technological solution for managing traffic developed by Citeos, which gives priority to high-quality buses operating on a new line, is designed to convert locals from private cars to public transport.

At the end of 2018, Rouen's residents were introduced to "intelligent" buses on the new T4 line, which rival trams in terms of performance and which, in time, could convince drivers to choose public transport over cars. Using a dedicated bus lane and equipped with an on-board GPS system, the so-called Bus Rapid



"We took use patterns and traffic into careful consideration in a way that would benefit buses."

Transit (BRT) system will have priority over cars at the 40 intersections stretching along the 8 km-line,

thanks to a solution developed by Citeos (VINCI Energies). Integrator for the programme, Citeos relied on traffic studies from the company Lee Engineering and selected Comatis radio systems to equip the buses and deliver "smart intersections," as referred to by Jean-Marc Raymond, Citeos business unit manager in Rouen. As well as installing street lighting, Citeos configured and optimised the control systems that manage the traffic signals using a programme based on traffic data supplied by the city (number of vehicles/hour, for example) -

the aim being to smooth out traffic control issues. "We took use patterns and traffic into careful consideration in a way that would benefit buses," sums up Raymond. On approaching an intersection, the smart bus requests authorisation from the control system to pass. One of three things then happens: the bus "is given a green signal", the green phase is extended to let the bus pass through or the red-light phase is reduced. Although buses have priority, they still wait until pedestrians have crossed the road before continuing their route.

AUSTRALIA ADOPTS SMART LIGHTING SYSTEM

Electrix, a VINCI Energies subsidiary, has won an ambitious energy performance contract covering the area of Canberra, Australia's capital city.

Home to around 400,000 people, Canberra is the smallest but most densely populated of Australia's 10 autonomous territories. It is set to benefit from the Streetlight project, the largest smart lighting programme in the country. At the end of a two-year tender process, Electrix, the Australian subsidiary of VINCI Energies, was selected in November 2017 by the Australian Capital Territory (ACT) Government to project manage this energy performance contract (EPC) for a 7-year period. Omexom (VINCI Energies) will provide its support for the project's technical and financial design. Under the performance contract, which covers the maintenance and operation of several thousand kilometres of network, as well as the upgrade, operation, and maintenance of more than 80,000 lighting points – over 50,000 of which will be replaced with LEDs – Electrix is committed to generating energy savings of 47%. This is a significant figure given the fact that public lighting accounts for around 40% of ACT's total electricity use.

Hypervisor and Smart City

"The project aims to reduce the territory's greenhouse gas emissions by 40% compared with 1990 levels by 2020 and to achieve zero emissions by 2050," explains Alexis Tillie, business unit manager at Omexom. "It will also help create the conditions for a gradual and flexible rollout of smart city tools," he adds.

Indeed, alongside the light fitting replacement programme, a low speed, low power wireless network will be deployed to make the streetlights smart and enable other equipment and sensors to be connected. This supports ACT's ambition to deliver low-cost access to a network suitable for other public services, water network and grid operators, project developers, and academics.

Another innovative aspect of the project is the implementation of two operation and maintenance support tools developed by

VINCI Energies in France, aimed at helping Electrix meet the contract's ambitious objectives:

- The CityApp operation and maintenance support solution comprises a tablet app for technicians and a central web portal used to analyse data relating to repair jobs, assets, and the assignment of repair jobs. It improves maintenance process efficiency and infrastructure management. CityApp has already been adopted by more than 120 cities worldwide;
- The BIMCity hypervisor, by interfacing with four operation support systems, automates information exchange, reduces

turnaround times, ensures data quality and updating, and creates a direct link with the public. This central position means that BIMCity can track the performance indicators set out in the contract even before the analysis capacity of the data streams is utilised.

To support ACT's goal to create, via the contract, an environment conducive to the development of a smart city, Electrix intends to propose extending the use of BIMCity to other services or applications once it has gone live for public lighting. It would be based on the same model, interfacing indirectly with

business systems or directly with equipment and sensors, or even proposing apps that provide information and help for people to get around town.

"Creating the conditions for a gradual and flexible rollout of smart city tools."



HOW LA POSTE IS OPTIMISING ITS LOGISTICS

The La Poste group’s parcel arm has improved the productivity and efficiency of its sorting and distribution centres by deploying a software package developed by Actemium Lyon Logistics.

In France, the craze for online shopping is as strong as ever and has led to steady growth in the number of parcels delivered in the country, totalling around 600 million in 2017. Colissimo, the parcel arm of the La Poste group, is a major player in this highly competitive environment, with a market share of 59%. The sector is characterised by the need to continuously upgrade sorting and distribution systems by promoting the capacity to devise new offerings that meet market needs. For La Poste, it’s not so much the high-speed sorters that concern managers but the instrumentation and control systems used for this equipment. Over the past 15 years, Actemium Lyon Logistics (VINCI Energies) has been incrementally developing

a Warehouse Control System (WCS), which controls La Poste’s logistics platform activities.

The process has taken place in stages: in 2004, Actemium retrofitted Speed Parcel, a registered trademark for the industrial IT system that controls sorting machines. New sorting centres then benefitted from these upgrades: 7 logistics platforms between 2004 and 2012, and 5 more in 2015 and 2016. And at the end of 2017, Actemium was entrusted with two further projects at the Toulouse and Erstein sorting centres. The system integrator will have installed its control system across all Colissimo assets without stopping or hindering production, while honing the tool at each stage of the process – the latest version of it now being Master Speed Parcel.



“It’s a fully-fledged software package that brings together the various versions of Speed Parcel rolled out over time, re-incorporating all the specific needs that the application meets from one centre to another,” explains Nicolas Jaffeux, parcel and postal services manager at Actemium Lyon Logistics. “By making all the specific features generic, we enable La Poste to activate a new functionality with a single development and with automated deployment.”

“Productivity gains of 5 to 10% have been achieved and the parcel reject rate has been halved.”

Increased throughput

This software package tailored to La Poste has resulted in significant improvements in throughput at the sorting centres. “Productivity gains of 5 to 10% have been achieved and the parcel reject rate has been halved,” says Jaffeux. The Moissy-Cramayel site, for example, can sort up to 17,000 parcels per hour compared with 16,000 previously, while other sites have increased their rate from 13,000 to 14,500 parcels sorted per hour. These excellent outcomes and technical achievements have led La Poste to include in the specifications of tomorrow’s sorting machines the need to interface with Master Speed Parcel, which has become the “brains” of Colissimo’s entire sorting system. It’s a strong asset to help exceed the figure of 300 million parcels delivered in 2017 and to bolster its leading position.

FROM PROOF OF CONCEPT TO PROOF OF VALUE

To make the leap from the world of startups and innovation specialists and to develop fully in the industrial environment, the Proof of Concept model must meet a number of prerequisites.

Proof of Concept (POC) may still be the preserve of startups, but it is slowly but surely making a place for itself in industry. And with good reason: by testing in real-world conditions an innovation which is outside the scope of mental representation, POC shrinks the design phase and operational implementation into a single sequence. The outcome? Secure, accelerated innovation. But something which – in the world of startups – is based on an agile methodology designed to determine quickly and at reduced costs the relevance of strategic intuitions, involves a more cumbersome, complex process and more restrictive specifications when transposed to an industrial scale.

“POC isn’t a magic formula,” cautions Thomas Leseigneur, innovation manager at Actemium, the VINCI Energies brand dedicated to industrial solutions. “Prototyping doesn’t mean testing left, right and centre. Before launching anything, you have to

accurately identify the need both in terms of market appetite and operational feasibility, and you have to know where you want to go and what you want to achieve,” he adds.

“POC isn’t a magic formula. Prototyping doesn’t mean testing left, right and centre.”

Launching a POC entails a number of prerequisites: ensuring the scope is limited and manageable (amount of data, features, and people); defining performance indicators accepted by all stakeholders; and involving, if need be, the IS (Information Systems) department and various company business lines in the process. Project managers thus ensure – prior to validation by



IT departments – that integration resources are in place and prevent the risk of technical barriers arising at the production stage. As for the business lines, who better to judge scenarios and direct operational choices?

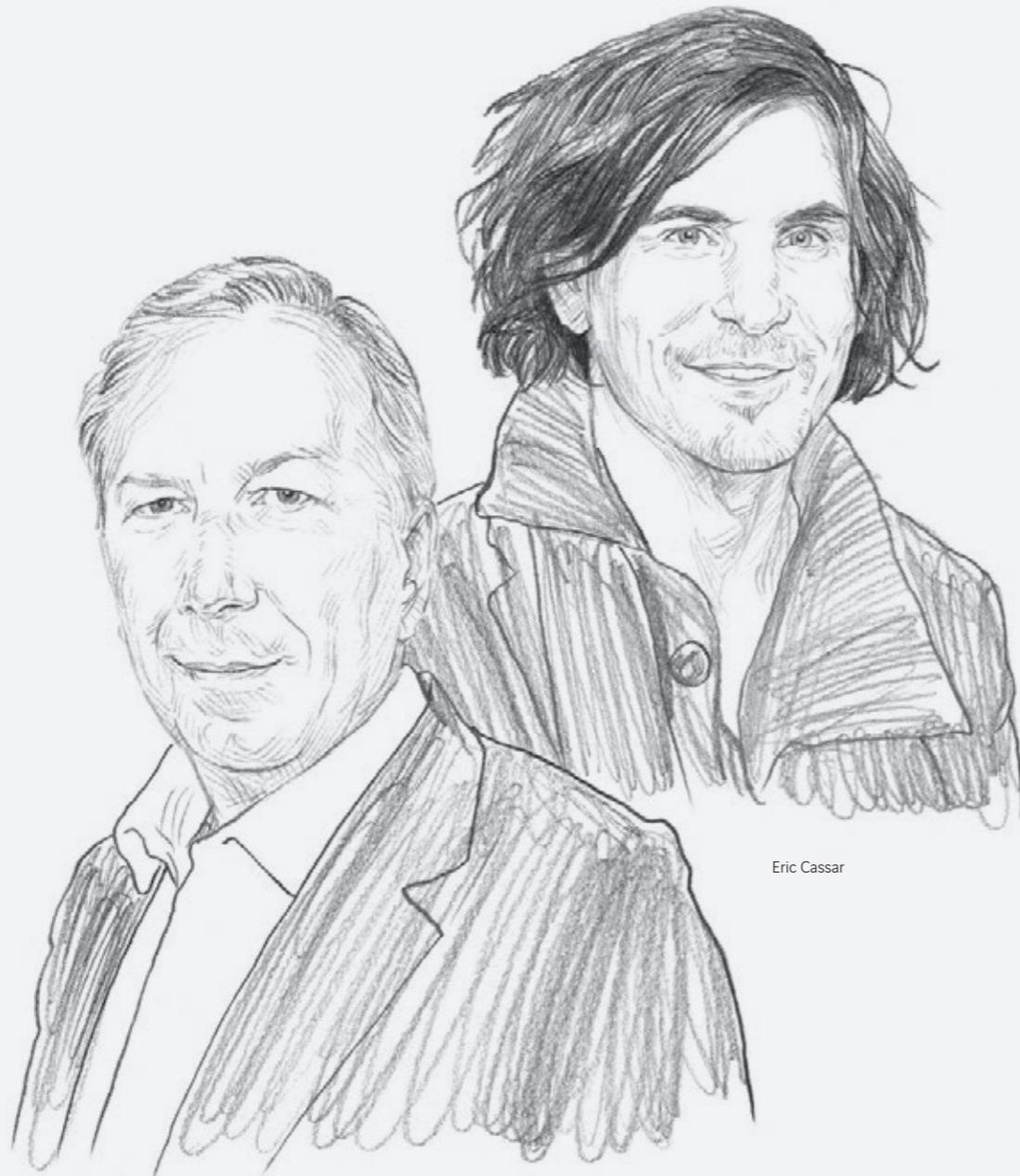
Collaborating and breaking down barriers

“A collaborative approach is undoubtedly the best guarantee of success for a POC,” says Leseigneur. “It’s a question of seeking the right data in the right place, knowing what business lines or even functions will be directly involved in the operational implementation of future development, and defining the contribution of a particular business line within the innovation business model. All of this can only be optimally achieved – in terms of time and performance – by breaking down barriers,” he adds.

It may not be a magic solution, but POC is a tool that can be used to address something that is a major issue for industrial companies: their capacity to manage digital transformation. Ultimately then, the idea is to meet large-scale challenges which are more than just technological.

For Actemium’s innovation manager, the most significant step involves the ability of integrators to move from POC to POV: proof of value. “Think of the solutions that have been put forward to enhance industrial data,” says Leseigneur. “We now know that these work. Capturing data, carrying it, storing it, analysing it: all of that has pretty much been mastered from a technological point of view. So proving a concept adds little in this case. However, showing that a concept has value is a significant step in terms of industrial innovation.”

TO WHAT EXTENT SHOULD WORKSPACES BE SHARED?



Eric Cassar

Philippe Conus

Digital technologies and the revolution in uses are calling into question the principles that have so far governed workspace design and construction. The distinction between workspace and private space is increasingly blurred and the two are being replaced by environments that are simultaneously flexible and customised.

Welcome to shared space! Why? How? To what extent?

Eric Cassar, architect and founder of the Arkhenspaces firm, and Philippe Conus, Building Solutions Director at VINCI Energies, debate the issue.

Why is the issue of workspace sharing now such a focus of attention?

Eric Cassar. In our societies, space is a valuable asset for companies. The only way to use it more efficiently is to innovate and share it. In this respect, workspaces have a major advantage over residential spaces because it is much easier to experiment with them and transform them. Workspaces have changed far more over the past 100 years than residential spaces changed over several centuries.

Philippe Conus. The issue of shared workspaces is driven by two concomitant revolutions – the digital

technology revolution, of course, but also the revolution in the uses to which technology is put, which is now erasing the barriers between types of space that have until now been separate, such as offices, houses, shops, and stations. These dual pressures are making it both necessary and possible to devise a different way to arrange space.

How does this impact facility management?

P.C. Until now, we began by providing technical maintenance for a building and then added a layer of services. Today, facility management cuts across

three dimensions: the place, the person occupying it, and the technology. It is not that technical maintenance has become less important – far from it. It is and will increasingly be important going forward. But services are not confined to a place. They must be designed and rolled out based on an open space approach, particularly via applications that accompany a person as he or she moves around (how I get to my workspace, where I park, with whom I share a vehicle, when I leave, etc.).



“Digital technology enables us to measure the use of space, adapt our response, and flexibly devise truly customised solutions.”

Philippe Conus

What does it mean to share space?

E.C. The distinction between private space and the office is no longer operative. What was called the office has become the work environment and the work environment is deployed throughout space. Sharing space means broadening the range of possibilities, diversifying the nature of places and services, offering a person, in response to his or her request or situation, a quieter environment, a more private space or transport to a meeting,

for example. In a nutshell, sharing space means customising solutions according to possibility, need and preference.

P.C. Sharing requires flexibility. Not so long ago, this was often considered a form of workplace dehumanisation – remember Accenture’s anonymous offices and file cabinets on casters. Today, digital technology enables us to measure the use of space, adapt our response, and flexibly devise truly customised solutions. Digital technology tells us how many people have access to the building, tracks their movement within it, identifies the services they use, and so on – either in real time or over the long term. All these data and trends serve as input for a range of services tailored to the uses and needs of both the workspace occupants and the building operation teams. We can, for example, adapt and even anticipate cleaning and maintenance schedules, modulate energy consumption curves, and offer specific concierge-type services.

Doesn’t all this raise privacy issues?

P.C. At La Factory, the VINCI Energies open innovation space in Paris-La Défense, we installed people-counting cameras with the consent of the employee representatives. The cameras provide only anonymous information. Prior user consent is a technology prerequisite as well, since the mobility application can only work for people who agree to be geo-located.

E.C. It is an issue, though. To me, the facility manager should serve as a countervailing power to the company. To make spaces smarter, the facility manager needs to have data concerning the people occupying the spaces. On the other hand, no one would agree to allow the data to be handed over to the employer. The facility manager must therefore make a commitment to serve as a trusted third party and agree not to transmit the data. It is similar to a situation in which I, as an architect, explain to a developer that I am working for him but also for the city. We must get agreement on a number of rules and then enforce them within a contractual framework.

How far can sharing be taken? Should it include customers, suppliers, people walking in off the street?

P.C. But it already does! L’Archipel, the future VINCI head office in Nanterre, will provide an auditorium and a sports facility open to the city. And its ground floor will be directly connected to the future RER Eole regional express line station.

With this fragmentation of workspaces, are we not running the risk of disrupting the identity of companies and the coherence of their image?



“Offices all look alike. The controlled process must leave room to express difference, identity, and values.”

Eric Cassar

P.C. Arguably, the opposite is true. The rollout of workspaces should prompt employers to devote more effort to their head offices, to build emblematic buildings in their image that express values and meaning. This is already happening. Many companies are re-designing their head offices to reflect their identity.

E.C. That is true, and it’s a good thing. But they don’t go far enough. You have to admit that offices all look alike. This is due to the prevailing economic approach. Builders have standard designs that have stood the test of time and that facilitate duplication. And investors buy buildings to rent and re-rent them. They shouldn’t be prevented from controlling the process this way. But they must leave room to express difference, identity, and values. When Apple,

Amazon, and Facebook in the U.S. and companies like Bouygues and BETC in France design their headquarters, they are making a statement.

P.C. The fact remains that many of the groups you mention operate across the entire property value chain. They are simultaneously developers, builders, investors, operators, and tenants. One of the obstacles to the spread of the smart building, especially in France, is the fragmentation of the value chain. In most cases, the investor does not know the developer. The developer places an order with the builder for a structure that is as commercially viable – and therefore as neutral – as possible. The builder and the technology installer for their part do their best to keep costs down, even if this means making short-term choices. And the tenant wants first and foremost to reduce operating costs. If we want to accelerate the spread of the smart building, with its shared spaces and its customised services, we need to promote a more comprehensive approach that fosters cooperation among all the parties involved.

E.C. The static vision is not necessarily the most effective vision. Today we need to devise architecture that not only organises spaces but also coordinates them, in other words makes changes in space-time. This can only be done if the operator and the architect work in close coordination from the very start of the design phase. The architect needs to propose new uses to the operator. The operator needs to agree to provide more information about how he intends the building to be used.

How can such cooperation between the various participants be encouraged, and how can the value chain be unified?

P.C. The first driver is probably economic. The digital revolution and the changing uses to which buildings are put are speeding up building obsolescence. A structure that cannot be digitalised and cannot provide a minimum range of services will lose market value. Developers will therefore, quite naturally, begin to take the new design and operation goals on board and undertake an increasing number of digital, service, and energy retrofits.

E.C. The important thing is to stop thinking in terms of “cost of construction” and to start reasoning in terms of the overall economic model. Digital technologies make it possible to invest the right effort in the right place at the right time. If a cost-benefit equation is drawn up, a digitalised building will ultimately cost less than a standard building.

ENERGY OPTIMISATION SERVING THE INDUSTRY OF THE FUTURE



Improving the energy consumption of French industrial plant and equipment must be based on optimising competitiveness. A virtuous quest for performance is needed to tackle the environmental challenges.

French industry must regain economic leadership by demonstrating its ability to challenge its own business model, starting with its energy consumption. This important budget item harbours scope for improving processes, quality and competitiveness, the benefits of which have so far been distorted. No industrial company is fighting the wrong battle, but the idea of “motivating” the industrial sector to redesign its factories to accommodate primarily environmental issues is utopian, even when subsidies and incentives are offered. In addition to such external pressure, those most involved are often ill informed or misled. The many demonstrable economic benefits of renovating production sites are still too

inconspicuous in an environment well known for its culture of secrecy. Other industrialists are put off by binding legislation and mandatory audits with added value that is difficult to quantify. But industrial companies should take note of the constant “regeneration” of the sector, which has a reputation for resilience, and the clear-cut economic milestones that it has set throughout its history – with the three major revolutions, whose common denominator is the transformation of the energy system used by industrial plant and equipment around the world. The appearance of coal, oil and then nuclear energy one after the other enabled industry to completely refashion itself. What could therefore be more natural than for industry to now take a close look at the energy it consumes, could produce, can save and must negotiate? The technology renewal rate is accelerating and a continuous improvement approach has never been more important. Yet monitoring energy use involves more than simply changing a core process or regularly updating equipment.

Continuous improvement programme

To introduce a continuous improvement programme covering energy efficiency, it is first necessary to have a clear picture of all types of optimisation that can affect it: targeted action that is easy to implement (installing variable speed drives, searching for leaks, installing insulation blankets, etc.); characterisation of useful energy flows, based on the minimum amount of energy required for each stage of the process; renegotiating energy purchase contracts, which are often poorly structured and difficult to understand due to market liberalisation; making the transition to self-consumption, facilitated by loosening of legislation; and making the most of load management potential. Specialist, flexible and independent integrators are indispensable partners to deal with these issues, including the financial aspect that runs through them all and ensures continuity of the programme. To make energy optimisation a tool for improving performance, it is therefore necessary to take the measure of the entire system. The plant of the future must be built to enable us to return to predictable growth that is sustainable for everyone, including the environment.



Thomas Leseigneur
Innovation Manager
Actemium

CMMS STILL HAS A FUTURE

Louis Pinon, innovation & smart building technical director at VINCI Facilities (VINCI Energies), is calling for a new, predictive-based generation of CMMS or computerised maintenance management systems.

BIM (Building Information Modelling), Smart Buildings and EMS (Energy Management Systems) are just some of the tools and systems that point to a digital transformation in the building sector. In this context, CMMS (computerised maintenance management system) software programmes, initially launched in the 1980s, might now seem outdated.

These systems, which assist maintenance departments in their tasks (such as maintenance, inventory, procurement, personnel and schedule management), are in fact the poor relation of this digital revolution. In the construction sector, CMMS is simply not taken into account as the focus is not yet on the lifecycle of a building. So far, we haven't seen integration with BIM, the 3D digital system that consolidates all of the smart and structured data relating to a construction project. And indeed, no naming convention applies across all of these new tools, which operate in silos. It's all the more unfortunate for CMMS that clients regularly change maintenance service providers, each one failing to pass on its maintenance checklist – the detail of its operations – to its successor.

Emergence of new, predictive maintenance system

More than just a technology issue, this is above all a question



of practices and uses. With data analytics it's entirely possible to make CMMS useful and relevant again. This means moving away from today's approach that is preventive (replacing assets on set dates), corrective (addressing breakdowns) and regulatory (changing fire detectors every three to five years) to a predictive system. CMMS will therefore now need to be dynamic rather than static, in other words connected to BIM and populated with information on any modification or repair relating to a particular piece of equipment. Although it is still at an early stage, the process of integrating the various management systems for building construction is under way. Indeed, this next-generation maintenance solution could well become a BIM module over time. Some players in the market like IBM and Oracle have already integrated new CMMS into their applications. The first tenders with integrated operation BIM systems

are coming onto the market, pointing to the emergence of predictive maintenance. However, the cost of installing numerous sensors and developing ad hoc software gateways is still holding some clients back. But by sharing the use of BIM systems, the various occupants of a building, for example, would have considerable scope for optimising their maintenance costs. Since operation and maintenance account on average for 75% of the total cost of a building's lifecycle, it's a question worth asking.



Louis Pinon
Innovation & smart building technical
Director at VINCI Facilities

AGILITY **PICTURE**

A NATIONAL LANDMARK RENOVATED HERE

The Rance tidal power plant near Saint-Malo in Brittany, France, a triple emblem of French engineering, technological innovation and green electricity, is a national landmark operated by EDF. Actemium Energie Hydraulique is in charge of refurbishing the facility, which has been operating for the past 50 years in a highly corrosive marine environment. The challenge will be to renovate the tidal plant's 24 generators without interrupting production. When the work is completed, the Rance plant will have received a new lease on life, and with it the Gaullist symbol of 100% renewable, completely predictable alternative 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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