

# Cigref@CES2018

JANUARY 8-12, 2018

2018

4<sup>th</sup> learning expedition

**CIO**

< **CHANGE MAKERS** >

**Cigref**  
SUCCEED  
WITH DIGITAL

## Report: **Feedback from CES 2018 - CIO Change Makers**

*Cigref is a network of major French companies and public administrations set up with a view to developing its members' capability to acquire and master digital technology. Its high-quality analysis and broad spectrum of members make it a focal point and a key player in digital society.*

*Cigref is a non-profit organization created in 1970 under the French law of 1901. By 2018, it numbered almost 148 major French businesses and organizations in all sectors of activity. It is governed by 15 directors, elected by the General Assembly. Its activity is handled by a permanent staff of 10.*

### Cigref team

Henri d'AGRAIN – Managing director	Josette LEMAN – Executive Assistant
Vanessa DEWAELE – Mission Officer	Thibault LURET – Communication Officer
Flora FISCHER – Mission Officer	Clara MORLIERE – Mission Officer
Marie-Pierre LACROIX – Information Officer	Marine de SURY – Mission Officer
Frédéric LAU – Mission Director	Josette WATRINEL – Executive Secretary

### Acknowledgements

We would like to thank all members of the Cigref delegation headed by Bernard Duverneuil, President of Cigref, for their contribution to this joint analysis:

ANDRE Jean Michel - SEB	HARDOUIN Jean-Charles - ARKEMA
AUGIER Frédéric - NEXITY	HAVARD Franck - POMONA
AUGER Thierry - LAGARDERE	HATIM Samir - VINCI
AUSTRUY Véronique - AIR FRANCE-KLM	HEINEN Jorg - SEB - WMF
BANZET Patrick - SEB	HERMANN Philippe - VEOLIA
BASEILHAC Laurent - ARKEMA	JEANNEAU Philippe - CAISSE DES DEPOTS
BEN MESSAOUD Fahem - ESSILOR INTERNATIONAL	KNISPEL Didier - CORA
BOISARD Anne Sophie - CHANEL	KERSSENS Jos - AIR FRANCE-KLM
BOVE Didier - VEOLIA	LAISSY Jean-Christophe - VEOLIA
BROUSSARD Nicolas - RTE	LEMAIRE Sébastien - AIR FRANCE-KLM
CAILA Philippe – CAISSE DES DEPOTS	LEVÊQUE Gilles -ADP
CHARBIT Claire - AIR FRANCE-KLM	MARTEL Emeric - SEB
CHERON Benjamin - VEOLIA	MERCIER Olivier - ADP
COURQUEUX Philippe - CORA	MEURS Elisabeth - SEB
COURTHIAL Pascal - HUMANIS	MINC Edouard - LAGARDERE
CUNY François - SYSTEMATIC	PERAUDEAU Aurélie - RTE
CUVELIER Philippe -LA BANQUE POSTALE	PETIT Etienne - VEOLIA
DAIDER Romain - AIR FRANCE-KLM	PULCE Laurent - VEOLIA
DALLA-TORRE Pascal - VEOLIA	RIVIERE Florence - AIR FRANCE-KLM
DEMOUGEOT Marc - VEOLIA	SCANFF Thierry - VEOLIA
DOUBLET Philippe - POMONA	SINE Alexandre - HUMANIS
DUMAS Hervé - VEOLIA	SUTTER Aurélie - AIR FRANCE-KLM
FORGUES Nicolas - AIR FRANCE-KLM	TEROSIER Dominique - ESSILOR INTERNATIONAL
GAUTHIER François - VEOLIA	VIVIEN Alexandre- VEOLIA
GIARD Aude - VEOLIA	WAAST- RICHARD Claire - ENEDIS
GNANOU Marc - CAISSE DES DEPOTS	YON Emmanuel - KEOLIS
GOMEZ Isabel - AIR FRANCE-KLM	ZELLER Laurent - AIR FRANCE-KLM

This document was written by Jean-Pierre CORNIOU (Sia Partners) and Clara MORLIERE (Cigref) with significant contributions from Thierry BORGEL, Éric TIRLEMONT, Philippe BERLAND, Sébastien CHARREIRE (Sia Partners), to whom we extend our warmest thanks for their support throughout this learning expedition, as well as Vanessa DEWAELE and Thibault LURET (Cigref).

**FOR FURTHER INFORMATION CONCERNING THIS REPORT, PLEASE CONTACT CIGREF AT:**

Cigref, Réseau de Grandes entreprises  
21, avenue de Messine - 75008 Paris  
Tel.: + 33 1 56 59 70 00  
E-mail: [cigref@cigref.fr](mailto:cigref@cigref.fr)  
Website: <http://www.cigref.fr/>

**Intellectual property rights**

*All Cigref publications are made freely available to the general public but remain protected by the applicable laws on intellectual property.*

*Copying of the title and 500-character excerpts is authorized, each followed by the reference "Source:" and the Cigref publication's URL. Any other form of publication requires prior written consent from Cigref ([cigref@cigref.fr](mailto:cigref@cigref.fr))*

## Table of Contents

<b>INTRODUCTION</b>	<b>6</b>
<b>1 THE DATA SOCIETY AT THE SERVICE OF HUMAN/ARTIFICIAL INTELLIGENCE</b>	<b>7</b>
1.1 DATA ERA: "DATA IS THE NEW OIL"	7
1.2 AI FOR HUMANITY	9
<b>2 THE SMART TRANSFORMATION OF COMPANIES</b>	<b>11</b>
2.1 SMART CITIES	12
2.2 SMART CARS	16
2.3 SMART HOMES	19
2.4 SMART ENTERTAINMENT	21
<b>3 "THE WORLD OF DATA IS NOT FLAT"</b>	<b>22</b>
3.1 INCREASING DOMINANCE OF ASIA	22
3.2 BATTLE OF THE SINO-AMERICAN PLATFORMS	23
3.3 REGULATION AND INEQUALITY OF DIGITAL POLICY INITIATIVES	24
3.4 BETWEEN DREAMS AND PROSPECTS	25
<b>4 PROPOSED ACTION PLAN</b>	<b>26</b>
4.1 IMPLEMENT STRONG GOVERNANCE FOR TRANSFORMATION	26
4.2 EXPLAIN IN ORDER TO ENGAGE	26
4.3 USE NEW TRANSFORMATION METHODOLOGIES	27
4.4 SHAPE IT ARCHITECTURE AROUND DATA	27
4.5 ADOPT AI TECHNOLOGIES WITHOUT DELAY	28
4.6 DEVELOP A HIGH-CAPACITY TECHNICAL ARCHITECTURE	28
4.7 DEVELOP DIGITAL SKILLS	29

## Chairman's message



CES 2018 (*Consumer Electronics Show*) took place at the beginning of January in Las Vegas. For the 4th consecutive year, Cigref travelled with a delegation of some sixty digital technology executives to this unique event. Seventeen-member companies were represented in this delegation.

Le Cigref has prepared a tailor-made programme for the delegation, with the support of Jean-Pierre Corniou and his co-worker at Sia Partners. The delegation enjoyed high-level private presentations from players in a few key sectors, such as Softbank Robotics on interactions between humans and robots, Orange on 5G, Alibaba on the emergence in France of this Chinese giant. We had the pleasure to welcome the Samsung Electronics' Chief Strategy Officer to present their transformation strategy and answer our questions. The delegation also met, on their booths, Engie, La Poste, Bosch and Dassault Systèmes to complete this strategic overview.

To create the well-known "whoa" effect, CES 2018's figures are impressive: nearly 200,000 visitors, 255,000 m<sup>2</sup> of exhibition premises hosting 4,500 exhibitors, including over 900 startups at Eureka Park, the startups dedicated area, with France in third place by number of exhibitors.

Two observations are particularly striking: the impressive rise of China, and the omnipresence of artificial intelligence, visible almost everywhere. While the *French Tech* startups occupy a significant part of the startups area, and Google's ads invade Las Vegas covering all advertising space up to the monorail, the major Chinese companies have taken over the center stage, to the detriment of Japanese businesses and former Western champions.

In line with past editions of the show, autonomous vehicles, connected objects, smart cities and smart homes players were particularly present at CES 2018. The delegation thus attended demonstrations of autonomous shuttle vehicle and self-driving taxi, presented jointly by Keolis and Navya.

The Cigref@CES2108 mission was a success both in its organization and in the opportunities it offered to take a closer look at the multitude of innovations presented there. This report presents a synthesis of our observations, interpretations and discussions.

Happy reading,

Bernard Duverneuil

President of Cigref

Head of the Cigref@CES2018 delegation

## Preamble

Coming back from the CES event provides every year a moment of reflection to analyze the massive amount of information received during the five days visiting the booths, attending conferences and keynote speeches and exchanging views with other participants.

It is necessary to put into perspective all the statements and the declarations of those present and absent. We capture also non-verbal information such as the respective placements of the booths, the themes chosen by the keynote speech contributors, the caution or daring shown by conference speakers. Reality forces us to admit that it is no longer possible to cover an event of such magnitude directly without pooling information and thoughts of the participants during debriefing sessions. Going back to the sources, confirming the data in the statements, and cross-checking and analyzing are part of the process that enabled us to uncover points of convergence that we develop here.

CES only reinforces the convictions acquired over the year on the need for businesses to change. Pieces of IT spread across many silos is no longer an option. Today everything must be structured around a uniform vision; a unique, versatile and high-capacity infrastructure; efficient data processing; and the ability to distribute context-based information to all contributors, in real time and in the format required for the best decision-making. But even more importantly, our focus is on the meaning we give to the information processing to serve businesses and communities. Questions then arise on the impact on public freedom; the impact on freedom of choice and conscience; between customization that isolates, recommendation that restricts, and organization of the city that anonymizes and controls. The debates held at each CES conference are a good indicator of this enhanced awareness. But the core of the data society still demands a lot of thought, both individual and collective, across businesses and States, as well as internationally. It would be absurd to deprive ourselves of the immense benefits of this transformation. We cannot take this risk in view of the challenges our planet is facing. Compromising them through lack of discernment, instruction and lucidity would be even more detrimental.

Thus, summarizing the CES contributions is a risk. Although we must make a choice, we must remember that technology is neither positive, negative nor neutral. It is the product of humankind and will only do whatever the community decides. This means that, more than ever, we must develop technologies that are truly at the service of human development. Reason and methodological rigour imply taking Seneca's sentence to the letter: "Be especially concerned to separate things from the noise they make".

Jean-Pierre Corniou  
Partner at Sia Partners  
Organizer and co-leader of the delegation

## Introduction

Simply reporting CES is a very difficult task given that this global event now covers every aspect of our daily life. Detecting the most striking innovations is complex because the evolution of digital society is no longer achieved by breakthroughs on individual objects, but by layers of interactions. We can also try to apprehend the CES size by figures: in 2018 there are some 255,000 m<sup>2</sup> of exhibition surfaces, 4,500 exhibitors, over 900 startups, and 7,400 journalists, with hundreds of conferences being held. But this abundance of impressive figures is not enough to illustrate what CES has really become. Originally a show dedicated to consumer electronics market in the US, CES has become the largest global event dedicated to the core of the twenty-first century economy, the production and exploitation of data.

Everything changes yet nothing changes. Year after year, the organization of exhibitors' stands, the subject matter of conferences and keynotes, leave behind the strict scope of products to focus on the analysis and consequences of the generalization of data processing. Those seeking to discover the latest "spectacular" innovations at CES may be disappointed. We should no longer expect major announcements at CES, even considering CES "Innovations Awards" that bring together plentiful inventions and innovations rewarded by the CTA (*Consumer Technical Association*, which organizes the CES events), and which can, taken individually, be of no interest and have no future.

Still, we can see outstanding products that will be distributed widely within 5 years such as 8K screens or fail like the 3D TV. It is also a place to detect weak signals and confirm trends, such as the essential role of smartphones in mobility; the pervasiveness of artificial intelligence based on speech recognition by the conversational assistants of the big four tech giant called GAFAM (Google, Apple, Facebook, Amazon, Microsoft); the strong enthusiasm for the development of 5G, as demonstrated by the numerous product launches announced for 2020-2025; the remarkable rise of all Chinese players; the generalization of prototypes of autonomous vehicles that make it possible to dream up new uses for cars (Honda commercial vehicles, Toyota "e-pallets", etc.); as well as the evolution of home automation products and services, which are increasingly everywhere: security, comfort, entertainment.

We must therefore consider the CES conference as a whole, and that is its main benefit: to encompass in one place, over five days, everything that makes up this digital polyphony that occupies our professional, personal and civic space. The slogan "*Let's go humans*" illustrates this digital saga, powerfully orchestrated by the CTA. This statement aims to promote the place of humans in a digital future, with a view to building a better world. However, the road between rhetoric and reality is still long. Environmental, ethical and societal issues are a few notable subjects not mentioned at CES 2018.

# 1 THE DATA SOCIETY AT THE SERVICE OF HUMAN/ARTIFICIAL INTELLIGENCE

CES 2018 enabled many to become aware of the critical importance of data. The premise: we have entered the world of data. The businesses present at CES confirm the importance of data as a strategic asset for their future. Data is used in every way possible to create value in the eyes of the consumer. Thanks to the volume of data and the recently attained computing power, what is now commonly referred to as artificial intelligence (AI) is everywhere and opens new perspectives to make the most valuable uses of data.

## 1.1 Data era: "data is the new oil"

The constant flow of data generated by connected objects provides context and information about human activity, health, location, etc. These changes in the use of data are having profound effects on society. Customers neglect companies who do not master data as they wouldn't offer significant added value. Data allows companies to rethink their economic model and transition from product-centric to customer-centric.

### 1.1.1 Data production challenges

At the start of the web era, we used to point out the amount of data produced since the beginning of civilization. The numbers are so staggering and elusive that we no longer count anymore. According to Intel's CEO, quantities of data generated are as follows:

Connected plant	Connected aircraft	Autonomous vehicle	Connected person
1 Petabyte ( $10^{15}$ )	40 Terabytes ( $10^{12}$ )	4 Terabytes ( $10^{12}$ )	1.5 Gigabyte ( $10^9$ )

The generalization of smartphones gave to over three billion humans now the power to produce data. The billions of connected objects installed each year in businesses, homes and cities accelerate this phenomenon. Each human activity therefore produces data covering an increasingly broad spectrum of physical parameters. The democratization of sensors makes it easy to record information about temperature, pressure, noise levels, weight, speed, acceleration, physical and chemical composition, location of everything, people and property, together with physical and biological phenomena. Sensors, telecommunication networks, servers, processing algorithms and the various human/machine interfaces, represent a powerful and global system. Its capabilities are constantly growing. The ability to collect, analyze and return this data is now unlimited. This transformation process aims to convert everything into digital data.

Manufacturers of all appliances presented connected products integrating supervision solutions, such as Whirlpool's connected washing machines. Samsung declared owning 10% of all connected objects worldwide. CES presented mirrors, beds, pillows, sports equipment, connected litterboxes and collars for pets, etc. These convenience sensors are almost always included as their unit cost is practically zero. Numbers for others, such as the very high quality 4K 360° video sensors, are also growing.



Figure 1: The dashboard of Whirlpool washing machines

Some of these connected items are a success with the general public or investors. The French startup Kolibree, which manufactures a connected toothbrush for children, announced it signed a partnership agreement with Apple and Colgate during CES. In addition, the Israeli business NanoscentLabs presented an electronic nose (with uses in health, agriculture, safety or to determine a “love match”). The French company MyBrainTechnologies promises to promote relaxation thanks to a cerebral wave sensor. These companies push the boundaries of sensory information capture.

### 1.1.2 Data use and value challenges

Elementary data is used to build models that give humans an image of the environment around them so that they can understand it and make better decisions than those induced by experience, culture, instinct or reflex.

The aim of these companies is to better understand customer usage in order to design products and services better suited to their needs, as well as to promote complementary services. For example: product recognition for rerouting to sale websites. The use of data makes it possible to analyze interactions governing complex phenomena, and thus be capable of planning ahead. It also offers the possibility of delegating the responsibility for making certain decisions to algorithms directly managing various robots and actuators. It allows humans to avoid repetitive tasks with no added value.

#### Data modelling complexity

To better understand the consumer’s uses, the company needs a context that can be provided by modelling the environment. A large number of CES 2018 actors exhibited their capabilities in the field of modelling: modelling industrial and logistics value chain, modelling urban space, as well as modelling living things (such as the human heart).

Data capture makes it possible to reconcile the complexity of the physical world with its digital image. The modelling of complex systems is increasingly developed in these new fields of interaction. The fidelity of this digital image enhances our understanding of the real world.

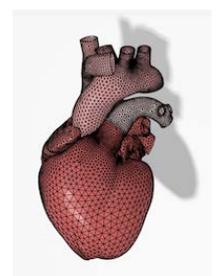


Figure 2: Modelling of the human heart

## New computing powers

The Intel's CEO predicts that quantum computing will solve problems that today's best supercomputers could take months or years to handle, such as drug development, financial modelling and climate predictions.

In quantum computing, a qubit -word combining "quantum" and "bit"- is the quantum state that represents the smallest information storage unit. Unlike a bit, which can only take the value 0 or 1, the qubit is a superposition of 0 and 1.

However, the field is only just starting to be explored. Intel foresees that it will take between five and seven years before the industry can tackle real engineering problems, and it will probably take one million qubits or more to achieve commercial relevance.

Thanks to quantum chips, processor power continues to grow while costs drop. These chips will be used to put even more AI in our terminals. They will allow biometrics to provide a valid alternative to passwords but also threaten our current data encryption mechanisms.

### FOCUS ON QUBIT AT CES 2018

Three players in the quantum processors race stand out at CES: Huawei, Intel and IBM.

Huawei presented its new Kirin 970 mobile microprocessor, equipped with a dedicated AI unit. During comparative analysis of an image recognition test, Kirin 970 processed 2,000 images/min, compared with 950 for iPhone 8 and 75 for the Galaxy S8, making it the fastest microprocessor on the market.

During its opening keynote, Intel unveiled Tangle Lake, a 49-qubit superconducting quantum chip. Tangle Lake represents a step towards Intel's goal to develop a complete quantum computer system, from architecture to algorithms.

At the end of 2017, IBM announced that it had mastered a 50 qubits system. The company had already made its 5-qubit experimental quantum computer available in its cloud offering.



## 1.2 AI for humanity

*"AI is the language of data, AI just needs data,"* states Young Sohn, Samsung Electronics' Chief Strategy Officer, concerning its artificial intelligence strategy.

Artificial intelligence (AI) is everywhere at CES 2018 trade show. The dedicated AI space at CES presents its multiple possible uses in everyday life: from home, through human body to the entire environment. Voice or facial recognition underlies all products of the trade show that claim *"AI inside"*. Without this label, a product already seems to be outdated.

Companies are exploring all possible fields of its evolution and come to CES to show their inventions. Beyond facial and visual recognition, the challenges still stand in natural language recognition and understanding (multilingual interactive conversation, automatic language processing), and smell. The use of AI is developing very fast, particularly in the health sector.

## 1.2.1 AI use cases in health

The health sector, which represents 12% of US GDP, has become a financial driver. The industrial challenge for the sector is to enable the transition from remedial action to preventive measures towards predictive work. With this goal in mind, connected objects and AI have the potential to improve diagnosis, identify a disease's risk factors and prevent them, monitor the effectiveness of treatment and model humans and their organs in order to anticipate health problems.

**Diagnosis:** American company Forward presents a treatment center equipped with sensors, laboratory analysis tools -including DNA- and medical imaging systems, to perform a full 360° body assessment, using deep learning systems. Many AI applications are being developed around sleep disorders, e.g. to detect sleep apnea by startup Bolun.

**Prevention:** The @-HEALTH sensor provides preventive detection of cardiovascular accidents. The Italian company Empatica created a bracelet that identifies preliminary signs of an epilepsy seizure thanks to physical agitation and increasing stress detection.

**Modelling:** The Visible Patient startup offers a 3D modelling on-line service allowing a medical expert to access a virtual clone of the patient built from an MRI scan. French startups Biomodex gives doctors the opportunity to practice on patient-like 3D-printed organs before a delicate operation.

La Poste, a community operator in France, launched a dedicated digital health application to connect patients, connected objects and health professionals.

## 1.2.2 The challenge of human-machine interaction and the socio-technical approach

CES 2018 exhibits many players from robotics and AI sectors. The development of machines and AI increasingly confronts humans with their technological environment. Initiated with the advent of smartphone as a universal information access tool, the use of multiple peripherals, touch- and voice-controlled devices amplifies these interactions and redefines the decision-making processes. Robotics companies try to **reassure about the role of robots** and show that it is **complementary with humans**. Given the limits of robot capabilities, innovations are focusing more on developing **one-use robots**. Example: Softbanks Robotics' Nao and Pepper, acting as receptionists in a shop or hospital, home-robots, etc.



Figure 3: *Robots will not replace humans, but make them stronger*

The rise of new organizations, a new relationship with time, based on the massive deployment of the knowledge worker<sup>1</sup> occur in all fields. The emergence of these new models challenges the socio-technical system, first brought about by mass industrialization. A company's performance no longer requires the accumulation of human and financial resources, but the development of capabilities using the resources that are available, which can also be robotic.

<sup>1</sup> Concept introduced by Michel Volle, economist (<http://journals.openedition.org/communication/5381>), designating the knowledge worker of the tertiary sector as the modern equivalent of the industrial workforce.

## 2 THE SMART TRANSFORMATION OF COMPANIES

Over the last 50 years, CES has changed significantly: starting out as the *Consumer Electronic Show*, it could now be qualified the *Citizen Experience Show*, a new meaning for the acronym heard at the show. This name would reflect the changes undergone by the show, its exhibitors and the public. Society now value more experiences, exchanges and flows, rather than products themselves. The transition from bare product sale to a service offering bundled with the associated product is what we refer to with the platformization phenomenon. This relates to the simplified user experience asked by society, using the data collected and analyzed. The consumer demands real added value in his experience. Companies must position themselves as close as possible to customers to provide them with a real-time, zero failure, zero lead time service platform. What can be observed in CES is the market concentration of these platforms on a very few actors. Companies are gradually becoming aware of the consequent effort they must put forth to remain competitive. However, in light of the number of companies at CES, we can put this observation into perspective and give companies time to respond to this phenomenon.

### Meeting with the delegation

#### **Samsung at CES, a constantly evolving electronics giant**

Samsung Electronics's Chief Strategy Officer, M. Young K. Sohn, presented the company under constant renewal. Samsung's turnover was nearly €200 billion in 2017, with 32% market share in smartphones worldwide. But major platforms such as Google and Amazon threaten the company as they integrate its market. A short-term goal for Samsung is to connect 100% of its products (currently 90%). Its medium-term ambition is to transform itself into an "*experience company*". To address this transformation challenge, Samsung defines a clear data production and use strategy and transform to move beyond the current B2C product model. The company wants to promote data protection and have the safest IoT platform. In the long term, the vision involves integrating every aspect of everyday life to better serve consumers. The acquisition strategy led to the purchase of 18 companies/startups in the field of connected vehicles within one year, in order to exploit two of its main assets, its vocal assistant and its screens, for *Infotainment* (contraction of information and entertainment).



Figure 4: Mr. Young Sohn, Samsung Electronics Strategy Director, and Mr. Bernard Duverneuil, Chairman of Cigref.

The so-called *smart transformation* illustrates the phenomenon at CES including *smart cities*<sup>2</sup>, *smart cars*<sup>3</sup>, *smart homes*<sup>4</sup>, *smart entertainment*, etc. We could also talk about *smart retail* or *smart fabrics*, *smart grids*, etc. *Smart* is a trendy word that nevertheless allows us to express a profound shift in society that wants to use technology to provide humans with connected, seamless and transparent services to improve their quality of life.

<sup>2</sup>Smart cities describe cities using technology to improve quality of life, called also connected cities, cities of tomorrow or cities of the future

<sup>3</sup> *Smart cars* describe connected and autonomous cars, not the very compact cars made by Mercedes.

<sup>4</sup> *Smart homes* refer to connected houses, also called home automation.

**Bosch at CES, a European company among the world's leading companies**



Present for several years now at CES, Bosch booth position and location illustrates the visibility it desires for the event and its relevance in the eyes of the organisers. The company exhibits its innovations in 4 sectors: "Connected City, Connected Mobility, Connected Home, Connected Industry". Amongst the products and services presented at CES are a community parking system, the entire display and control concept of the vehicle of the future, a smart vacuum cleaner robot that scans its environment and creates interactive maps, as well as old machines rendered digital using sensors to develop the industry 4.0.

By connecting 100% of its products by 2020, the company estimates that it will achieve at least €1 billion in annual savings and increase its revenue by more than €1 billion through the sale of its products.

As a public utility foundation, Bosch fully reinvests its revenue in the company's development: €7 bn in R&D, 10% of the turnover for patents (about 5,000 patents filed per year). With 270 plants worldwide, Bosch employs 65,000 research engineers and numbers a 50,000-strong workforce in China to expand its business there.

## 2.1 Smart Cities

The importance of the smart cities fundamental trend is shown in the new CES 2018 space dedicated to *the* subject. Sometimes described as the city of tomorrow, or the city of the future, the smart city is projected, imagined, envisioned by each of the present actors. Inextricably linked to the city, mobility is the leading topic CES 2018 addresses in the *Smart Cities* space.

### 2.1.1 Looking forward to the city of the future



Figure 5: Ford's CEO presents the city of tomorrow, far more European than American

James Hackett, Ford's CEO, expressed in his rather humanistic presentation that *"If you can change the street, you can change the world"*. The idea is to mobilize infrastructures data sources to redefine the city architecture around the *living street* concept. The CES viewpoint on the city of the future is that current cities no longer meet the needs of their inhabitants, who wish to project themselves into new environments and with a more responsible lifestyle.

With all the technological resources currently available, CES's participants challenge the cities current and future shapes according to our wishes. Companies such as Engie and its partners are unveiling energy management solutions for buildings in order to save and redistribute energy in real time.

Five major challenges emerged from CES discussions and panels:

- physical infrastructures: road, air, electrical, telecoms, IoT;
- flow management: energy, goods and waste;
- energy production, if possible renewable;
- urban systems mapping and modelling;
- multi-party governance.

### FOCUS ON 5G AT CES 2018

CES 2017 showed concern about the availability of 5G but this was no longer the case this year, where the two main parameters expected (low latency and broadband) were announced for 2020. At CES 2018, some consider that **the transition period could be faster than expected** due to the many associated possible uses and the ramping up of technology adoption between 2G and 3G, faster still for 4G.

In CES 2018, mainly equipment manufacturers and telecoms operators are mobilized around 5G. Among them, Orange, Qualcomm, ZTE, Intel, Huawei and Ericsson made 5G one of the main pillars of their communication at CES 2018. **The 5G technology launch (operational in 2018 and industrial in 2022) will boost the growth of connected objects (vehicles, health, etc.), by improving data speeds (20 Gb/s vs. 1), reducing latency (~1ms vs. 10), and ensuring quality of service depending on the offered service.**

**Two** use cases concern critical infrastructures and mobility, 5G being essential for autonomous vehicles and connected objects to functioning, **thanks to a continuous connection to the cloud. The 5G network will provide new opportunities for industrial companies and public administrations, in particular for machine-to-machine interaction.**

Presented at CES, the 5G **3GPP roadmap**<sup>5</sup> is fleshed out, with many product launches scheduled for 2020-2022. Specifications end in June 2018. A number of trials (winter Olympic Games in South Korea, Orange cities, etc.) have emerged before the commercial launch, which is estimated to take place from 2020 as regards to data speeds, with a second, fuller phase, in 2022. Verizon announces the deployment of 5G for residential areas before 2020, but it remains **pre-standard**.

**In France, the stakes vary: from coverage of the country, to the promise of an innovative technological base, through the development of network skills.** Companies must anticipate the services to offer. To this end, the operators need to communicate the deployment phases and the

<sup>5</sup> Mobile Broadband Standards Consortium <http://www.3gpp.org/specifications/67-releases>

associated scaling. According to Orange, which will open APIs on the network to allow customers direct network access, the network becomes one mega software.

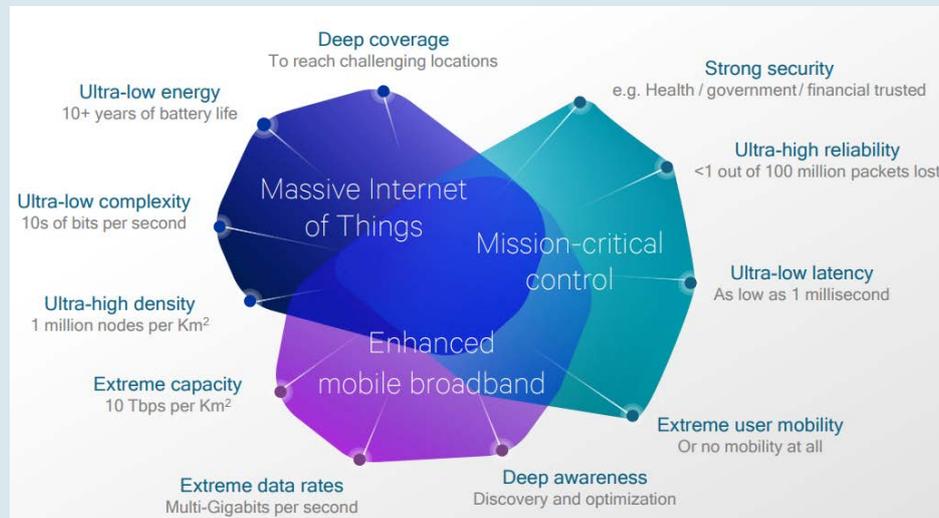


Figure 6: Different dimensions of 5G technology according to Qualcomm

All CES smart cities' actors question the governance of the connected city. Because the ecosystem's economic model has not yet been determined, city governance is even more important in order to be able to make the best decisions for its inhabitants. In this governance, the stakeholders are numerous: elected officials, local authorities, businesses and citizens.

During a round table, the mayor of Cascais, Portugal, explained that all companies in his city which wants to offer urban services must join the town hall platform. The aim is to keep data only for inhabitant's benefits.

Questions about the place public authorities occupy in the country's development and the training of populations less comfortable with digital technology arises. CES in general makes scarce reference to the digital gap that the exhibited innovations can create.

### 2.1.2 The challenge of mapping and modelling the smart city

A number of solutions presented at CES attempt to solve the problems of modelling connected cities. This means to determine and transfer infrastructure and environment data to the ecosystem in order to connect the various services of the smart city. It includes the modelling of urban spaces that can show the dynamic interactions between connected objects, cars, inhabitants and the city. It can generate innovative ideas to create more responsible mobility: congestion, sharing of the last km, lifestyle and pollution, thanks to the management of interactions between collective and individual uses.



Figure 7: Alibaba urban modelling dashboard

Thus, businesses use the data collected in the city to optimize travel flows, as the Japanese company Hitachi does. The Chinese tech giant Alibaba positioned itself in the mapping, modelling and facial recognition sector, creating a solution already implemented in five Chinese megacities.

HERE Technologies, digital mapping specialist, will produce aerial maps for UAVs with Unifly, an air traffic management software provider. It will map the buildings height, power lines, scaffolding, etc.

In addition to infrastructure mapping, Chinese players have embarked on outdoor and public spaces facial recognition. Large-scale facial recognition allows the emergence of many pilots (cash register-free stores, license plate recognition, crowd surveillance, etc.) but raises ethical issues, insufficiently addressed at CES.

### Meeting with the delegation

#### Dassault Systèmes at CES, leader in 3D modelling and printing

The city of Singapore called on Dassault Systèmes to model its various infrastructures to create a new district and a virtual city. Singapore wants to offer a collaborative platform, called Virtual Singapore, for governments, businesses, researchers and citizens in order to become a true *Smart City*.

Dassault Systèmes showed at CES 2018 its expertise in 3D modelling of complex systems with this full modelling of the global megalopolis, as well as a very faithful modelling of the human heart.

Dassault Systèmes announced the acquisition of an organic fabric printing startup as 3D printing is making great strides in the industrial sector. The company specializes itself in materials such as metal and in living fabrics.

### 2.1.3 Mobility platform

CES 2018 highlight the many mobility solutions and their platforms enabling citizens to move easily around the city. Changes in transport and mobility needs are transforming the urban environment. The sector has suffered an upheaval, as strong as during the standardization of production.

The car for personal use, historically associated with the concept of individual freedom, has faced constraints linked to congestion in cities and roads, and has become an unpleasant means of transport (gridlock, wasted time, etc.). The manufacturers' statement based on "*the pleasure of driving*" is out of step with reality.

To recover the lost ease of mobility, citizens are demanding **cross-functional travel platforms** that give them itineraries from point A to point B taking into account traffic, obstacles and unforeseen circumstances. These platforms include not only the people transportation but also goods and products in circulation in the city. Public transport, personal vehicles, car-sharing and carpooling services are components of this mobility.

#### Meeting with the delegation

##### FORD at CES: from constructor to mobility operator

During his opening keynote at CES 2018, the Ford's CEO aims to combine technologies and cars to ensure that they become more than just the sum of what they are and that they redefine the transport system so that it is adapted to community life. His strategic vision for the company is to turn it into the orchestrator of the future urban transport network as "*the World's most trusted mobility company*", while their current model is based on the sale of personal vehicles. He announced the open-source platform for Ford Mobility in partnership with:

- Autonomic, which developed an open cloud platform dedicated to mobility, a sort of city "operating system" (OS);
- Qualcomm on C-V2X communications and IoT;
- Transloc, the specialist in proximity delivery solutions ("microtransit");
- Integration of Waze.



Car manufacturers have become aware of the **slowdown in vehicle sales** and the risks of urbanization on the automotive market. They try to set up these mobility platforms to position themselves as key players in tomorrow's cities, as close as possible to the citizen needs. However, at CES, we noted that these mobility platforms have yet to determine their economic model.

## 2.2 Smart Cars

The advances of autonomous vehicles are among the most spectacular progresses at CES 2018. It confirms the increasingly full capability to entrust the driving process to the vehicle alone. There is still a lot of research and development to be done to equip a vehicle with all the components - sensors, software, means of communication - enabling in all circumstances to fully replace human abilities.

But the **limits of machines' autonomy capabilities** are constantly being **pushed back**. The launch of truly autonomous vehicles in traffic is estimated to less than ten years by CES players.

The prototypes of autonomous vehicles seen at CES, called level 5 (without steering wheel or pedals), are designed **to require no human intervention**. The vehicle moves though the city thanks to checkpoints. It must be able to be synchronized with lights, other vehicles and its environment on the open road. There are still no operating standards on communications between vehicles and other objects (e.g. lights), which makes interfacing with cities infrastructure complicated.

Meeting with the delegation

**Keolis and Navya, mobility operator and car manufacturer**

Transport company Keolis and autonomous car manufacturer Navya from Lyon have set up a partnership to co-construct autonomous public transport solutions to supplement current transport networks. These two vehicles remain urban means of transport. Keolis is doing trials in Las Vegas, Australia, France. The shuttle unveiled at CES 2017 runs on an open track in Las Vegas over a 2km circuit.



The main challenge is to change **the regulations and find the right business model**.

The *concept cars* of car manufacturers have a growing number of digital functions using **facial and voice recognition**. Byton offers a new *concept car*, an electric SUV with a 500-km autonomy, that stands out for services such as the door opening through facial recognition, voice and gestural control, and on-line services for home delivery. Mercedes is the most advanced in advanced touch interfaces and AI voice assistance, whereas not so long ago the German constructor was lagging behind in the command and interface displays of its cars.



Figure 8: Innovative interior of a concept car

At CES 2018, the US company Fisker presented Emotion, an electric and autonomous sedan to compete with the Tesla Model S. Valeo stands out in this scantily represented market, with a low-cost electric car. Byton also competes with Tesla in the premium range: the rear seats for instance are similar to first-class aircraft seats.

Car manufacturers have come up with **new services to add to autonomous vehicles** for new business. Toyota, for example, proposes with its e-palette a shuttle that can be arranged either as an office, a mobile store or even a medical facility.



Figure 9: Hyperloop presented at CES

An **ecosystem of actors and suppliers** is developing around the autonomous vehicle, as happened for smartphones and computers. Some players have taken position on the market of operating systems for autonomous vehicles.



Figure 10: Toyota e-palette

At CES 2018, Baidu showed its open source platform called Apollo, combining their expertise in search engines and artificial intelligence, in particular with voice interaction. With regard to chips and software to be integrated into driving support systems, Intel acquired Mobileye for \$15 billion in 2017. Furthermore, to respond to the issue of updating cartography data, Mobileye has set up a “*Road Experience Management*” data collection system adopting the crowdsourcing model. In this way, BMW, Volkswagen and Nissan vehicles will be able to contribute.

The democratization of autonomous cars must depend on the acceptability of this change for motorists and on the **development of a legal framework** on the responsibilities of the stakeholders. **Car autonomy levels** create a differential in the driver’s responsibility for a car: at levels 2 and 3, the driver must transfer his/her responsibility at levels 4 and 5, and the driver gives his/her authority to the machine. The concept of transfer of responsibility was often addressed by the actors of the connected city at CES. It is essential to codify precisely, through operating scenarios, what any vehicle can do and not do, and determine the responsibility for each action.

### FOCUS ON LIDAR AT CES 2018

**A key technology for autonomous vehicles is LIDAR sensors, widely present at CES 2018.** LIDAR (Laser Imaging Detection And Ranging) consists of a laser that detects its environment and estimates the distance from the objects around it using a beam of light. Combined with GPS and an inertial unit, LIDAR sensors can scan the environment as 3D images over a range of 100 to 200 meters. This year, the number of offers presented at CES was far larger but the technological background remains the same.

The development of this technology and these components allowed it to be made accessible to the market. Several companies such as Nvidia, AEye, Innoviz, Quanergy, and Velodyne, are currently conducting demonstrations on Toyota, Chevrolet, Fisker or Navya vehicles. It is worth noting that that Elon Musk is hostile to the use of LIDAR, and Tesla only carries cameras and image recognition software based on a Nvidia solution.

**The power and reliability of the sensors is crucial to the performance of autonomous vehicles.** The vibrations the sensors experience in the cars make it difficult to improve the precision of LIDAR. To prevent this, Quanergy presented a LIDAR solid-state sensor that is not yet commercially available.

At CES interesting was the positioning of French startups: Dibotics, autonomous car embedded software, compensates for the camera and reproduces a 3D environment based on the raw LIDAR data.

## 2.3 Smart Homes

Also known as home automation or connected house, its dedicated space at CES presented connected products and services intended for the household. Despite the technology and interoperability standards still under construction, **this market is growing fast.**

**The conversational assistant** is in charge of controlling all connected objects of the Smart Home; the list is headed by Amazon Alexa & Google Home, which currently share this market. Equipment manufacturers such as Samsung and LG supply the equipment and objects connected to the home. To accompany these connected objects, other businesses are proposing **home automation solutions**, such as Somfy for security applications. Other actors, such as La Poste, are positioning themselves to offer physical and digital services.



Figure 11: The connected house according to Leroy Merlin

### 2.3.1 The race for sensors and connected objects

Amongst the CES connected house products, we find alarm, overhead, camera, portal, connected thermostat. Two French companies Somfy and Legrand presents many products. Home automation companies strive to collect as much data as possible concerning the habits and usages of residents. Somfy has completely transformed its product strategy. Historically it worked with a proprietary protocol but this family-owned company has now **opened up to all protocols** and interfacing with platforms, such as Amazon Alexa or the Legrand platforms. It added security solutions to its range. Other players such as Avidsen are moving towards a **solar connected house** using solar power and sensing motion to adapt the openings of the house.

**Electric appliances**, the other large segment of the smart home sector, see Asian companies, including Samsung, LG Electronics, Haier, gradually conquering all market shares.

Within this ecosystem, companies offer multi-standard platforms with **open APIs**. Otodo, for instance, offers a multi-protocol hub that orchestrates all connected objects. With the multiplication of connectivity standards, **interoperability** becomes essential. It is supported by several technologies such as **Wi-Fi**, **Bluetooth**, **Z-Wave** and **Zigbee**, the 2 competing wireless communication standards for home automation, and **Li-Fi** (Light Fidelity), based on light wavelength, with potentially high data rates but requiring a direct path between transmitter and receiver.

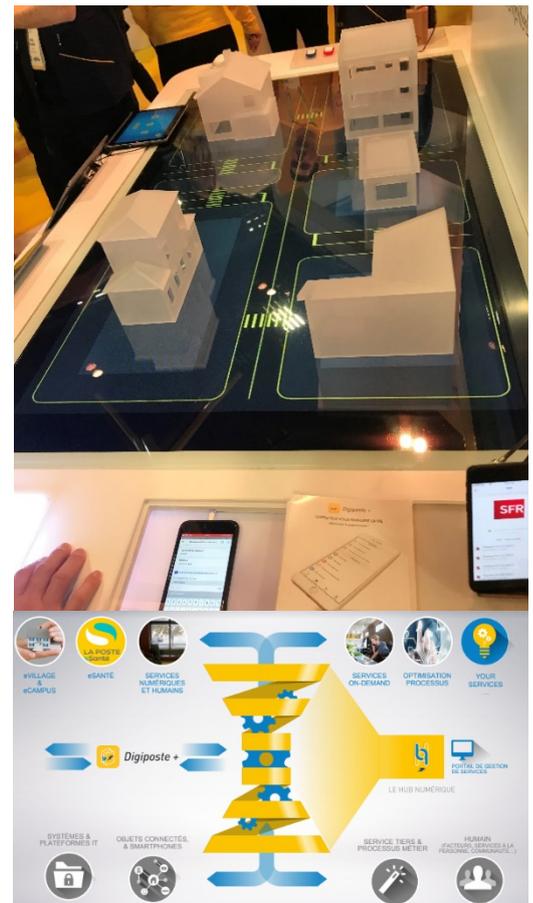
Meeting with the delegation

**La Poste at CES: local services operator**

Present for the 4th time at CES, the La Poste group called on its **postmen and postal workers** to speak about the transformations and the new vision of the group at the stand.

The *French IoT* startups area presents IoT objects/concepts selected to enhance the Digital Hub ecosystem, in partnership with their 4 industrial partners Legrand, Boulanger, Malakoff Médéric and BNP Paribas Real Estate. The "Corporate" area presents several new "digital and human" services from La Poste in different areas:

- **City:** services offered by postmen or approved third parties for daily life (shopping, DIY, etc.);
- **Home / Office:** connected objects for residents' uses such as connected locks or connected buttons to ship items from their mailbox;
- **Health:** e-Health offering to manage patient data and deliver health services.



**2.3.2 The age of conversational assistants**

The GAFAM rely on conversational assistants to enter homes and step into **the citizens daily lives**. They rely on their smart agents such as Amazon Alexa and Google Home, together with Apple Siri, Microsoft Cortana, Samsung Bixby and LG Think. The arrival of the giant Chinese Baidu is interesting, as it launched its own platform: DuerOS.

The number of features and connected objects driven by conversational assistants is booming. **AI agents become the autonomous daily orchestrator** of connected objects. The French startup Ween.ai entering this sector was in the top 3 of CES's preferred startups. The challenge for these agents is to get closer to human's characteristics. To do so, the startup Emoshape, supported by Orange Silicon Valley, creates a chip simulating human emotion for conversational agents.

Amazon Alexa and Google Home each use their assistants to enforce their artificial intelligence platform. While Amazon Alexa was dominant last year, it was impossible to miss the rallying call of "Hey Google" and Google's aggressive marketing campaign to make a space for itself on the market (15 million dollars of physical advertising at CES). If Amazon Alexa seems to stay in the lead, most objects are now compatible **with both assistants**.

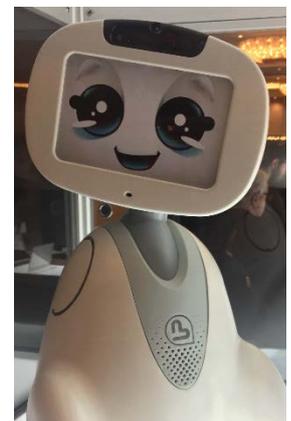


Figure 12: The Blue Frog Robotics robot

Fixed or mobile, AI-based talking robots with a sometimes cartoon-like design, line the aisles of the CES halls. On display, it was possible to observe robots capable of carrying out a growing number of activities: cleaning, moving around the house, playing ping-pong, playing scrabble, etc. Robots are generally intended for the silver economy market, for instance Honda robots designed to improve the mobility of seniors, or the baby tech market.

## 2.4 Smart Entertainment

### 2.4.1 Creating new means of entertainment

In 1967, when it was created, innovative objects presented at CES mainly concerned electronic objects such as TV sets, tape recorders and portable radios. Gradually screens took over everything. And this year again, CES 2018 presented **ever bigger, finer, more immersive and now more flexible screens**. Samsung presented "*the wall*", its large-screen TV using 8K technology. As there is no 8K content yet, Samsung promises possible *upscaling*<sup>6</sup> of all types of visual sources using artificial intelligence mechanisms.



Figure 13: The Wall presented by Samsung

At CES 2018, no real announcements were made concerning smartphones. ZTE introduced its *dual screen phone* with more multi-task possibilities and a bigger screen. The smartphone can potentially **become the PC of the future** (Razer project called Linda).

The development of volumetric video would allow freedom of movement in virtual reality video, in particular thanks to 360° cameras and the volumetric video capture studio unveiled by Intel or Insta 360. In its keynote, Intel introduced **Voxel**, the 3D equivalent of the pixel, which adds volume to images.

**Virtual Reality (VR)** is not experiencing the expected growth. At CES we saw virtual reality headsets but at a very small scale. The market continues to grow, but its democratization has been slowed down by the equipment high cost of acquisition, the limited availability of appealing content, and the physical discomfort of wearing one headset. HTC Vive Pro delivers HD quality images and an accessory will enable wireless use in 2018. Lenovo unveiled its first all-in-one virtual reality headset for the Google Daydream ecosystem. By contrast, **Augmented Reality (AR)** seems to be conquering a bigger share of the multimedia landscape. Many presentations of application solutions serve to enrich reality as displayed on the smartphone.



Figure 14: Giant screen to create an avatar

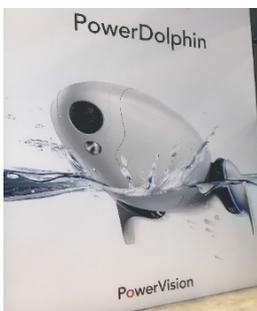
In the media entertainment sector, retail market is also transforming. After the great boom of e-commerce, companies see the need to implement so-called "**phygital**" strategies combining the advantages of bricks and mortar stores with the strengths of the digital world. The stores feature giant mirrors/screens capable of facial recognition, creating the customer's own avatar and offering items to suit each body shape.

<sup>6</sup> *Upscaling* is the enhancing of an image or video to adapt it to a resolution higher than its native resolution.

## 2.4.2 Drones - from entertainment to industrial use

One of the most prosperous markets for drones over the past 2-3 years is the entertainment market: photography, popular video reporting, etc. The CES 2018 halls were filled with drones of all shapes and prices (from \$200 to \$6,000) depending on the size of the camera they can take on board. Visitors could even enjoy drone races. The Secretary of State for Transport of the United States announce that the one-millionth drone registration during CES 2018.

Over and above their use for entertainment by the general public, we observed a **professionalization of drone usage**, diversifying into many B2B niches. Likewise, Parrot, one of the majors on the drone market for the general public, was absent from CES 2018. The company lost some of its market share to the Chinese players and therefore refocused on its B2B market.



The **major innovation of the market at CES 2018** was the **underwater drone** such as the PowerDolphin, which makes it possible to shoot images of the seabed, as well as, thanks to Drones Rescue Robotics, carrying out sea rescue to deliver assistance in difficult conditions/terrain (drowning at sea, mountain, etc.). Drones can now detect and avoid obstacles, track a moving person through facial recognition, produce 3D modelling of the house. Surveillance drones also allow image recognition via their cameras used to monitor protected areas or hard-to-access places.

The drone has also turned into a **passenger transportation mean**, such as the Volocopter, presented on-stage during Intel's keynote. Many autonomous UAV passenger and freight transport projects are developed worldwide, with established companies such as Airbus or startups such as the Chinese EHang UAV taxi.

## 3 "THE WORLD OF DATA IS NOT FLAT"

This title questions Thomas L. Friedman's reference book titled *"The World is Flat, A Brief History of the Twenty-first Century"*. We observe countries' inequalities in technologies adoption, usages, and political initiatives in the digital world as well as very different kind of regulations put in place in continents. Globalization does not erase nations political and cultural differences. On the contrary, these differences give a new competitive edge to actors of these nations, while weakening others. The concept of *Human as a device* is generalized, allowing payment in stores by mere facial recognition and direct access to the person's bank account. The historical, cultural and political differences can partly explain the varying levels of development of technology sectors around the world, and their representation at a trade show such as CES.

### 3.1 Increasing dominance of Asia

The US consumer market for technical goods grew by 3.2% in 2017, to \$321 billion. The UAV, OLED TV and virtual reality markets each exceeded one billion dollars in 2017 for the first time. The vast majority of these products come from China, which has become the world's leading supplier of electronic goods. The domestic market is also growing at high speed due to Chinese interest in technological objects.

## FOCUS ON CHINA AT CES 2018

Gradually, the spaces of the Las Vegas Convention Center were taken over by Chinese stands: out of 5,000 exhibitors, 1,500 were Chinese (vs. 1,600 American). A few now dominate and monopolize the center stage: Alibaba, Baidu, Huawei, ZTE, Haier, even Xiaomi, are also clearly identified, while other industrial and commercial giants like TCL, Hisense, Changhong, ZTE, are far less well known.

China's technological power is asserting itself in all sectors represented by leading Chinese players:

- **Commerce:** Alibaba has become Amazon's main competitor, Suning presented a *Smart Shop* enabling an *unmanned* experience
- **Autonomous cars:** Baidu, the Chinese Google, presented its program of autonomous vehicles, called Apollo
- **Drones:** Chinese businesses are almost omnipresent, especially with DJI and Yuneec
- **Robots:** Many humanoid robots, including Ubtech which raised a total of \$520M, but also the Sanbot robot from Qihan, the company making cameras for surveillance systems
- **Household appliances:** Four of the five leaders in the global electronic goods market are Chinese. Haier acquired GE Appliances branch of the American company General Electric
- **Smart City:** Alibaba Cloud City brain solution makes it possible to regulate traffic and search for vehicles/persons in a city using AI.

Several factors come into play in the rise of these Chinese players on the international scene. The evolution of Chinese players has gone through several phases: the considerable improvement of design, the creation of brands that reach out to all markets, and internationalization towards Indonesia, India, and all of Southeast Asia. The mass of consumers embodied by the middle/upper classes of the huge Chinese population allows players to industrialize products on their domestic market before opening up to the international market. The role of the government, which relies on the Cyberspace Administration of China (CAC), is essential in the development of the players and their means of industrialization. China is the country developing its facial recognition capabilities the most and deploying a large system of surveillance cameras (600 million planned for 2020).

### 3.2 Battle of the Sino-American platforms

Major European companies were poorly represented, according to our observations at CES 2018. It was mainly a Sino-American duel. The big four US platforms, the GAFAM group (Google, Apple, Facebook, Amazon, Microsoft), joined by the NATU group (Netflix, Airbnb, Tesla, Uber), and closely followed by Chinese giants, BATX (Baidu, Alibaba, Tencent, Xiaomi), are positioning themselves as close to the customer as possible.

Their services downgrade more traditional companies to the low end of customer relations. Some traditional companies like Ford, Samsung and Somfy are already announcing their own cross-functional platforms, particularly regarding mobility, health monitoring and home management. European companies must now make strategic choices about their positioning and business model to remain competitive in this market.

The arrival of Alibaba Cloud Services confirms that the battle of the cloud will continue to rage. Businesses have the choice of hosting data on an American cloud and a Chinese cloud, but no real European cloud alternative.

Meeting with the delegation

**Alibaba at CES: the trade show's Chinese leader**

Alibaba is a giant e-commerce company. Alibaba relies on the 400 million most wealthy consumers in China. Their Singles' Day event generated over \$ 25 billion in sales in 1 day (versus \$3.3 bn for Black Friday in the US), of which 90% were purchases made via mobile.

Alibaba presents itself as a *data company*. While the company started by developing e-commerce website, it now focuses on data and many of its use cases. To streamline traffic between e-commerce, logistics, advertising, leisure, messaging, music, Alibaba uses data from end-to-end. Alibaba has deployed a high-performance system for managing cities in five Chinese megacities and plans to expand to South-West Asia. This solution is not an announcement like other American systems, it has already been implemented. The implementation lead time to manage a city's traffic

Another factor in this duel: the tense relationship between the US operators and the Chinese smartphone manufacturers. The day before Huawei's keynote at CES 2018, in which it presented the latest Mate10Pro smartphone, American operator AT&T announced its refusal to sell this smartphone on the American market. The reason for this refusal was the accusation of espionage of the United States through Chinese equipment. Conversely, the Chinese market is difficult to penetrate as Chinese players are already well established, with very strict entry conditions for international players.

The battle opposes contrasting visions: a European humanist vision with a state protective of individual rights (development and liberation of the human being, ecology), facing an American *Big Brother* vision of a society of data directed by the market, confronted with a new vision where all the technology is used and exploited for the emergence of a country, China.

### 3.3 Regulation and inequality of digital policy initiatives

The technology is the same everywhere in the world but its acceptance and adoption by the inhabitants vary from one region to the next, and consequently so do its regulations. It can be seen that the liberal model presented, based on a balance between the free capture and use of information, contrasts with the European model of stronger public regulation. This model is embodied in the General Data Privacy Regulation which apply in Europe, but also wherever European citizens are involved. China, eager to assert its technical leadership with a population avid for new technologies, moves forward without inhibition with its industrial and technological giants.

Another concrete example is the unequal development of 5G network. The first to experience serious development of this technology will be China, South Korea and Japan. Africa will probably skip a generation, moving straight from 3G to 5G in some cities. The United States plan to make big investments to deploy 5G for broadband Internet use in areas too sparsely populated to be connected by optical fiber. Multinational companies operating in Africa and Asia must integrate a 5G strategy starting today.

### 3.4 Between dreams and prospects

Speakers at CES developed convergence of views on the future society. It projects a model of society that responds to a deep desire to exploit technical advances to better solve the problems that industrial society has created or failed to solve. This *better world*, a recurring theme in all panels, can only be multi-faceted. Indeed, car manufacturers like Ford or Toyota imagine a world with a happy mobility, with no pollution or congestion. Intel believes that the computing power of processors will help reinvent sport or film-making. Alibaba and Baidu exploit the power of their algorithms to streamline the city and commerce. Dassault Systèmes feels capable of modelling everything, both living and complex systems. Each of these companies only address a partial solution, but for which it hopes to become the world pivot, given the apparently immense needs with 9 billion inhabitants, of whom 6 will live in Chinese, Indian or African cities. The fact remains that these projections, which often converge on recurring science fiction themes such as the flying car, respond, in their own way, to the quest for meaning that technologies, robots or artificial intelligence cannot generate by themselves. Dreams are characteristics of humankind, always stimulated to see new horizons, enabled it to conquer them all. CES is in line with this desire, with a bit of utopia, commercial logic and ambiguity.

## 4 PROPOSED ACTION PLAN

CES 2018 reinforce our conviction that the digital revolution is accelerating and covers all activities, sectors and professions, and therefore requires implementing a global and consistent strategy to manage this transformation, developed in the various papers of Cigref.

With the Cigref delegation in Las Vegas, we initiated a list of actions for which we propose the following framework, in line with our recommendations 2017.

### 4.1 Implement strong governance for transformation

Major changes expected across entire sectors (automotive, health, home, city) have strong impact on business models and competitive environments. The digital transformation of businesses and the redirection towards new market entry and development strategies require commitment from General Management and the Executive Committee. This confirms the need for strong governance of the company's transformation at the highest level.

The shift to the digital economy aims to bring the benefits of transparency, speed and commitment to all stakeholders in the company and society as a whole.

The governance of the transformation must therefore stand surety for the overall consistency of the company's actions as well as the value of transparency for the company. Digital governance provides the framework for stakeholder relations, responsibilities, key processes, sustainability of initiatives, risk management and resource allocation.

*Cigref: Work on digital governance and the role of the IT department in this governance.*

### 4.2 Explain in order to engage

To change, management must first understand the scale and depth of this digital transformation and be able to convey it within their companies. This requires explaining and sharing to all in-house stakeholders, as well as external partners. We recommend organizing meetings to explain technologies and their impact, as well as organizing initiatives to rally actors, focusing both on the global view of the *world of data* and on the rapid resolution of the visible problems.

Access to information is now such that all employees can believe that they are familiar with the most advanced topics without having the expertise. For example, the concept of "everything is technically possible" makes defending architects' positions more complicated and sometimes casts doubt on their legitimacy. Preconceived notions of technologies and subjective ideas of their impact can reflect negatively on the company and its positions. It is therefore a question of explaining the terms used, concepts and their possible applications.

This explanation is all the more necessary given that our society is oriented towards the massive use of data. The company must be able to rally its employees to the vision of its transformation in the new world of data.

None of the changes mentioned will create the expected benefits if digital confidence is not solidly anchored in the design, construction and management of the new information system. It is a vast set of themes requiring an all-round vision of the value of data, protecting it and respecting it.

## 4.3 Use new transformation methodologies

Supporting the governance of initiatives and explanations to the stakeholders, preparing the vision and its application by activity implies a major methodological change. These new methods integrate information technology activities and professionals into a single vision of the company's products and services. The historical segmentation into project owner/ prime contractor, useful in structuring the foundations of the information system, is no longer appropriate in an IT world with zero lead time/zero failure.

The deployment of agile tools and DevOps, the continuous commissioning of applications, are new forms of the deployment of IT services. These methods call for profound changes in the organization of businesses. It is necessary to break down company borders and silos.

The same applies to the distinction between management IT and industrial IT, which are merely different angles of approach to the same activity. The industrial, IT and digital spheres, now unified, must be capable of integrating objects whose professional use requires them to be absorbed into the overall system. This is the case with UAVs, 3D printers, robotics and cobotics and even anthropomorphic robots.

Our discussion of the extension of agile methods, initially intended for IT development, to the whole company, was born of this observation of the importance of making pluridisciplinary teams work together. To do so, the entire company must get on board and get organized to industrialize the tools necessary for agile development (Cloud, DevOps, API, etc.)

*Cigref: Reflections on the Agile method at scale and on employee's future of work.*

## 4.4 Shape IT architecture around data

In order to survive in the data era, companies must create a data strategy and implement it by rallying its employees and external partners to it. To develop such a data strategy creates value for the company.

The collection of information is now an acquired IT capability. But the number and diversity of sensors and collection tools make difficult data management and its uses. The objective is to be able to redistribute and exploit (analyze) this data to facilitate operational excellence, improve the customer experience, but also allow predictive maintenance and enable companies to search for new business models.

To that end, the IT architecture is organized to produce, store and then use data. The convergence of the information system towards a single model puts data architecture at the heart of IT performance. Data, both structured and unstructured, internal and external, must be processed quantitatively and qualitatively throughout the value chain, from its emergence to the contextual restitution to the actors.

Once IT is industrialized, the IT department must take control of the company's data assets. To that end, it is necessary to set up metadata management processes in relation to the business lines, organize the management of these assets and the interfaces with the ecosystem to allow it to be used for future service offers and its possible marketing.

The new European regulations for the protection of personal data must be incorporated in IS architectures. This difference between Europe and the rest of the world can lead to specific guidelines by region.

Companies therefore wonder how to structure the information systems for cross-functional and secure data use, at the service of value creation.

*Cigref: [The guide to a successful application of the GDPR](#) and work on digital technologies and architectures.*

## 4.5 Adopt AI technologies without delay

Data strategy and governance give the company the prerequisites to set up initiatives around the use of artificial intelligence. The IT department must help the activities to transform their business by integrating the AI analysis.

The specialists confirm that this is a promising but difficult area to implement, as it requires intense work. Our conclusion is that it is essential that the digital officers take advantage of these tools, now readily available in open source, and start deploying them wisely. First, and in line with data strategy, the company must identify the appropriate subjects to start adopting these technologies.

It is necessary to avoid expecting a magic answer to the company's complex problems. It is only by anticipating and then capitalizing on the solutions from different approaches that they can be dismantled.

*Cigref: Reminder of the recommendations made by the [Cigref working group on Artificial Intelligence in 2016](#):*

1. **Allocate a dedicated AI budget**
2. **Switch to Internet 4.0: AI, predictive algorithms**
3. **Add a robotics engineer to the IT teams to switch to 4.0**
4. **Develop machine learning systems**
5. **Follow *TensorFlow* tutorials**
6. **Develop an in-house API culture**
7. **Raise awareness of AI among Activities and Functions**
8. **Develop a community around AI and sharing**
9. **Eliminate the company's pain points**
10. **Create logical black boxes to store AI and allow the possibility of destroying it (erasing all instances) in the interests of the right to be forgotten**

## 4.6 Develop a high-capacity technical architecture

Coordination between the different IT parts necessitates a high-capacity technical architecture that integrates networks, clouds and information end points. This model does not require the deployment of 5G, which will be done on an industrial scale from 2022. The current solutions can be implemented in a flexible, scalable manner to cover IT volume and quality requirements. This infrastructure, which ranges from connected objects to information end points of all types, but where the smartphone remains key, is the responsibility of the CIO.

The CIO can set up the necessary industrial partnerships with the best providers to build and deliver this architecture with robust operational governance. The scope of potential partners is broadened naturally to include the Chinese players, who demonstrate a remarkable vision and capability for

execution. The emergence of Alibaba as a credible player in cloud storage, as well as the power of Baidu in AI are the revelations of CES 2018. Like Samsung or other major players such as Huawei, they represent alternatives to North American operators. It should also be noted that in Europe, Bosch, Dassault Systèmes, Schneider Electric, each in its area of expertise, provide appropriate solutions for the advanced industrial systems design and development.

Companies must nevertheless be prepared for the deployment of 5G and its impact, and determine the cases of use of a high-speed, high-quality service wireless link and the consequences of these infrastructure developments on our companies.

*Cigref: Work on digital technologies and architectures.*

## 4.7 Develop digital skills

The evolution of IT implies more than ever strengthening companies' digital skills. Investing in employee training and hiring the best profiles to upgrade IT expertise and provide suitable working environments is imperative.

The skills and methods to reduce the time to commission the solutions are critical to the successful implementation of business strategies. This requires key skills in architecture, networks, machine learning, design, ergonomics and security.

Ensuring the system-wide consistency of initiatives and delivering the qualified information required for operation and decision-making are some of the many challenges requiring qualified people to address them.

The company will not be alone in developing its skillset. Its partners, whether big groups, startups or consultants, will enable it to address the challenges in a logic of openness and co-construction.

*Cigref: Continuing European and national work on digital skills and professions. Promote the place of women in the digital professions. Training initiatives in partnership with the Conférence des Grandes Ecoles.*



# Cigref

SUCCEED  
WITH DIGITAL

Cigref is a network of major French companies and public administrations set up with a view to developing its members' capability to acquire and master digital technology.

[www.cigref.fr](http://www.cigref.fr)