

ARTIFICIAL INTELLIGENCE IN COMPANIES

Strategies, governance and challenges of data intelligence



Artificial intelligence in companies

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October 2018

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Cigref is a network of major French companies and public administrations set up in order to develop its members' ability to acquire and master digital technology. It is a key player and federating body in the digital society, thanks to its high-quality thinking and the extent to which it represents its members.

Created in 1970, Cigref is a nonprofit organization. It counts among its members some 150 major French corporations and public administrations across all business sectors. It is overseen by 15 board members who are elected by the General Assembly. Its day-to-day work is carried out by a team of ten permanent members of staff.

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Preface

For one year, Cigref's Cercle IA (an AI workshop) met to consider the growing power of Artificial Intelligence (AI) in companies and the challenges it poses. Through fascinating presentations and discussions, we noted the beginning of an acceleration in AI usages, increasing challenges and a higher level of awareness.

For the company to benefit from the potential of AI, the IT department has a key role to play. It must ensure the consistency, security, comprehension and quality of all of the company's data, while also enabling the integration of new associated technologies. The IT teams' ability to fulfil its mission and to efficiently make data available allows the company to seize the opportunities created by AI that are often linked to Big Data. To that end, working closely with business functions is essential and must facilitate the ability to choose the most pertinent use cases, identify correlations and manage projects in a flexible and innovative way, while maintaining consistency, long-term visions and production opportunities.

That is why managing AI related activity, which is strongly correlated with data and digital management, is a key element in developing AI projects. Discussions among the workshop participants (of the Cigref's Cercle IA) showed that organizations seek one another and that there is no single recipe, given the diversity of companies (sector, size, culture, maturity and personalities involved). Nevertheless, a close relationship between the business functions and IT department, agile and collaborative cultures, an entrepreneurial spirit, a sense of imagination and the right to fail have come up over and over again as factors of success, with a particular focus on the creation of multidisciplinary teams, data labs, fab labs or other collaborative platforms, etc.

The IT teams can support, enable, ensure, stimulate and inspire in the context of the acceleration of data and AI usage and the transformations they bring about.

It is the job of the business function office to map out objectives, get involved in prioritizing activities and tailor its vision to what the customer values, etc. It can do this by listening to the customer who, in the end, approves what is needed. The IT department deploys its technical expertise to offer the best options and ensure they progress at an appropriate pace. Regulators are also a key actor; they provide the framework and the boundaries that must be integrated by design, given that ethical questions arise from technological and business concerns.

AI delineates what could be called "augmented business". It can optimise processes and resources, offer new services and help further develop relationships. AI at the service of human intelligence is, in the end, a transformational tool that affects every area of the company.

Xavier de Broca, CIO of BPI France, Co-Chair of Cigref's Cercle IA (2017/2018)

Overview

The 2018 Cigref's Cercle IA is continuing its 2017 exploration of "[The challenges of AI operational implementation in major companies](#)", which took stock of the early AI experiments and initiatives in companies. This report also considered future possibilities, in terms of business models, around interactions between intelligent agents and modes of collaboration with the AI ecosystem, in particular with regard to research.

The purpose of Cigref's Cercle IA is to follow the evolution and impacts of the implementation of AI in business, from a structural, technological and human point of view. This report **contains an analysis of strategic advances in AI, IT adaptation and structural and management models of data intelligence**. It is intended as a pragmatic/practical analysis. It is based exclusively on the feedback and experiences of Cigref members and is aimed at understanding the development of AI in business based on technology and data management. Indeed, the emergence of AI in business is a result of companies' advanced digital transformation and of their successful data-centric model.

[An AI strategy starting to structure itself in different ways](#)

Companies are reflecting on strategy, whether vertically or horizontally or even in an agile manner. Awareness-raising and the involvement of companies executives are the cornerstone of developing an overall AI strategy. But this is not always the first stage. Some strategies are built from the bottom up, aimed more at coordination by businesses in a closer or looser collaboration with IT, in an agile model with autonomous multidisciplinary teams and a culture of experimentation. This will allow companies to detect skills and aptitudes internally, which could also be boosted by various means, including AI challenges, workshops and conferences. Participating companies wish to re-internalise certain technical skills and resources (data platform, datalab dedicated to designing AI algorithms, connection with production, etc.) to better master AI solutions while seeking out partners to provide expertise and add new dynamics.

[Data intelligence management](#)

Data intelligence spans big data, analytics, machine learning, statistics and data science more broadly. In such an environment, artificial intelligence is most valuable because it is often a complement to Big Data. Where Big Data technology allows learning based on the correlation between data and information, AI allows situational understanding to solve problems, process complex questions, propose hypotheses and even make decisions, thanks to various learning techniques (supervised, unsupervised, by reinforcement). This concept of data intelligence is representative of the hybrid transformation that companies are undergoing, helping them to manage both their legacy systems and the creation of new systems that are able to interact with each other.

Many challenges to overcome

Integrating AI systems into businesses poses a number of challenges:

- Coordinating and organising AI initiatives to develop them and boost their visibility and value added (in particular with cross-fertilisation of projects);
- Accounting for the need to reconcile different business cultures;
- Raising awareness among teams and management of AI challenges and real possibilities. Understanding the major categories of AI traps (skew, bias, over-learning) is essential for the business functions. This acclimation could help demystify AI and make it easier to adopt
- Building tailored architecture in real time and adapting it gradually;
- Balancing AI budgets. For the time being, efforts seem to be focussed on specific areas like building datalabs, establishing projects and putting chatbots in place;
- Advising the Executive Committee of the transformation challenges within the company (effects on transforming the jobs and necessary skills of tomorrow) and in customer relations;
- Mobilising talent.

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Introduction

Artificial intelligence (AI) is a term that gets thrown about, whose value is no longer discernible and which some find frightening. This is undoubtedly due to its overuse by the media and the never-ending headlines it generates. However, behind the term “artificial intelligence” lay a number of recent scientific and technical advances that, little by little, are fuelling and reshaping many different areas of economic and social life. AI was born more than half a century ago, but it has now entered a phase of acceleration, from scientific discipline to practical application and increasingly from a theoretical question to a civilization and geostrategic question.

Companies are pursuing their digital transformation thanks to an unparalleled convergence of processing power, miniaturization, and storage and network capacity. This has given rise to significant breakthroughs in the data sciences and deep learning, which are considered to be driving the exponential growth of AI.

AI and its impact on businesses should thus be the focus of reflection and monitoring. Thanks to that convergence, AI is reaching its full potential in various features: it is optimising existing processes, automating (e.g. the process of data mining), enabling assisted or augmented control, detecting, predicting, and interacting in an increasingly natural fashion with humanity, thanks to the evolution of automatic natural language processing. Its added value today lies mainly in its detection, prediction, and human interaction capabilities.

The reality of AI in business is not limited simply to optimising processes: it creates new organizational structures, working methods, services, approaches to customer service and therefore a rethinking of business models. It reshuffles the competitive landscape, opening new opportunities for innovators. AI is also updating thinking around certain geostrategic questions, because whoever owns the data—but also the skills and technology to process that data through the design of artificially intelligent algorithms—has in their hands “one of the keys to the future in a digital world” (Villani Report “Making sense of AI” - March 2018).

The present document is the result of reflections by participants in the Cigref Cercle AI which took place over the course of 2017/2018. It answers the following question: **What are the strategic, organisational and operational means to handle the advent and use of AI systems in businesses on an increasingly massive scale?**

Definition of artificial intelligence (AI) - by Orange

AI is a group of disciplines that must be combined to create intelligent services that can learn, interact and help with decision-making:

- Expert systems and reasoning
- Knowledge engineering
- Natural language processing and comprehension
- Statistical learning (machine learning, including deep learning)
- Game theory
- Optimisation
- Simulation
- Processing of signals, images, etc.

These technical building blocks can be used to create business use cases.

There is a tendency to confuse AI with learning (machine learning and deep learning) but learning is just one part of the disciplines involved in AI. However, learning techniques are increasingly present in AI applications because of the availability of data and advances in algorithms and processing capacity.

Nabil Benameur - Head of Data Intelligence & Algorithms
Technology & Global Innovation - Orange

1. Background: the AI trend in businesses

For a few years now, AI has slowly been infiltrating the world of business, with its vast field of application. It has called upon machine learning (including deep learning) and its subcategories (supervised, semi-supervised and non-supervised learning, learning by reinforcement¹, etc.).

1.1. A very versatile field of application

AI applications emerging in business are versatile. Developments differ depending on the sector or, within a company, the business function. In general, the majority of the participants in Cigref's Cercle IA pointed to a plethora of initiatives demonstrating that the AI trend is well established in businesses.

The most common use cases involve anti-fraud efforts, virtual assistants or conversational assistants in the back or front office, predictive marketing, detecting outages or weak signals, and firewalls incorporating AI (IS security alerts, cyberattacks, etc.).

AI challenges in automobiles: application in predictive maintenance - Groupe PSA

The automotive industry is undergoing a profound transformation under the influence of AI, the usage of which is becoming ubiquitous. Technical challenges are moving away from organic design towards software and improved exploitation of related data.

It represents a paradigm shift for front-line employees, taking into account not only big data, machine learning and artificial intelligence, but good data above all, without which nothing is possible.

One operational application with high added value is predictive maintenance on the product: teams of AI experts from PSA have put machine learning in place to carry out preventive detection of system failures.

The number one approach uses neuronal networks in supervised mode, specifically developed using the data stored in the PSA Big Data infrastructure. Based on rolling tests carried out internally, it learns to recognize flaws already identified in our repositories.

.../...

¹ The definition of these terms is available in the deliverable "[Gouvernance de L'IA dans les grandes entreprises ; enjeux managériaux, juridiques et éthiques](#)", Cigref - Bensoussan Avocats, 2016

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The flaw is annotated to identify “weak signals” and anticipate a possible malfunction from the client perspective.

The effort will be complemented by a non-supervised mode that will detect potential defaults as they arise. These settings are then incorporated into on-board calculators (engine example) to monitor indicators in real time. The goal is for network analysts to be able to identify the causes of failures much more quickly and to make the design more robust and durable.

Yves François - Innovation Project Manager

Matthieu Donain - AI Research engineer, Head of OpenLab AI

Guillaume Gruel - Head of Engineering & Quality Data Service

Groupe PSA

The majority of businesses have completed experimentation phases focused on machine learning and new conversational interfaces. The Proof of Concept (POC) logic is omnipresent, both in the business functions and in the IT department, and will have an impact on operational efficiency and customer knowledge.

The applied AI or “AI as a service” logic consists of sourcing solutions externally to then implement them in information systems. It remains a compelling element of many use cases and enables a rapid response to identified issues specific to business functions. One recurring challenge is to strengthen automation of certain processes to optimise them. This would save time and improve efficiency in a “big data” context, as evidenced by SACEM.

AI use cases at SACEM

The main mission of SACEM, the society of authors, composers and publishers of music, is to collect copyrights in France and redistribute them to creators in France and around the world. SACEM is faced with data multiplicity coming from the new digital music platforms (Spotify, Apple, Google, Deezer, etc.) which are growing exponentially. One of the challenges is to be able to identify, in the most automated way possible, the works used on these platforms, thereby providing better protection for copyrights and ensuring that the creator of the music receives just compensation. For that, our main use cases in which AI and machine learning have been employed are the following:

- The first use case involves increasing the rate of identification of works through syntax:

By introducing multiple combinations of syntactical algorithms based on data that these platforms had declared, we studied how we could increase the rate of automatic identification of these works. We relied on training data constituting a representative sample of works. We then defined a group of variables that corresponded to the different types of syntactical algorithms utilized. We ran the learning model in order to determine the best possible identification rate for each combination of algorithms. We hope to be able to launch an experiment taking

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advantage of our manual identification in order to train a neuronal network to learn the most common input errors and automatically correct them.

- The second use case involves increasing the rate of identification of works through musical detection/recognition:

We run into problems when content on the platforms comes in the form of remixes, covers, or is otherwise so deformed that applications like Shazam are not capable of recognizing it, because it doesn't exist in the recordings databases in that exact form. To address this, we are testing two approaches. The first involves learning a representation of the work that could be based on the musical dictionary of SACEM which holds more than 750,000 musical themes. The second aims to train a neuronal network to recognize the basis of similarity between the two musical reprises in such a way that each version can be given a fingerprint that can be easily and quickly compared to the fingerprint of known original works.

We are also looking at two other use cases that are not directly linked to identifying works:

- Segmentation of corporations:
To better understand the corporate community we serve, we used unsupervised machine learning algorithms. This helped us identify coherent clusters and tailor responses to their specific needs.
- Prediction of copyright distribution:
Initial studies were carried out to predict the distribution of copyrights of our corporations in a logic of new services and whether we encountered problems in our information system. The studies were conducted using varying levels of data granularity, and clearly showed an increased accuracy of prediction compared to the previous linear regression model.

With regard to organization, we are currently in a more research-oriented experimental phase than an AI production phase. We are made up of small teams within the IT department and we have to depend on interns, PhD candidates or special consulting firms to support us in this effort. In a more intensive overhaul of our IS and the implementation of a platform anchored in the music industry, which will ultimately transition towards API and an outward-facing approach, a consultation process will be planned to determine how to introduce AI at a deeper level within the IT department and the company more broadly.

Xavier Costaz - Project Director for cross-cutting and innovative projects

Guillaume Doras - Research lead

Frédéric Falkoff - Data, web and resources lead

Jocelyn Jacob - IS client lead

SACEM

1.2. The hybrid reality of AI use cases

Advances concern mostly the use of machine learning systems and more generally of data intelligence, which is a continuation of digital transformation programmes. The term "data intelligence" refers to big data techniques, analytics, machine learning and statistics. The majority of companies are therefore using a hybrid approach to artificial intelligence, because the various techniques and processes are interconnected. It is often the combination of technologies and skills that creates value. This is all borne out by current use cases. Incorporating machine learning into every process does not always make sense. To generate predictive models, the use of machine learning certainly makes sense, but when it comes to doing basic data correlation, statistical models are more than adequate. AI is a part of a continuum more than it is a disruption. This AI transformation can be considered "hybrid" because it involves a dynamic interconnectivity between legacy technology and new systems.

AI at the service of jobs - Pôle emploi (State employment office)

Number one in the French job market with 54,000 employees, over 1,000 branches and locations, as well as a national network of partners, Pôle emploi works every day to help people get back to work and to provide tailored service to meet the recruitment needs of businesses.

To shore up its personalised service and face the major challenges posed by increasingly rapid economic and social shifts, Pôle emploi is accelerating its digital transformation through the use of artificial intelligence.

Pôle emploi has a considerable amount of data at its disposal (2016 key figures: 8.5 million registered job-seekers, 403,000 companies using our service, 4 million paths to get people back to work, 7.4 million jobs advertised on pole-emploi.fr). Pôle emploi relies on this core data set to create new smart services using AI. Some twenty products operating predictive algorithms, machine learning, deep learning and semantic analysis are currently in the production or experimentation phase.

These services, developed for the advisers at Pôle emploi, enable:

1) Job-seekers, to considerably broaden their search field:

Example with the "winning approach" use case, a combination of predictive algorithms. By relying on our knowledge of professional pathways, one algorithm predicts opportunities to obtain employment within 6 months, for a given profession and geographic region. In order to provide complementary information, a number of alternatives are available through the use of other AI services. For example:

- Business function view: a "similar jobs" algorithm looks at candidates with similar jobs to suggest other options, creating a better chance of returning to work.
- Skills view: a "galaxy of jobs" algorithm brings together similar skills/professions and suggests jobs that use all or some of the job-seeker's skills, always with the aim of

suggesting other jobs that offer a better chance of employment. It also recommends the best training resources to job-seekers who need to brush up on certain skills.

2) Businesses, to improve their candidate search:

Example of “attractiveness of offers” use case

Through market knowledge and following the approach of the above example, one algorithm predicts the chances of a successful job offer.

In order to provide complementary information, a number of alternatives are available to recruiters through refining criteria (geographic location, type of contract, duration of post, etc.) to improve the attractiveness of the selection.

Hervé Fonteneau, Manager of IS Risk & Fraud Prevention - IT Division, Pôle emploi

1.3. Managing the hype

This wave of AI still lacks recognition and support from top management, let alone from a dedicated governance perspective. This is perhaps a result of the overblown media hype surrounding AI and its magical properties, exaggerated to a greater or lesser degree. But it is also due to the wave of chatbots of which the operational results have not met expectations. The media hype around chatbots is however far from representative of the reality of AI in businesses today: first of all, even if companies do POCs on chatbots, the majority of them agree that this is only an early iteration of AI that is still not quite intelligent, because it is driven essentially by rules engines or basic mapping. On the other hand, major advances have been made in research on voice recognition and language comprehension, but they still have not been transferred to operations, and current applications remain very limited. Nevertheless, businesses are already gearing up for this revolution and anticipating possible transformations in customer relations.

1.4. Main challenges to address

The reality of this hybrid transformation in companies highlights certain organisational, technical and resource-related concerns.

1.4.1. Budget & resources

While many projects are already under way in companies, both internally and externally, investment still has not followed: IT requires resources to put together effective teams of data scientists, offer training to internalise the skills of the future, create data lakes to experiment with machine learning systems and to acquire data from beyond the boundaries of the company.

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It is a necessary condition for quality data and models which are essential prerequisites for using AI in business.

Often, the only resources dedicated to AI are allocated to the data lab or to chatbots, but that is not enough, because AI permeates the entire company. Now is the time to recognize the value of AI more broadly. The IT department often plays a key role in this transformation (in close collaboration with the business functions: providing data and security, monitoring the rapid evolution of tools, optimising user experience externally, non-dispersion, consistency and IS operation, etc.). It must be able to oversee the integration of AI in the company, starting with its IS, from both a strategic and operational point of view, and be the go-to support for business. Its cross-cutting position can create opportunities to take advantage of correlations between business functions, irrespective of their competing interests.

The budget question is tied to the question of structure and governance addressed below. It is necessary to budget resources for AI to avoid the risk that initiatives might be diluted.

1.4.2. Organisation and ecosystem

The organisational challenges associated with AI occur at multiple levels: collaboration and work modes, resources and strategic forecasting. We have observed that **too many entities remain in silos and that cross-cutting work is a real challenge** in major companies: computer scientists and statisticians, for example, do not work together enough; power struggles occasionally arise between them. In this hybrid transformation which uses all of the expertise within the company, cross-disciplinary collaboration is a matter of survival.

Another related question is how to ensure that the whole company **advances homogeneously** when some departments are more mature than others. Coordinating an AI project requires taking that difficulty into account by, for example, setting up committees tasked with coordinating specific AI projects.

Existing external resources are not sufficiently utilised and lasting research partnerships are scarce: harnessing the expertise coming out of research labs and open source projects is a major challenge. Here, it is worth noting that, increasingly, major companies are seeking open source alternatives to reduce their dependence on certain software companies². Finally, **understanding the market and AI** is now an essential element for getting a handle on the landscape of software and actors, but also for carrying out a successful strategic perspective. This market knowledge must also open new doors to using open source technology and involving French actors.

² See Cigref report *L'open source, une alternative aux grands fournisseurs* (coming December 2018)

1.4.3. Technical aspects

There are multiple challenges posed by the technical impact of AI:

- The advent of real-time technology necessitates the appropriate architecture, such as events-based architecture. In addition, machine learning in the business functions should be able to be recovered and used by technical platforms operated by IT.
- Semantic work (natural language recognition) and machine learning pose major challenges. For example, it is necessary to look ahead to the transition from decision-making assistance to autonomous decision-making, even if there are currently few algorithms capable of taking decisions without supervision. There are nevertheless a few simple cases where the decision to be taken has no consequence and the entire chain has been automated. Such is the case with programmatic advertising.
- If in the next few years customers are helped by personalised virtual agents/assistants, businesses will have to remain connected with them, especially because many of these assistants will have been developed by tech giants in the US. Companies will then need to converse with these assistants and set themselves apart from their competitors. According to Christelle Launois (Société Générale), thinking about interaction is urgently required and should be done through these personalised assistants in a way that is empathetic. We must also urgently ask ourselves the following question: how can we model empathy in IS in order to better understand the customer and offer more relevant responses? This raises a number of questions about the interaction between man and machine that we are trying to replicate, as well as ethical questions: how should the agent behave? How can its neutrality be guaranteed and by what criteria should its responses and recommendations to the customer be evaluated? How should the question of responsibility for AI-given advice be dealt with?

Diversity of AI use cases - at Orange

Associated with Big Data, artificial intelligence is now a powerful driver for Group Orange, enabling the company to reimagine customer service and to optimise and automate the management of its networks, improve customer experience and improve operational efficiency.

The multipurpose nature of AI technology has allowed us to successfully develop and apply use cases in a wide array of areas: marketing, customer service, fraud detection, security, management and security of network and platforms, etc.

Orange is also developing and putting together AI-based products and services using natural language processing, dialogue and conversation agents, shape recognition and predictive analysis. All together, these constitute a response to emerging use cases of processing customer service or text and document indexing: sorting emails, thematic

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grouping of verbatims, detection of intention in dialogue, indexing of audio-visual data, etc.

For example, speech-to-text transcription and language comprehension have recently made considerable strides, allowing us to make conversational agents available to our customers who can then more easily and naturally express their concerns or needs.

A great deal of progress remains to be made, however, because accurate comprehension of customer requests is not generally enough to make a chatbot intelligent. The chatbot must be capable of finding or even putting together the correct response and flesh out its capacity over time based on the various cases it encounters. Response engines today are usually limited to a selection of responses prepared in advance, for example by browsing manually prepared dialogue trees or by recycling question series, which can function when the response perimeter is structurally limited (e.g. researching references in a catalogue), but the limitations rapidly become apparent when it comes to “open” conversations. Thus, there is a real challenge at hand to automate the building of conversation engines (comprehension + response) and a real need for analysis and diagnostic tools to be applied to the functioning of chatbots.

Jérôme Gueydan - VP Data Intelligence Enablers & Software Environments
Technology & Global Innovation - Orange

1.4.4. Human Resources

The quest for talent with a background in AI is becoming urgent for businesses. They have to **anticipate the AI skills they will need in the future** and begin educating their employees, in particular to peak their curiosity, through such tactics as hackathons, for example. This point is elaborated on more specifically in parts 2.2 and 3.3 of this deliverable.

The talent rush is a reality in this high-performance and fast-evolving area, and the major leaders in the US have understood this for a long time.

2. Management of data intelligence

Data intelligence entails tailored governance. Data intelligence is a term that comprises multiple dimensions: Big data, analytics, machine learning, statistics and everything related to data science more broadly. Artificial intelligence can grow and reach peak added-value in this realm.

Much work has been done on governance and on attaching value to data within businesses (in particular at Cigref), but when data enters into systems that are more or less automated and capable of learning, deduction, suggestion, diagnostic and even prediction, governance should take into account the more specific and multi-scale evolution of data intelligence.

2.1. Prerequisite to data intelligence governance

The AI boom in companies goes hand and hand with the data sciences boom and requires a solid data environment. The implementation of data lakes³ or datamarts⁴ is now considered to be a fundamental requirement for exploring AI usage. However, it is not simply a question of breaking down technical silos, but also business function and usage silos. Data tools are equally essential to enable data scientists to develop algorithms, especially in open source code. The ease with which data can be accessed and the intelligibility of that data are factors of performance.

Cercle IA defined the main prerequisites for data intelligence governance as the following:

- Data governance (see Cigref report on [Valorisation des données](#), 2016, especially point 4, *Quelle gouvernance pour valoriser les données ?*)
- Internal communication, education and awareness: certain participants discussed the practice of “gaming” in their companies, i.e. games intended to raise internal awareness among employees and management about the challenges and usefulness of AI.
- Benefit of the support of the top management
- Alignment with overall business strategy
- Partnership between business functions and IT department often on mixed project teams
- Identifying internal talent, motivating teams via AI challenges
- Developing a skills centre dedicated to data intelligence

³ A data lake is a data storage method used by big data. This data is kept in its original format or lightly repackaged. The idea is to have a place for different types of data” (Wikipedia).

⁴ A datamart is a group of data that is targeted, organised, sorted and aggregated to meet a specific need for a given business function or discipline. A data panel that is restricted to its functional discipline can then be examined, based on settings defined in advance during its design” (Wikipedia).

With regard to the strategic alignment of AI governance, even if the level of maturity varies between sectors, strategy development is cutting across all disciplines: AI serves a strategy of process optimisation thanks to automation and the development of predictive analyses (maintenance, fraud, loss of customers) and service personalisation.

2.2. Identifying skills internally

2.2.1. Start anticipating skills and training challenges now

One of the major challenges of data intelligence has to do with building future teams, harmonising agility and aligning the right skills for the duration of a project. The DSI also has a role in this organisation that is specific to data intelligence: it can champion the creation of a data science centre under its purview. That would facilitate a multidisciplinary approach and ensure the indispensable aligning of business functions with IT.

Data Science - at ENGIE

At ENGIE, it all started in 2015: Everybody was talking about analytics, artificial intelligence, data science and digital transformation. The Group could not miss out on what was becoming a major trend. But how could a group like ENGIE familiarise itself with data science? How could we develop skills in that field? How could we identify the right candidates? What strategy should we employ?

Traditionally, three choices were available: recruiting new candidates, using external talent or training employees. At ENGIE, we chose a fourth option: we bet that among 150,000 employees, many of whom were engineers, we could find data scientists by trade or by affinity who were willing to use their talents for our business functions' use cases. In the data science world, challenges are held a dime a dozen: the idea was to organise that type of competition internally at the Group. We created a system of internal data science competitions *à la* Gagggle (based on the name of the official data science competition platform), thus satisfying two objectives: 1) to work substantively on ENGIE business functions' use cases, and 2) to identify and support the future data scientists of the Group.

That is how the Data Science Challenges were born. They consist of an internal online platform for data science competitions, which brings together use cases from different business functions with the Group's data scientists who are determined to solve them. These challenges now involve a variety of disciplines: renewable energy generation, marketing & sales, energy efficiency, trading and IT. In three years, dozens of topics have been addressed and a dozen data science challenges have been launched on the platform, all in a secure internal space. Today, the success of the platform is evident in a number of aspects: more than 700 registered users, including an active core group of 70 employees, more than 20 business units involved, and no less than 3,500 resolution models

filed. The growing appetite for and expertise in data science among the ENGIE teams is another mark of the immense success of this initiative.

To provide more overall support to this effort, a “data science tribe” was created in 2016 with the support of the Group's IT and Human Resources Divisions. This multidisciplinary Group resource is agile and collaborative. Data scientists from a variety of entities come together to demystify data science and help it progress at ENGIE, experience a new collaborative management approach, promote a community spirit despite geographic distance and share best practices.

Matthieu Pestel, CEO Global Business Support - ENGIE IT

2.2.2. Create momentum and identify resources internally

In order to generate internal excitement, it is important to create momentum by pushing the use of the datalab for AI purposes (or even Fab Lab) or by holding in-house AI challenges. Internal communication is useful for supporting this transformation (and encouraging a dynamic approach without fear).

Getting employees involved and generating internal interest with an AI Challenge - at the ICDC (IT Caisse des Dépôts)

The Caisse des Dépôts is guided by efforts to intensify data usage in all its forms in order to gradually develop a vast array of AI use cases. The initial challenge was to find a way to rapidly familiarise employees with data and involve developers in AI tools and challenges.

An AI Challenge was launched in June 2017 with the following objectives:

- To be able to rapidly launch internal applications to meet customer needs
- To identify AI affinity internally and quickly build skills related to this new technology
- To use the Big Data platform

An IT community came together for the challenge. The data science community was responsible for organising the event. This helped combine skills in these “tribes”. Some 50 people (out of 700 ICDC employees) submitted business function proposals.

Marc Gnanou, Director of Innovation - IT,
Thao Sananikone, Chief Data Officer,
Caisse des Dépôts

2.3. Options for structuring the company around AI

Different organisational structures can be implemented to facilitate the adoption of AI in businesses:

- **Implementing a digital plan**, or even an AI-specific digital plan, that takes AI governance into account. Sometimes this digital plan brings together multiple entities within the company (for example, IT and Digital Marketing Divisions), while other times it is directly attached to the IT department that reports to Executive Committee.
- The organisation could benefit from a **community of experts** and a **business committee** to understand business function challenges. Business functions could get involved through workshops and the implementation of a POC per business function.
- Some companies prefer to **allow initiatives to proliferate** in the business functions and subsidiaries (in line with a culture of independence and a push to decentralise) while putting in place **overall governance** structures to ensure monitoring. For example, business functions are expressing a wish to regain control of certain disciplines, in particular customer service.
- Other entities could be created: for example, a data innovation lab outside of the IT department (or in partnership with it), geared towards data and its uses. This lab would enable the creation of tools that could be sold to the entities. Another option would be a data analytics hub to centralise initiatives. Whatever the case, a **structure or unit is necessary to respond to the proliferation of AI as well as to handle communication between the various entities** that mutually contribute to that proliferation.
- Businesses need to **create ecosystems** to ascertain the added value of making these solutions or having them made: the question is whether to make or buy. Some companies prefer not to choose a single software developer; they prefer to take the best of breed, i.e. to reserve the ability to integrate software from different developers in order to select the best adapted solutions.
- Businesses cannot do without a robust policy on data security, usage and compliance (see Cigref - Afai - TECH IN France deliverable [Entreprises : les clés d'une application réussie du GDPR](#)). Cyberattacks that rely on machine learning (through malware, for example) that automatically detect security breaches are particularly concerned with the evolution of hacking techniques.

Still, this reorganisation brings up certain challenges and questions:

- One challenge is related to production in order to transition into the operational phase. Indeed, a number of experiments around AI remain at the POC phase and never conclude (see chapter 3.5).

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- Many AI cases require breaking down data silos to allow use cases to emerge, and an already existing system of good data governance.
- Some companies are split on new AI partnership models, not in financial terms but in terms of the more qualitative aspects of the relationship, the transfer of knowledge and data, and the value added on both sides of the equation.

To sum up: if a company has already allocated the resources to create a big data core; if it has developed a plan for data upstream that is reaching maturity; if it has started the process of skills building and opening up an ecosystem for its teams; and if it has helped its teams and top management familiarise themselves with the technology; then data intelligence governance is well established. It requires constant adaptation in terms of leadership, roles distribution, risk management and coordination of business functions.

Example of organisation to foster AI projects - at Enedis

Enedis laid the foundation for its data governance: it inventoried its data, created governance units, defined roles and responsibilities and decided who would own the data. Enedis also set up teams of experts who mastered data driven tools and algorithms, including AI.

With regard to urbanism, Enedis chose to share its valuable data (in a core) and decentralise usage (in data labs and manufactured goods). This infrastructure enables data experts and IS projects to exploit the data by relying on an ecosystem made up of Hadoop and Teradata technology. The infrastructure currently includes more than 20 data labs. The core comprises a data lake, data banks, tools and expertise.

On this platform, a project is made up of a mixed team that brings together the experiences and assets of each entity (IT department, digital projects and company business functions). The project uses tools already in place, expertise in data science and a simple access to data. In its POC phase, the project conducts experiments directly in a production environment; that way, there is no disruption in the transition to the deployment phase. Compared to a project that creates its own platform, the time to implementation was reduced by half and the investment required was less.

Franck Atgie, Head of Data Hub at ENEDIS

2.4. Overseeing AI strategy in businesses

AI strategy has its logical place under the Strategy division, but it permeates other divisions. For certain companies, AI, which was once under the purview of the Strategy division, is now under the CIO. Some participants underline the crucial nature of getting support from general management to implement an AI governance strategy. If general management is aware of the need to overhaul the company's IS, build a data lake, and outfit teams with tools and training to develop AI, then budgetary concerns and finances will follow. The dynamic around AI is often

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well under way when projects have already been undertaken upstream to familiarise the company with big data and pique the interest of the business functions.

Other companies take the approach of using an AI lead. At Renault, for example, an expert AI lead was appointed: their role is to direct research and innovation, support the different business functions in their use of AI, help them to acquire the necessary skills, and work with them to build partnerships externally. To do so, the point person relies on an internal network of experts and specialists.

Other organisations opt for a system whereby the business functions take the lead on AI projects. Talks are given by the major AI leaders in the company (start-ups, business functions) so that employees from the different business functions can take ownership of the subject.

In other cases, as with Orange, the focus is on creating a skills centre dedicated to AI that is shared with the existing big data hub.

Currently, integrating AI into corporate strategy requires a reimagining of business function strategies as well as of overall compliance of data governance. Providing a platform that allows AI applications to be tested and algorithms to be designed internally is one element of the recommendations for Cigref's Cercle IA members to follow.

2.5. Impact on business functions

The difficulty of driving AI forward comes from its cross-cutting nature and its intense evolution within companies with diverse digital structures (existence or non-existence of Chief Digital Officer and definition of that role, existence or non-existence and positioning of Chief Data Officer, proximity between IT department and business functions, etc.).

AI's impact on business functions occasionally requires developing proprietary governance. At Air France KLM, for example, a chatbot board business function was created to ensure smooth coordination between business functions working on related issues (marketing, servicing and maintenance business functions, airport business functions with direct customer contact, etc.). This specific board follows the monthly progress of various initiatives and enables better coordination for improved efficiency.

AI implementation and coordination strategy with the AI Programme at Air France KLM

An AI programme was created to accelerate the adoption of AI at Air France KLM. Its aim is to offer cognitive services to customers and employees.

The AI programme is organised around three objectives:

- Encourage awareness of AI challenges thanks to use cases: the AI programme is guided by business and technology concerns.

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- **Coordinating different business lines** around similar initiatives and helping speed up AI's integration into our business lines with the help of an ecosystem comprising partners and universities.
- **Making AI sustainable:** Build the internal capacity to produce and host AI services (implementation of services and infrastructures, governance, skills, etc.).

Wail Benfatma, Manager of AI Programme
Isabel Gomez, IT Director, Operations Research
Air France KLM

With regard to involving business lines in governance, it appears essential to create connections between top management, middle management and the business lines. That could involve creating a special strategic committee geared towards the business lines. Orange, for example, created a new entity under the Corporate Innovation division. One of the offices under the new entity has the mission of delivering technical building blocks to supply business line use cases.

Structure of AI governance at Orange

To structure its governance around AI, Orange identified four axes:

- Strong involvement from Executive Committee which, through a dedicated committee, coordinates and leads the Group's overall governance and strategy.
- Creation of a centre of excellence dedicated to big data and data science, with recent recruitment of AI experts.
- Data processing support for business units. It is support by business for business. Co-development with the business entities of some 50 use cases of every scale each year, demonstrating the value created, convincing them to invest in AI and encouraging them to become independent.
- End-to-end control of data, with a strong push from the entry into force of the GDPR and the desire to independently control flows.

2.6. Role and driving force of IT department: IT as fertiliser and catalyst for AI?

2.6.1. IT department: an AI enabler

As we have seen in preceding chapters, the AI boom in companies is a cultural question but also an organisational and governance-related question. The IT department is fundamental to the transformation that AI implementation entails. It carries out crucial work on the convergence of infrastructures (data lakes, technology, data, etc.) and on the urbanisation and quality of data. This is necessary work for AI exploration and implementation. It also carries out important work on systems security.

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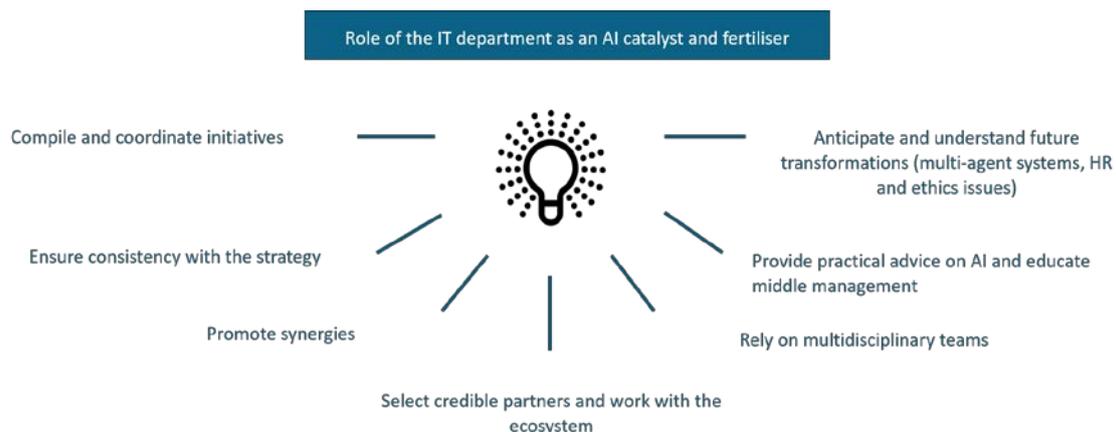
In some companies, the IT department already monitor and coordinate AI projects, using their technical skills and know-how. They also act as partners and coordinators for various offices that work on AI-related issues (HR, marketing, digital, finance, etc.).

2.6.2. Role and contribution of IT department

AI creates an opportunity for the DSI to create proposals on a number of axes, using its mastery and knowledge of data:

- The IT department can be fertile ground for experiments aimed at observing the impacts of AI on business lines
- The IT department can position itself to support business functions in customer service
- The IT department can promote initiatives along two axes: visibility (with regard to the Executive Committee) and the convergence of infrastructures (data lakes, technology, data, etc.)
- The IT department's main asset comes from its methodology and from monitoring and coordinating projects, especially agile projects. The DSI can create value through its technical and methodological skills (selection, motivation, calling on external help)
- The goal of the IT department should be to create consistency, to have clear ROI on its operations in order to optimise the IS budget
- It is also important to note that the IT department is increasingly a force for proposing ideas around AI as a service offering (see [Open Innovation](#) - Cigref report, 2017).

To sum up, the role of the IT department in integrating AI systems is first and foremost to gather initiatives, coordinate them and ensure overall consistency with corporate strategy. The IT department has taken on the role of community catalyst, fertiliser, accelerator and driver.



Above is an illustration of the ways the IT department can reaffirm its capacity to:

- Be connected to all actors in the company. It should promote synergies and ensure consistency through its technological choices

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- Select credible partners and work with their ecosystem
- Pursue digital transformation through APIs, data, security, compliance (GDPR, ethics, etc.)
- Anticipate and understand future transformations, such as multi-agent systems: these systems will facilitate the transition from assistance with decision-making to unsupervised decision-making: how to anticipate this and how to maintain a certain amount of control despite this, in a form of authority-sharing between AI and man?
- Anticipate the impacts on organisational structure, especially among business entities
- Unite: the IT department will be an AI catalyst, offering practical recommendations and advice on AI. It will need to rely on multidisciplinary teams (business line - IS - strategy) and educate middle management.

It will also need to be able to handle all HR and ethics questions. Questions about the complementarity or even substitution of business functions and on “black box” machine learning concerns will require the utmost vigilance:

- Ties with HR must be strengthened
- Educational efforts must be undertaken to promote comprehension around AI and the language surrounding it: what is the difference, for example, between automation and AI?
- One possibility would be to build a monitoring platform to evaluate AI
- To avoid the black box phenomenon, the random suppression of variables in certain cases enables increased comprehension of the impact those variables have on results. As a result, it plays an important role in the “explicability” or “sustainability” of black boxes
- These black boxes should not be opaque to at least one team of experts within the organisation; otherwise, it will be difficult to anticipate impacts on the company.

Risks related to learning and methods of responding - at Orange

Questions of “explicability”, “auditability”, robustness and equity around learning algorithms are central today. Beyond ethical risks, there are three major operational risks linked to learning:

- Biases - If models are trained based on past data without taking the appropriate precautions, they will, without fail, reproduce past biases, whether they are obvious or not. For example, the representation ratio of men to women, wage gaps, etc. Predicting the business functions of tomorrow based on data about the reality of those business functions today thus requires a specific expertise to identify and correct these biases; otherwise, there is a risk of perpetuating certain injustices and inequities.
- The degradation of data - The learning environment and targets evolve over time. For example, fraudsters are constantly getting around learning models that detect fraud through completely new behaviour. It is therefore necessary to create robust

and resilient models to resist this degradation, to evaluate them constantly and to regularly update models with new data.

- Over-learning - The risk is to stick too closely to learning data when models are too fleshed out, thus failing to achieve pertinent results. The main characteristic of over-learning is the assimilation of noise (parasite data or data with no correlation to the problem at hand) within pertinent data, leading to inconsistent results (where the inconsistency is difficult to discern).

How to avoid over-learning:

- It must be verified that what has been done makes sense, i.e. that it can be explained
- Always set aside a portion of the learning base to use as a test base. For example, use 70% of available data for learning and set aside 30% of the data, never feeding it into the model algorithm. Once the learning is completed (using 70% of the data), check the results against the test base (the remaining 30%). If there is a significant difference in performance, the model should be reworked.

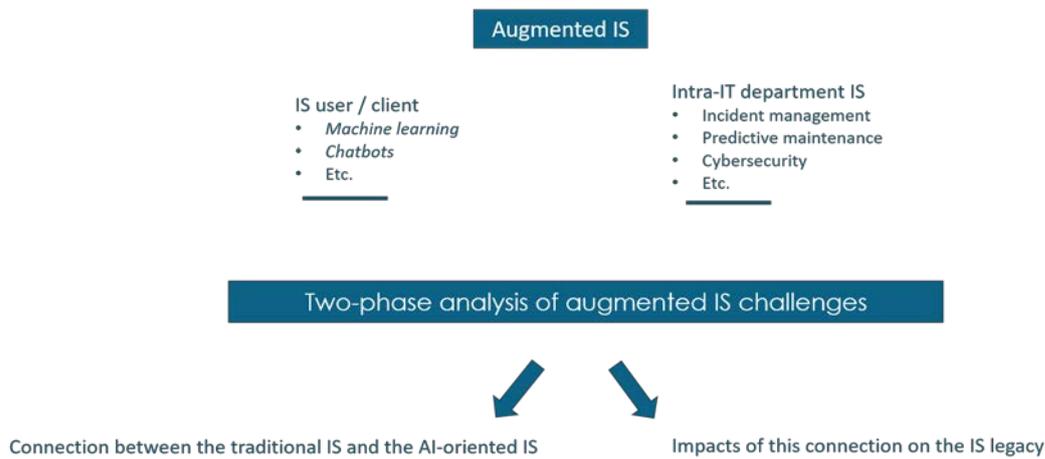
Bruno Kauffmann - Artificial Intelligence Skill Enter
Technology & Global Innovation - Orange

3. Augmented IS: Opportunities to include AI in evolving IS

3.1. What is “augmented IS”?

“Augmented IS” (term put forth by Cigref’s Cercle IA) is an IS (information system) that integrates AI functionalities to improve its performance and capacities (e.g. supervision and maintenance). Augmented IS brings the AI capacities of prediction, description, diagnostic/detection and surveillance to bear on traditional IS.

This augmented IS integrates AI applications and interacts with legacy technology, whether it be on the user side or the IT department side:

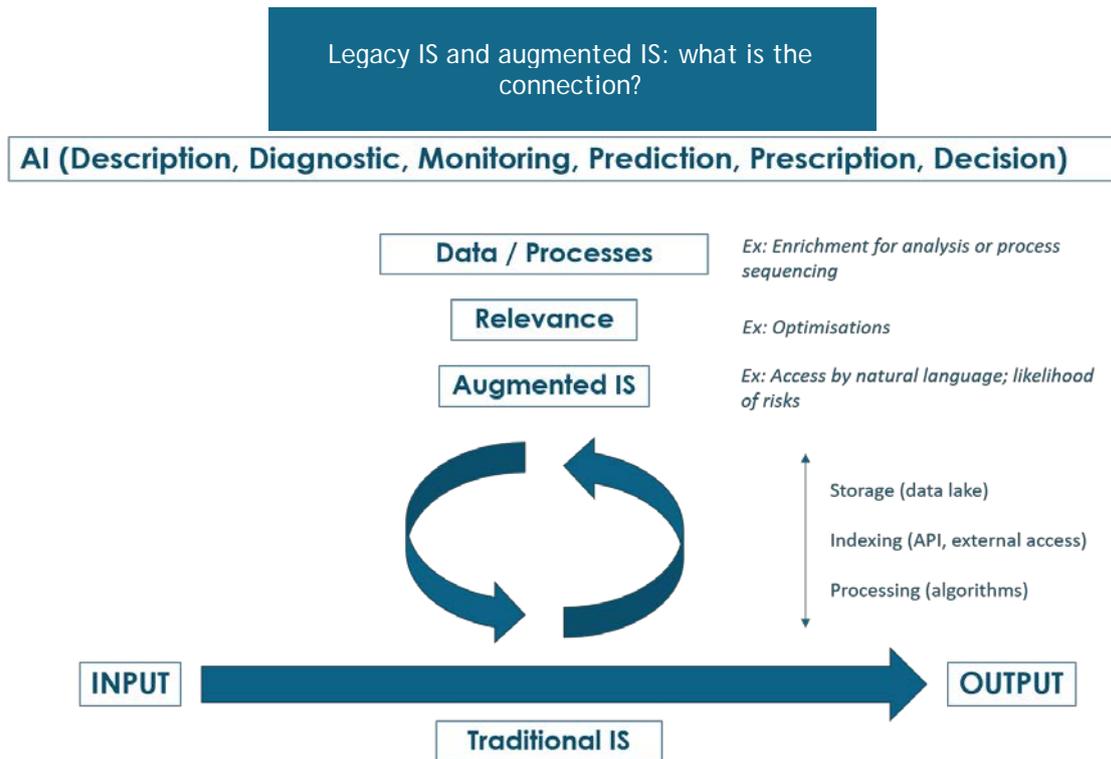


Source: Cigref (2018)

Drawn as a diagram, IS can be represented by inputs, outputs and processes between the two. IS would be augmented using an AI feedback loop contributing algorithms, and potentially access to new data and knowledge (opportunities for correlation). The application's data itself would generate knowledge, on the basis of which learning machines would hone and improve IS.

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The integration of AI functionalities into IS reduces redundancy and increases relevance thanks to a small data strategy consisting of only transferring meaningful data to the augmented IS system. It evolves in a more interactive open environment, incorporating real-time technology and advances in natural language comprehension. That accentuates IS subjects related to data management, API-isation and platform-isation of companies.

The intra-IS department augmented IS approach entails using all of the AI techniques to improve the IS system's capacity and performance and, in particular, its processes (ITSM, ISS, project portfolio coordination, etc.) To enable IS to benefit from AI techniques, it is necessary to:

- Foster open and urbanised architectures
- Package these techniques to make them accessible throughout the IS (even in surprising areas like accounting)
- Build frameworks connecting legacy technology and AI techniques

The connection between legacy IS and augmented IS requires taking into consideration the historic model of the legacy IS that already expand with applications that are created over time outside of the system. There is possibly an ultimate growth model for the data lake which would examine in fine the durability of the legacy IS system. That will of course require time, but the movement has already begun, because companies are increasingly interested in moving towards open applications and APIs and are working harder all the time to develop multidisciplinary teams rather than specialised teams. That is also evidence of a transition from a project-based model to a product-based model.

3.2. Shift towards open and interactive architectures to integrate data intelligence

The impact of AI on technical architectures creates a number of challenges:

- To practice data science, a data lake environment (or even a datamart environment, i.e. ad hoc data wells) is essential. This requires breaking down data silos. However, it is not simply a question of purely technical de-siloing. Silos must also be broken down between business lines, usages and data governance as a whole (which includes the description and quality of data).
- But this data lake environment is not sufficient. The necessary tools are also required to enable data scientists to develop open source algorithms with dedicated experimentation environment: it is the ease of use by business line experts that will help it evolve through successive and reactive iterations.

Impact of AI on IS architecture - Groupe LA POSTE

Functional needs

Our functional uses and needs increasingly require a real-time IS. In the realm of decision-making, AI relies on increasingly instantaneous flows from a variety of sources. For example, fraud detection often requires working on a history that was analysed after the fact, then examined in production, in order to act instantaneously.

Transformation of IS

De facto, real-time must integrate IS. This transformation is unavoidable. Concretely, in terms of IS architecture, hot data streams and cold data streams are drawn together by different patterns, such as reactive architecture, relying heavily on events, APIs and micro-services.

Crossing of IS

Meanwhile, learning and production structures remain quite distinct from one another at the time of this writing. The delivery process of new discoveries in data science and AI should be well defined, in particular to fulfil the accountability standard demanded by the GDPR.

The analysis, exploration and creation of AI algorithms are separate from the functions of providing data and AI tools (this separation exists for, inter alia, legal reasons). That creates a necessary cohabitation between AI-oriented IS and legacy IS.

AI can be done by multiple types of IS systems:

- A traditional modernised IS system using patterns to facilitate access to AI (possibly external access, as AI will not be exclusively internal)
- A modern IS built on legacy IS using exposition structures (API/Business/event).

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Whatever the typology of the system and the need for compartmentalisation, the intermediation and exposition of service (internal and external) are fundamental to AI deployment.

Jean-Luc Raffaëlli - Company Architect - Groupe La Poste

The members of Cigref's Cercle IA came up with a set of recommendations for integrating IS evolutions with AI:

- The nexus between various AI technologies requires the use of APIs, so the IS must be opened up and made accessible in the form of APIs. In the same way, open source is becoming unavoidable, enabling us to work with rapidly evolving technologies that have to be changed frequently.
- Using open innovation: certain models of open innovation are based on the use of open source. While companies begin using APIs to open up their services, it has not yet become a general trend, given that it requires mobilising considerable resources (data scientists, technology, etc.) There is an urgent need to begin developing a trend now by, for example, contributing more to open source ecosystems. There is a strong and shared belief among the members of Cercle IA that, in order to harness expertise, it is necessary to continue to pursue openness, contribute more to the ecosystem, and even code some segments of the IS in open source to attract external communities to start developing within these models.
- Encapsulate external technology to benefit IT actors.
- Do not underestimate tests.
- Develop an agile culture (importance of training and methods).
- Remain continually concerned about data compliance and ethics (GDPR, [CNIL report on algorithms](#))

Open innovation at Pôle emploi

Our collaborative innovation efforts, both internally and externally, increase the speed with which Pôle emploi designs and produces services, thereby ensuring we can adequately meet the needs of the ecosystem. By encouraging synergies and strengthening our cooperation with all actors (LAB method - design thinking, FAB, start-up ecosystem), Pôle emploi is multiplying its creative capacity and offering services that are simpler, more intuitive and centred on usage.

Open innovation has changed our IS in the following ways:

- Data openness: Pôle emploi has made data openness a guiding strategic priority. Easier access to information, particularly in the job market, is indeed a crucial factor for facilitating professional mobility and development. Shared data, then, includes information shared by job-seekers (e.g. CVs) and the job postings that we receive.

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Pôle emploi makes its data available on its institutional site (www.pole-emploi.org) and *via* the digital platform Emploi Store Développeurs;

- Opening our AI platform: as a complement to opening our data, an effort is under way to open up the tools we use to build AI (DATALAB); this will accelerate co-innovation with the start-up ecosystem and the academic world.

Hervé Fonteneau, Manager of IS Risk & Fraud Prevention - IT department,
Pôle emploi

3.3. AI tools and skills: outsource or in-house?

The criteria for choosing AI tools should be focused on the capacity to integrate the tools into the company's systems: tools should be able to be integrated throughout the chain of production. One technical building block should be able to be plugged in anywhere along the operation chain.

However, there is a question as to how much to invest in technical mastery of AI tools versus the purchase of pre-packaged tools from developers.

Outsourcing technical skills involves risks, particular with regard to controlling security, expertise and ethical evaluation. Integrating a building block that is supplied and maintained by a third party into the operation chain creates the problem of losing business line expertise. Indeed, even if the data belongs to the company, the algorithms and models in general belong to the suppliers. They can therefore acquire and consolidate the business line knowledge from multiple corporate clients and then sell it to competitors or use it themselves. The real problem is in learning: the truly valuable business line knowledge lies in what the AI will learn over time. The ethical dimension for companies also has to do in part with their capacity to develop their own solutions and deal with possible questions of algorithm traceability and explicability in advance to the greatest extent possible. The question of the acceptability of models is crucial today. If you do have to turn to external expertise (evolving trend, tricky subject matter, etc.), then oversight is indispensable and requires real expertise (including legal expertise).

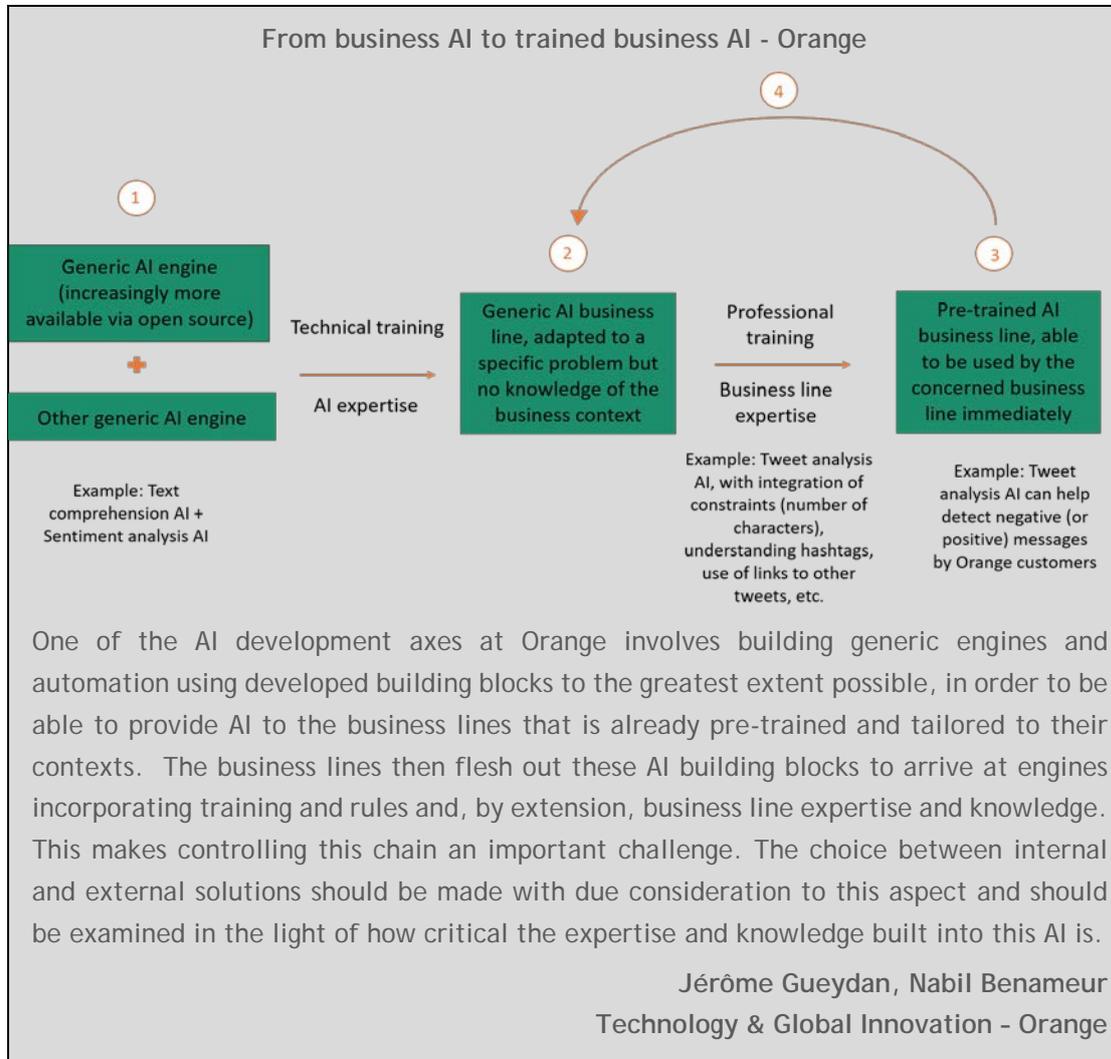
Creating AI tools in-house, on the other hand, requires skills; it is rare to find an open source tool that perfectly meets the company's needs right off the shelf. It generally serves as a good starting point, which then needs to be tailored to each context. It requires significant assembly and often a bit of development, which means the right skills are essential.

The advantage of using building blocks developed internally and of assembling open source blocks is the ease with which you can share these tools internally, because there are no limitations in terms of paying for licensing and no risks of leaking business line expertise.

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In practical terms, it is exactly like editor's software (which is not more adapted to the corporate context), except that in that case, the editor or an integrator usually does the tailoring and thus they are the ones who need the necessary skills.



3.4. Conversational agents & Natural language processing

Feedback and use case for Natural Language Processing (NLP)

A number of companies are interested in use cases based on conversational interfaces or automated natural language processing (NLP). There is no question that we are entering an era in which digital interfaces are becoming more and more intuitive, to the point where voice and spoken language technology can now be used in customer service. Nevertheless, while the value created by NLP has been clearly identified, a number of challenges remain.

3.4.1. Sources of value in conversational interfaces

Paul-Henri Chabrol, Digital Agency Manager at Axa, during his presentation at Cigref's Cercle IA, discussed the various sources of value in conversational interfaces. There are three kinds:

- **Brand perception:** they make it possible to speak with customers with a simple, modern, customisable and fast interface.
- **Productivity:** chatbots automate recurring and time-consuming tasks.
- **Customer experience:** NLP has advanced to a degree where it can understand requests that are more and more complex. Today, a chatbot is perfectly capable of resolving a technical problem, but would have difficulty in a direct dialogue with a person.

3.4.2. Architecture: what is a chatbot made of?

Paul-Henri Chabrol defines the constituent parts of a bot in three dimensions:

- **Connectors:** the channel through which the chatbot is available (can be a messaging service, an app, a connected environment, etc.)
- **Natural language comprehension** (speech to text, etc.) capable of understanding intention and the parameters of a question. There are a great many solutions on the market or in the open source library. Depending on needs and skills, companies can either pivot towards sourcing or building.
- **Structuring of dialogue and integration in APIs (business line side):** APIs have to be integrated into the IT process, and time is required to build good APIs and the dialogue boxes that underpin them.

Hybrid use case combining expert systems and Natural Language Processing - HAGER GROUP

Hager Group, supplier of solutions and services for electrical facilities, set up a semi-automated system of commercial invoicing: calls for tender and invoices are heavily regulated in many countries, given the high security stakes involved. A hybrid use case combining an expert system and a supervised Natural Language Processing solution automated the identification of the most likely product code. That yields excellent results and optimises the work of the invoicing teams, focused on high-value projects. For the time being, the learning foundation is based on data sets from thousands of invoices and invoice requests, and is gradually improving.

Sylvain Girard - Director - Enter of Data Excellence - Hager Group

3.4.3. Challenges

Challenges in Natural Language Processing occur at various levels, according to Paul-Henri Chabrol:

- **Product design:** The conversational agent is a new means of engagement and has its own specificities. It is important to consider its design, i.e. the way in which it will interact with a person. Designers therefore have to make concrete choices around questions of aesthetics, ergonomics and ethics. Identifying use cases and user experience are the major difficulties standing in the way of optimal design.
- **Agile organisation:** by definition, a chatbot project is a learning project that is highly iterative and cannot be done in a cumbersome organisation. The best model seems to be integrated independent teams focused on use cases and customer value. The ROI on chatbots remains uncertain today. However, it is important to have teams working on them long-term.
- **Data privacy:** if the company is using NLP technology that is off-site and relies on SaaS partners, then privacy is a critical issue. In this context, data privacy governance is required.
- **Technological maturity:** for an NLP system, understanding two intentions in one sentence is a complex problem. NLP platforms are all quite capable of recognising simple requests, but for more complex problems (and most customer requests are complex), the platforms lack maturity. These problems require supervised learning, which takes time, and the ability to manage expectations.
- **Reliable production of programmes and their agile evolution.**

Use case involving Natural Language Processing targeting suppliers in the context of responsible purchasing - SAINT-GOBAIN

In the context of our responsible purchasing policy, Saint-Gobain set a target of identifying suppliers that were not in compliance with that policy or were not behaving responsibly (environment, social rights, financial fair play, etc.)

The TIGER application (with 300,000 active suppliers managed in another application) automatically scans the web using several criteria:

- Names of suppliers
- Related vocabulary (products involving wood, the environment, etc.)
- Analysis of collected text in the light of the problem at hand (corruption, social rights, pollution, etc.)

TIGER provides interpreted and verifiable information that is then submitted to the purchaser, tailored to the markets within their purview. This has been quite successful with a relatively high rate of relevance. The POC has moved into the production phase.

Artificial intelligence in companies

Strategies, governance and challenges of data intelligence

Saint-Gobain relies on open source libraries. The number of languages included varies, because NLP operates using the words roots, and that works for many languages, including Asian languages.

Frédéric Anterion, Director of Group Applications, SAINT-GOBAIN

3.5. Production of AI programmes

While AI is being studied, it hardly (if at all) poses questions about IT automation, response time, security or reliability of evolution.

Today, AI is more and more integrated into “live” IS, user interfaces and legacy systems. Careful work is being done to ensure consistent high functioning and evolution that is high performing, easy and safe. There again, tools are evolving and IT system management and DevOps contribute to agility. A major investment needs to be done in this evolving discipline. Otherwise, we will miss out on the everyday benefits of integration, or fail to account for risks related to customer quality and information security.

IS urbanisation (API-isation) is a key factor in integrating AI algorithms into IT applications.

Conclusion

The advent of artificial intelligence and its integration into company systems reflects a growing maturity in most major corporations. AI usages are growing and diversifying.

More and more companies are organising, coordinating initiatives and learning from business line use cases. The IT department has a key role to play in this context: in terms of coordination, making data available, infrastructure convergence, education, culture of agility, security and compliance.

AI requires a more specialised and complex data governance known as data intelligence. The reality of use cases demonstrates this hybrid nature of AI in companies, where it interacts with and benefits from other data science disciplines (big data, analytics, statistics, etc.)

Data intelligence governance requires constant adaptation in terms of leadership, roles distribution, risk management, skills acquisition and coordination of business functions. It also requires implementing augmented IS, i.e. a modern conception of combining legacy IS and modern IS that incorporates AI functionalities.

The exploration of these three dimensions—strategy, governance and the impact of AI on IS—helps provide a current overview of AI in companies through tangible examples and accounts of AI's impact on structure, business lines and IS. With regard to fundamental research, progress and breakthroughs continue apace, resulting little by little in operational applications. Following these technological research topics and developing a related vision and strategic prospects remain essential preparations for the major disruptions to come.

ABOUT CIGREF

KEY PLAYER IN THE DIGITAL SOCIETY

Cigref is a network of major French companies and public administrations set up in order to develop its members ability to acquire and master digital technology.



NETWORK OF MAJOR COMPANIES

Created in 1970, Cigref is a nonprofit organization. Its counts among its members some 150 major French corporations and public administrations across all business sectors, all users of digital services.



DIGITAL PLAYER

It is a key player and federating body in the digital society, thanks to its high-quality thinking and the extent to which it represents its members.



TO SERVE ITS MEMBERS

15 Board members, elected by the General Assembly, ensure its governance. A team of 10 permanent members leads the activities.