Finance and Artificial Intelligence (AI): from an industrial revolution to a human revolution…. a thorough overhaul is required…

Jean-Philippe Desbiolles
IBM Watson Group

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Abstract:
(Industrial) revolutions come and go but finance remains. Today, in the era of Artificial Intelligence (AI), what changes should the finance industry expect? To answer this, we must first consider the causes of this new revolution, which is industrial only in name, so as to gauge, next, the scope of the changes it will bring about. These range from customer experience to human capital, and also take in learning processes. We are confronted with fresh paradigms that the financial sector needs to understand, control and integrate. New opportunities will arise from this imminent shake-up and it will be down to the finance industry to seize upon them. But, are we ready? Although there are still barriers, we are on the right track and these are being removed one-by-one. Artificial Intelligence will be what we make of it and maximum benefit will only be derived through action. The financial sector will have to leverage AI to once again make humans central to its professions and to restore meaning, trust and transparency.

An ongoing revolution: the fourth…but is it really an industrial revolution?

We are experiencing the fourth industrial revolution which is industrial only in name. It will not only change everything but also, and more importantly, change all of us! It should be renamed the human revolution as it affects our basic characteristics, namely our senses.

Combinatorial progress

This revolution is being driven by an unprecedented combination of technological and scientific factors occurring in the same time and place. AI is one component but it cannot account for everything. Taken together, AI, the Internet of Things (IoT), Big Data and blockchain are buttressing and heightening this upheaval in a financial world that is increasingly open, platform-oriented and cloud-deployed.

Nevertheless, AI should be differentiated from its peers due to its revolutionary nature. In the same way as steam, electricity and the Internet, it can be classified as a Generic Purpose Technology (GPT).[1] GPTs have an overriding feature in that they change *everything* for *everyone*. Consequently, far from being reserved for a minority, they also touch service professions requiring intellectual skills as regards knowledge and expertise which were previously relatively protected. As a result, AI directly affects us inherently. We thought we were protected but this is no longer the case and the financial sector is in the firing line.

Defining AI

Whilst, as we have just seen, AI already has an established status, there is also meaning behind its definition. AI is a bridge between two worlds: that of programming and that of learning or, in other words, between a deterministic world and a probabilistic world. AI therefore paves the way for us to enter a new world in which the foundations are supported by two pillars: data and learning. Although recent years have given us the opportunity of familiarising ourselves with the inherent issues surrounding data, learning raises new issues. Knowledge transfer (understanding), know-how (expertise) and soft skills (feelings, personality, etc.) are the ground rules in this new relationship between man and machine.

AI as enhanced intelligence

These fresh challenges have already led to a shift in paradigm and now the buzzword is no longer AI but "enhanced" or even "cognitive" intelligence. In the past, AI was too often calculated and paired down to algorithms or data sciences. Today, AI is encompassing cognitive sciences covering, but not (yet) totally appropriating, six main fields: language, voice, vision, empathy, reasoning and knowledge management. Although there is still the scientific dimension, we now need to speed things up and open our lens to linguists, behavioural sciences, the understanding of the human brain, psychology and biology. And didn't *Wired* magazine, writing about AI in 2016, carry the headline "The End of Code"?[2]

[1] Lipsey R., Carlaw K. & Bekhar C.(2005), *Economic Transformations: General Purpose Technologies and Long-Term Economic Growth*, Oxford University Press.
[2] "The End of Code", *Wired Magazine*, June 2016.

Applications and significant changes in the finance industry: current changes and what is to be expected

AI is currently entering three main areas which are fairly distinct and which have varied goals.

Customer experience or human-machine interface

As mentioned above, whilst our working practices will be affected, our uses are also set to be shaken up. Customer experience and the human-machine interface will be thoroughly revamped, or "redesigned", to cater for a new User Experience (UX)/User Interface (UI). The reason for this imminent upheaval is very straightforward: although huge progress has been made on mobile apps, websites, tablets and smartphones, we are still, ultimately, having a fairly basic experience which is nevertheless fun as a result of gamification. We have to prime ourselves for dialogue, discussion or even debate[3] with machines which will be able to contextualise this relationship and even to feel our desires, joys and hurts. Basically, we need to be ready to adjust. These first features already exist on AI platforms through language-related advances (Neuro-linguistic programming (NLP), Natural language understanding (NLU) and Natural language generation (NLG)). Although understanding feelings is still at its nascent stage, there are Application Programming Interfaces (APIs) such as the Tone Analyser, which can detect the tone and mood of a discussion. One direct result of this trend is that the customer-bank-insurance company relationship will experience unprecedented hyper-personalisation and hyper-contextualisation.

The increase in human capital

Next, we are set to witness what English speakers call the empowerment of men and women who use cognitive systems that can present information and recommendations based on facts and evidence without any limitations in terms of data ingestion (whether structured or not) within huge corpora. Here, many novelties are heralding a break with the past:

- These systems are evidence-based: they give an answer which they perceive as being as accurate as possible and provide us with all the underlying facts and evidence. It is therefore down to us to use our critical thinking and freewill to decide what is finally the most meaningful in light of the information put forward by the machine. As a result, financial offers will be increasingly justified and documented thanks to these systems.

[3] IBM Research Project Debater, https://www.research.ibm.com/artificial-intelligence/project-debater/

- These systems also ingest an unlimited amount of data. Whilst, up until now, this premise only applied to structured data, which accounts for 20% of total data, meaning that the remaining 80% was ignored de facto, we are finally able to use non-structured data (videos, sound, handwritten documents, etc.) on a massive scale, and include them in rationale and recommendations. Chief Investment Officers (CIOs) are going to be able to feed all their work into these machines and make sure that it is leveraged and used in a consistent manner by as many people as possible in their companies.

You should be starting to get an idea of the magnitude of the change we are witnessing. Push marketing, which caused customers to become wary of financial service providers, is finished. At long last, we are going to be able to give power back to millions of men and women: the power to clarify recommendations, to justify viewpoints, to restore dialogue with their own customers and to explain why A is possibly better than B for a given buyer, meaning the power to prove to the latter that he/she is unique and not only one of many!

Automated processes are dead, long live learning processes!

The 1970s first saw the emergence of Business Process Reengineering (BPR) prior to very high levels of automation with approaches such as Robotic Process Automation (RPA). Ultimately, the latter led to a huge number of rule-based business processes being automated. With ongoing projects, machine learning is being used within these processes allowing the latter to improve based on the outcomes achieved. Industry is also undergoing a fresh transition with the rollout of cobotics, or cooperative robotics, which is upending man-robot relations. A whole new form of collaboration is becoming available... There have, for instance, been amazing results in the fields of risk and compliance: a two-hundred page file can be ingested and understood by an AI system in several minutes compared to several hours for a human employee.

Furthermore, customers are now looking to scale up AI by being able to actually transform their business models, their customer relationships and their front to back processes. However, approaches such as Proof of Concept (POC) or Proof of Technology (POT) are bucking the trend as they are not in line with the main goals of these approaches: on one hand, to cut the time-to-market of AI initiatives and, on the other, to slash projects' marginal costs. With this aim in mind, we are jointly building Cognitive Factories with four cornerstones:

- Industrialise approaches and methods in a cross-disciplinary manner
- Create assets that can be rolled out and replicated within major groups
- Capitalise on a permanent improvement strategy for all projects, irrespective of their field of application, to move towards a one intelligence-multi-use and multi-channel approach
- Adopt specific change management and HR aspects to cater for the new skills that need to be acquired, developed and retained

Are we ready to embrace these new opportunities?

What obstacles need removing?

On one hand, the issue, itself, still raises many concerns (philosophical, ethical, human, etc.). This means that change management is required today, more than ever, in order to overcome these obstacles and to provide conditions conducive to the adoption and appropriation of these systems, which take us outside our comfort zones, by as many people as possible. These systems issue information and recommendations which we do not think about as we are limited, firstly, by our knowledge and skills and, secondly, by our very human resistance to change.

On the other, education, especially at European level, is lagging behind. Its core foundations are knowledge and calculations which are undeniably the two fields in which machines are leaving people behind! Conversely, teamwork, cooperation, critical thinking and empathy are all areas in which humans are well in advance over machines! This difference highlights the absolute necessity of rebalancing hard and soft skills! They need to be combined to establish new conditions for this unprecedented collaboration. These are the issues which I am lobbying for as a member of the *Conseil de coopération économique* (CCE) for the European Union which is tasked with addressing AI-related questions and their impact on work and skills.

Barriers are gradually coming down

Although there are certainly still other obstacles, the good news is that we are already working on lifting them! At a time when 60% of decision makers state that, in their opinion, the main stumbling block for the successful rollout of AI is a lack of confidence and transparency,[4] we are now able to identify, characterise and rectify the biases inherent in AI. This can be done in real time within an open ecosystem (multi-suppliers for platforms/open source or not)!

Although the scarceness of data science skills is often flagged up, the most recent technological advances go some way towards addressing this. IBM has announced the launch of NeuNetS:[5] now, neural networks can be created by other neural networks! In this manner, we are providing the stakeholders with high performance solutions that are ready to be used "as is", or improved to address specific uses. This ultimately speeds up the rollout of AI to end users.

[4] IBM Institute for Business Value (IBV) study, October 2018.
[5] Smith B., *IBM AI OpenScale: Operate and automate AI with trust Watson,* https://www.ibm.com/blogs/watson/2018/10/ibm-ai-openscale-operate-and-automate-ai-with-trust/

Three key factors to remember

To conclude, three basic points should be kept in mind:

- An observation: AI is anything but magic! Much work will be required to monitor its learning cycles and ensure its take-up.
- A paradigm: The more AI is used, the better it will become! This principle is of key importance as learning is a strategic issue.
- A challenge: Tomorrow's world will be an enhanced world, a world in which all the rules governing the coexistence between man and machine are being, and will have to be, recast. It is a world in which education and in-service training must be given priority!

Artificial Intelligence will be what we make of it. Nothing is inevitable except the fact that it will be omnipresent in the future for all of us. We need to stop being AI theologians and become practitioners! Today, the financial sector has a great opportunity to make human beings central to its core business again, to provide services which mean something to its customers, whilst being able to give explanations to restore confidence and transparency in the relationship. So, let's do it!