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EXECUTIVE EDUCATION

I

Artificial intelligence collaborations for society

AI management challenges, opportunities and success factors for public and private collaborations

Data science and artificial intelligence (AI) hold great promise for public sector organizations to improve services for citizens. But a great challenge remains: governments do not have sufficient knowledge or resources to integrate AI into public services on their own.

Harnessing the potential of AI for society requires collaboration between universities and the public and private sectors. This collaborative approach is already the norm in applied AI centers of excellence around the world.

But despite their popularity, cross-sector collaborations entail serious management challenges that hinder their success. In our research in *Philosophical Transactions*, we show the **opportunities and challenges of AI** for the public sector and propose a series of strategies to successfully manage cross-sector collaborations.

Management challenges and opportunities of AI

While the challenges of collaboration across private sector organizations has been widely researched, much less attention has been paid to the difficulties of working across the public, private and non-profit sectors.

The first issue that can hinder collaboration success is the **different environments** surrounding public and private organizations. While public organizations are accountable to their service users and the public at large, private organizations are responsible to their shareholders. This can lead to clashes when aligning the interests of the various stakeholders.

Marc Esteve

Marc Esteve joined ESADE Business School in 2016 as a Visiting Professor. He is a Senior Lecturer (Associate Professor) of International Public Management at the School of Public Policy at University College London. Dr. Esteve is also the director of the MPA in Public Administration and Management at UCL. He received his PhD in management sciences from ESADE Business School in 2012. Prior to joining UCL, he was a visiting research fellow at Cardiff Business School and a postdoc at the ESADE Institute of Public Governance and Management.

Prof. Esteve's primary research interests have focused on understanding how individual characteristics influence decision-making, specifically in interorganizational collaborations. He is currently delving more deeply into the mechanisms and effects of personality in the context of collaboration; his present research involves a study that explores the role of personality variables on strategic decision-making by using experimental designs.

Public-sector procurement of AI-based technologies presents challenges and raises **questions of accountability**. Who is responsible for a decision taken by an algorithm when it has an adverse impact on someone's life? Or for the potential criminal misuse of AI and data?

Another central challenge of potential AI collaborations between the public and private sectors is the **divergent approaches to managing risk**: the political risks of governments are not easily reconciled with the market risks of business organizations.

In particular, managers of collaborative ventures may find it difficult to deliver public **value for money while also maximizing profits** to satisfy shareholders. As future collaborations related to AI take place, there is always the inherent risk that the data used have been gamed or sabotaged to serve the opportunism of a self-interested actor.

Additional challenges related to cross-sector collaborations around AI relate to **skills and data**. There is a significant skills gap in AI between the public sector and business and universities. Public organizations lack individuals who possess knowledge and skills in AI and require technical assistance and training.

Developing the digital skills needed for public sector use of AI is not a quick process. More funding is needed for PhD students in machine learning to overcome this shortfall.

> "Who is responsible for a decision taken by an algorithm when it has an adverse impact on someone's life?"

7 factors for success in AI collaborations

Our research findings point to the following seven managerial strategies that can contribute to the success of AI collaborations between the public and private sector:

1. Facilitative leadership

In contrast to the classic idea of hierarchical leaders who impose their views on followers by relying on a position of power, facilitative leadership endorses respect and positive relationships among team members, constructive conflict resolution and candid expression of thoughts and attitudes.

Our analysis concludes that leaders of collaborations should promote broad and active participation, ensure broad influence and control, facilitate productive group dynamics and extend the scope of the process. Facilitative leadership is imperative to collaboration, especially since incentives to participate can be low and resources may often be asymmetrically distributed.

2. Shared objectives

Even if all the parties in a collaboration are highly aligned with the main objective of the alliance, there may be differences between the objectives of each organization. To ensure success, it is important that objectives be aligned because they act as a guide for decision-making and a reference standard for evaluating success.

3. Gathering and sharing knowledge

Management activities should focus on institutional capacity-building for joint action, such as the creation of common standards for the collection and processing of data. On a technical level, organizations are challenged by the way they manage their collaborative data networks to create data-sharing across jurisdictions. Formulating common standards for data collection and improving data-sharing procedures is crucial to ensure successful collaborations.

4. Communication

A communication strategy can have a direct impact on the management of a collaboration. When the collaboration is visibly producing tangible outcomes, stakeholders are more willing to invest time, energy and resources. This happens by showing the value of joint actions through quick wins.

“Facilitative leadership is imperative to collaboration, especially since incentives to participate can be low and resources may often be asymmetrically distributed”

5. Socializing

When managers make the impact of collaboration efforts transparent for key players to work together, collaboration improves. Transparent results and indicators can facilitate more ideas and reforms across all levels of the collaboration when it may be more difficult to implement a top-down idea in decentralized settings.

6. Expertise

Hiring tech-savvy network managers and shepherding the efforts of field experts within the network can induce trust on the basis of their competencies and improve service quality. The appropriate use of relevant technology can significantly improve performance in data quality, data integration, data analysis and visualization.

7. Sense-making

In cross-sector collaborations, relationships can be asymmetric: one partner may need more cooperation than the other. In these scenarios of unbalanced reciprocity, it is effective to create strategies for trust-building and persuasion. A collaboration manager must, then, make sense of this situational need and stimulate the network structure by encouraging actors to engage themselves.

“When managers make the impact of collaboration efforts transparent for key players to work together, collaboration improves”

II

Ambivalent leaders: key drivers of corporate social performance

Why overly optimistic leaders are not best suited to improve social performance in organizations

One would think that positive leaders must be the holy grail of organizations: they keep teams engaged and highly productive, they boost performance, etc. This certainly may be the case in many contexts, but our latest findings question this line of thought when it comes to improving corporate social performance.

Leaders who are overly positive **may not be the best choice** to tackle societal issues and deliver corporate social results. In fact, leaders of this type could even hinder corporate social performance – that is, the company's commitment to having an impact and outcomes for society.

Research on management and social performance has largely focused on managers seeing societal challenges as either positive or negative, for instance as opportunity or threat. According to the common argument, managers with positive interpretations tend to be **proactive in tackling social issues** while those who see things in a negative way are often more reactive.

But what happens when managers don't adopt a black and white approach? What happens when **leaders are ambivalent about social issues** – that is, when they see social issues as positive and negative at the same time? Can this mental attitude help to increase a company's level of corporate social performance? Together with a scholar from KEDGE Business School in Bordeaux, we wanted to shed light on this unexplored territory, as there is very little empirical evidence on how ambivalent leaders influence corporate responses to social issues.

Tobias Hahn

Prof. Tobias Hahn holds a PhD in Economic and Social Sciences and a Master in Environmental Science from the University of Lüneburg, Germany. He is also an Honorary Professor at the University of Sydney Business School. Prior to joining ESADE, he taught at a business school in France and was a project manager at a non-profit research institute in Germany. His main areas of expertise are corporate sustainability and corporate social responsibility.

His work has been published in journals such as *Academy of Management Review*, *Organization Studies*, *Ecological Economics*, *International Journal of Production Economics*, *Journal of Business Ethics*, *Business & Society*, *Organization & Environment* and *Business Strategy and the Environment*.

Tobias is a Senior Editor of the journal *Organization & Environment*. He also serves as an editorial board member for the journals *Academy of Management Review*, *Journal of Business Ethics*, *Business & Society* and *Business Strategy & the Environment*. Currently, Tobias is also the president of the Group for Research on Organizations and the Natural Environment (GRONEN).

To test this hypothesis, we analyzed 249 CEO statements from corporate sustainability reports issued by 58 companies from 8 sectors – automobile, chemical, construction, electronics, forestry, mining, oil and gas, and pharmaceutical – over a period of five years. We tested the sentiment of the language used in these statements to measure the effects of leaders' positivity, negativity and ambivalence around social issues on corporate social performance.

In our analysis, **88% of CEO statements** specifically referred to at least one of the 12 social issues we tracked: climate change, human rights, poverty and hunger, infectious diseases, waste and emissions, water and sanitation, land degradation, biodiversity, child labor, corruption, gender equality, and accidents.

Benefits of ambivalence

Our findings suggest that leader ambivalence about social issues is positively related to **corporate social performance** in organizations. We argue that there are several plausible reasons behind this increase:

› Leaders who are ambivalent have greater openness and readiness to balance multiple perspectives as well as greater predisposition to change – a relevant aspect to tackle the inherent complexity of social issues.

› Ambivalence may be particularly helpful for executives to avoid biased, overly optimistic or overly pessimistic responses. Ambivalence also enables leaders to develop more balanced, prudent and substantive responses

> “Research on management and social performance has largely focused on managers seeing societal challenges as either positive or negative, for instance as opportunity or threat”

to social issues that take into account the complexity and long-term implications of their actions.

- Leader ambivalence is particularly relevant and beneficial in contexts of heightened complexity. The ability of leaders to see through the competing positive and negative aspects of an issue is particularly helpful when the issue at hand is unclear.

- Through ambivalence, leaders are more likely to develop more adequate interpretations and responses. Ambivalence prevents leaders from excessively leaning towards either positive or negative views on and responses to social issues.

- Ambivalence heightens the sense of novelty of an issue, which leads to a deeper engagement with the challenge in question.

- Ambivalence motivates a balanced consideration of the issue and helps people to lead change in complex situations.

Negative thinking is not so bad after all

Contrary to our expectations, our findings also demonstrate that while leaders who are overly positive tend to lower social performance, leaders who are negative tend to increase it.

One explanation for this unexpected finding could be the serious nature of complex social issues such as climate change, human rights, poverty and infectious diseases. Excessively positive leaders may reflect a more abstract, high-level perception of these issues that may lead to a more symbolic response, which would explain the decrease in social performance.

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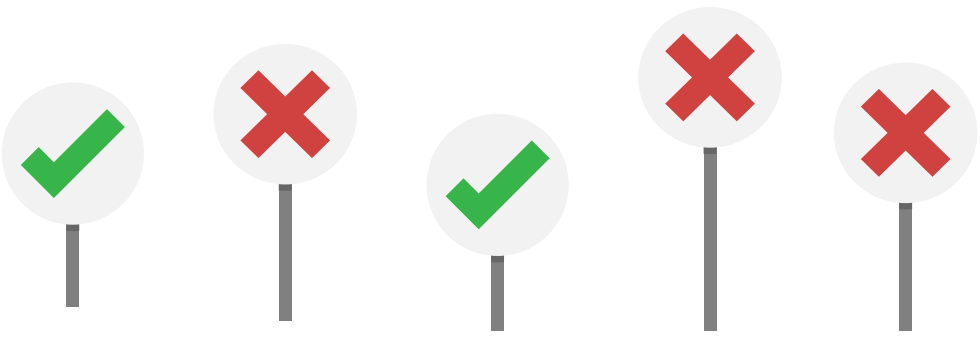
On the contrary, leaders with negative sentiments may reflect a more concrete, low-level perception of an issue, marked by an awareness of the gravity of many social issues. This practical, hands-on approach may in turn lead to more substantive action and thus higher levels of social performance.

Overly positive reporting

Another explanation for this positivity versus negativity link might be the nature of social sustainability reporting as it is currently practiced in the corporate world. As recent research findings corroborate, the tone of corporate sustainability reports tends to be more positive compared to the tone of corporate financial reports.

This overly positive reporting casts doubt on the credibility and effectiveness of sustainability reports and raises questions about whether these reports are more of a public relations tool than an accountability exercise.



“As recent research findings corroborate, the tone of corporate sustainability reports tends to be more positive compared to the tone of corporate financial reports”

III

12 characteristics of innovative people

Innovation inherently involves uncertainty, creativity and a special mindset that not all people have or are willing to embrace. What distinguishes innovative individuals from others?

In a study published in the *International Journal of Innovation Management*, ESADE innovation expert Lotta Hassi and Satu Rekonen of Aalto University investigated **how individual characteristics** promote experimentation behavior.

"Failure and unexpected outcomes are inherent in experimental innovation. Our study demonstrates that positive adaptation to adversity and not being defeated by challenges are among the key characteristics of innovative people," state the authors.

1. Continuous reflection

Participants with innovative behavior adopted continuous reflection – that is, they were open to questioning their first idea and the direction of the project. Through continuous reflection, participants were able to notice new pieces of information that were potentially important for the project, like a radar endlessly scanning the environment.

2. Unattached exploration

When participants were strongly attached to an idea, they were less open to letting go and trying other things. Those who were more prone to innovation were able to postpone fixation on an idea and stay open to exploring different possible directions before closing in on a single option.

3. Iterating between abstract and concrete thinking

In the experiments, employees had difficulty going from abstract concepts to concrete details – most individuals were strong mainly in one mode of

Lotta Hassi

Lotta Hassi is a lecturer of innovation in the department of Operations, Innovation and Data Sciences. She has over 10 years of experience working in the fields of innovation and design, as an entrepreneur, consultant, researcher and lecturer.

At ESADE she works in several multidisciplinary innovation projects that bring together research centers, companies, and universities from different disciplines. She teaches master and executive level courses.

She came to ESADE from the Business Innovation Technology research center of Aalto University in Finland, where she collaborated closely with companies to develop their innovation practices.

thinking or the other. However, those who were able to move fluently between conceptual and practical thinking, maintaining the connection between the two, were more prepared to identify uncertainties in the idea and design a good experiment setup.

4. Action-oriented

Another driver of innovative individuals was their action-oriented behavior. This personality trait allowed them to move from intellectual work to practical ideas, which proved fundamental when building a prototype and running the experiment. Action-oriented individuals pushed their teams to move from planning the experiment setup to building prototypes and to run experiments early.

5. Opportunity-focused

While some individuals only saw dead ends, opportunity-focused participants were able to see opportunities in different situations and shared with their teams several possible routes for the project – this played a key role in moving the team forward into experiments. This type of mindset promoted innovative behavior also when unexpected opportunities arose.

“While some individuals only saw dead ends, opportunity-focused participants were able to see opportunities in different situations and shared with their teams several possible routes for the project”

6. Mental resilience

The study demonstrates that people who adapt positively to adversity and don't let challenges defeat them are also more prone to innovative behaviors. Mental resilience allows people to take in the new information in negative feedback, accept it in a constructive way and remain operative. This also means being able to let go of an idea once it is proven unsuccessful and continuing to explore other solutions.

7. Intellectual humility

The field data revealed that intellectual humility was also at the core of innovation. The more innovation-driven individuals had a mindset that was humble in the face of new information and they were open to learning by acknowledging the limits of their own knowledge. Intellectual humility also allows openly sharing feedback that is discouraging, which may open up new avenues for developing alternative solutions.

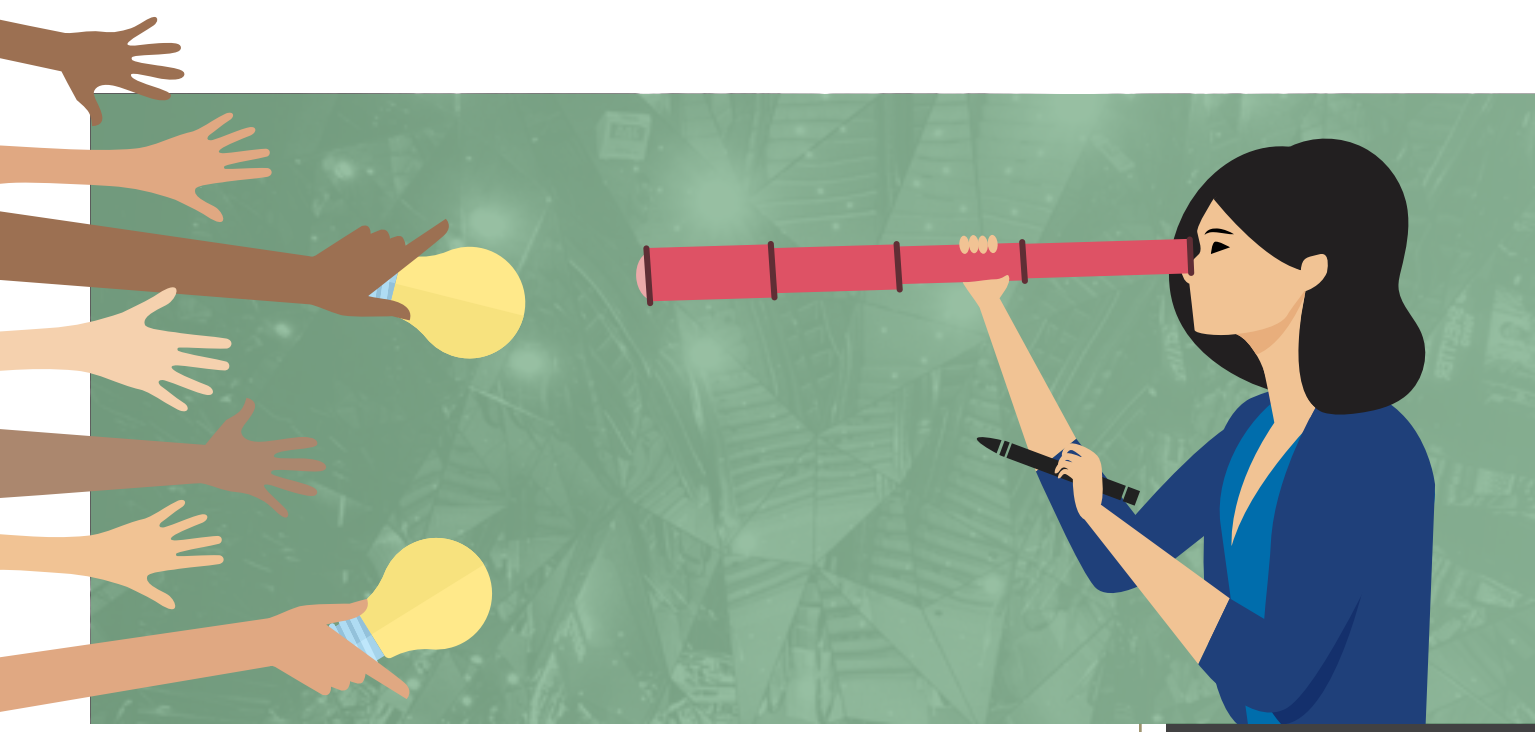
8. Courage

When running the experiments, the individuals had to submit their unfinished ideas for early evaluation by users or other relevant stakeholders and receive instant feedback. These situations required participants to show courage and step out of their comfort zone, as they did not know what the response would be. The only way to find out was to place themselves in a vulnerable situation, facing the risk of refusal and failure.

9. Sensitivity towards uncertainties

In the study, most individuals experienced difficulties with being sensitive towards uncertainties. The participants required constant help from the tutors to notice uncertainties before moving on to designing experiments.

“The study demonstrates that people who adapt positively to adversity and don't let challenges defeat them are also more prone to innovative behaviors”



The temptation to move directly to the realization of the idea was great and individuals were not able to identify uncertainties. With the tutors' support, various uncertainties were found, and the next experiment resulted in changes to the solution.

10. Designing valuable experiments

When designing the experimentation setup, participants struggled to design valuable experiments – that is, to keep them small, fast and focused. In tutoring sessions, participants were trained to develop the ability to identify the smallest and fastest action that will produce the required learning and move forward.

11. Extracting learning

The field data showed that participants experienced difficulties in extracting learning from the conducted experiments. To promote innovative behavior, individuals must pay attention to unexpected information or events, meaningful comments and how feedback could be used to improve the original idea.

12. Implementing learning and idea adaptation

Individuals more prone to innovation had the ability to extract meaningful learning from an experiment and implement that learning back into the project to adapt the idea and make it evolve in a meaningful way.

“To promote innovative behavior, individuals must pay attention to unexpected information or events, meaningful comments and how feedback could be used to improve the original idea”

IV

Men vs. women: who performs better in competitive environments?

Are men more competitive by nature or is that a biased belief? Some research has shown that women underperform in competitive environments compared to men and are more likely to avoid such environments in their careers.

If that were true, it would lead to a gender gap in wages, either because women are less effective in certain **competitive environments** or because they are less likely to seek promotions.

However, other research has shown that women's underperformance in competitive environments depends on the task and the gender composition of their competitors.

In light of these contradictory findings, ESADE Associate Professor Pedro Rey Biel and his coauthor Nagore Iriberri from the University of the Basque Country conducted a study to gain insight into **whether women underperform** in competitive environments and, if so, why.

The researchers ran several behavioral experiments with 640 male and female participants. In each session, half the subjects were men and half were women. The subjects were not told that the experiment included a gender study to prevent biased perceptions.

The experiments consisted of two tasks, which the subjects performed in sequence in two four-minute periods. One task involved spatial relations, a skill that men are supposedly better at. The other involved verbal and memory skills, an area in which women tend to outperform their male counterparts.

Pedro Rey Biel

Pedro Rey Biel is Associate Professor of Behavioral Economics at ESADE. He holds a master's degree in economics and finance from CEMFI (Bank of Spain) and a PhD in economics from University College London (United Kingdom). Before joining ESADE in April 2018, he was a tenured faculty member at the Autonomous University of Barcelona.

Since 2008, he has held a visiting position at the Rady School of Management at University of California San Diego (UCSD), where he has taught MBA courses on managerial economics and strategy. Prof. Rey has also been the lead behavioral scientist behind All of Us, the United States Precision Medicine Initiative started by President Obama.

Prof. Rey's research combines theoretical and empirical methodologies, as well as laboratory and field experiments to understand economic decision-making and how it is affected by the design of proper incentive schemes that take into account the complex array of behavioral traits behind human motivation.

Relative underperformance and stereotype threat

The results show that women underperform only in specific situations. “We found relative underperformance by women only in competitive environments in very specific contexts,” said Prof. Rey.

When women know their rival is a man, it seems to **trigger a stereotype** that makes them feel threatened. That, in turn, leads them to underperform. “Specifically, we found women underperformed only in the task believed to favor men and only when the rival’s gender was revealed or when the women were informed that their rivals were ready to start competing,” Prof. Rey explained.

What does this mean exactly? The experiments demonstrate that when the rival’s gender is not revealed, the two genders **tend to perform similarly**: men showed an average improvement in the number of correct answers of about 5, while women improved by about 6.

However, when participants were provided with information about their rival’s gender, men on average improved by 8 answers while women improved by only 3.

In other words, when men and women know their opponent is of the opposite sex, men’s performance improves by 75%, while women’s performance declines by almost 50%.

> “The experiments demonstrate that when the rival’s gender is not revealed, the two genders tend to perform similarly”

Manipulating information

So technically women's underperformance does not depend on their rival's gender itself, but on their **preconceived stereotypes** of their opponent's sex before they perform the task.

"Our findings demonstrate how manipulating the information given to men and women before they perform a task influences how they will perform in competitive environments. Women are more likely to underperform when they are provided in advance with **information about their rivals' gender** and supposed gender-based differences," said Prof. Rey. "If women believe they are about to perform a task that favors men, their performance will tend to decline."

When researchers briefed participants with gender-related information, such as telling women whether the task they were about to perform tended to favor men or vice versa, they found the belief that they were performing a "male" task caused female performance to decline significantly.

"Based on our evidence, it seems that **omitting or emphasizing gender-related information** can weaken or reinforce previous perceptions about differences in tasks and competitive abilities, thereby affecting performance," the authors explained.

"The effect of correcting false preconceptions about women's relatively lower ability to perform jobs traditionally considered male should be studied, since such perceptions are not true."

> "Women are more likely to underperform when they are provided in advance with information about their rivals' gender and supposed gender-based differences"

V

Leadership and engineering: the missing pieces in the machine learning era

The most sought-after profession at any organization interested in implementing machine learning is that of data scientist. Leadership and engineering are essential, but their role in the successful deployment of machine-learning models in production is often overlooked. Nowadays, industry is realizing that the only valid machine-learned models are those in production. In this article, we discuss how leadership and engineering are essential to monetizing machine-learning initiatives.

Nowadays, we refer to the capability of machines to be extremely competitive at a specific task in a particular domain as artificial intelligence (AI). As Daniel Dennett argues in his book *From Bacteria to Bach and Back: The Evolution of Minds*, we are creating **extremely competent machines** that have no understanding of the world whatsoever. Nonetheless, machine learning (ML) – a subfield of AI – is transforming all sorts of organizations, businesses and government bodies in unprecedented ways.

This is a natural consequence of two factors: a) the availability of data as a result of the digitization of words, and b) an increase in computing power. Both of these factors are **growing at an exponential pace**, so this is just the beginning of a new ML age. However, although the press surprises us every day with new ML applications that perform better than experts at certain specific tasks, ML techniques are reaching a plateau.

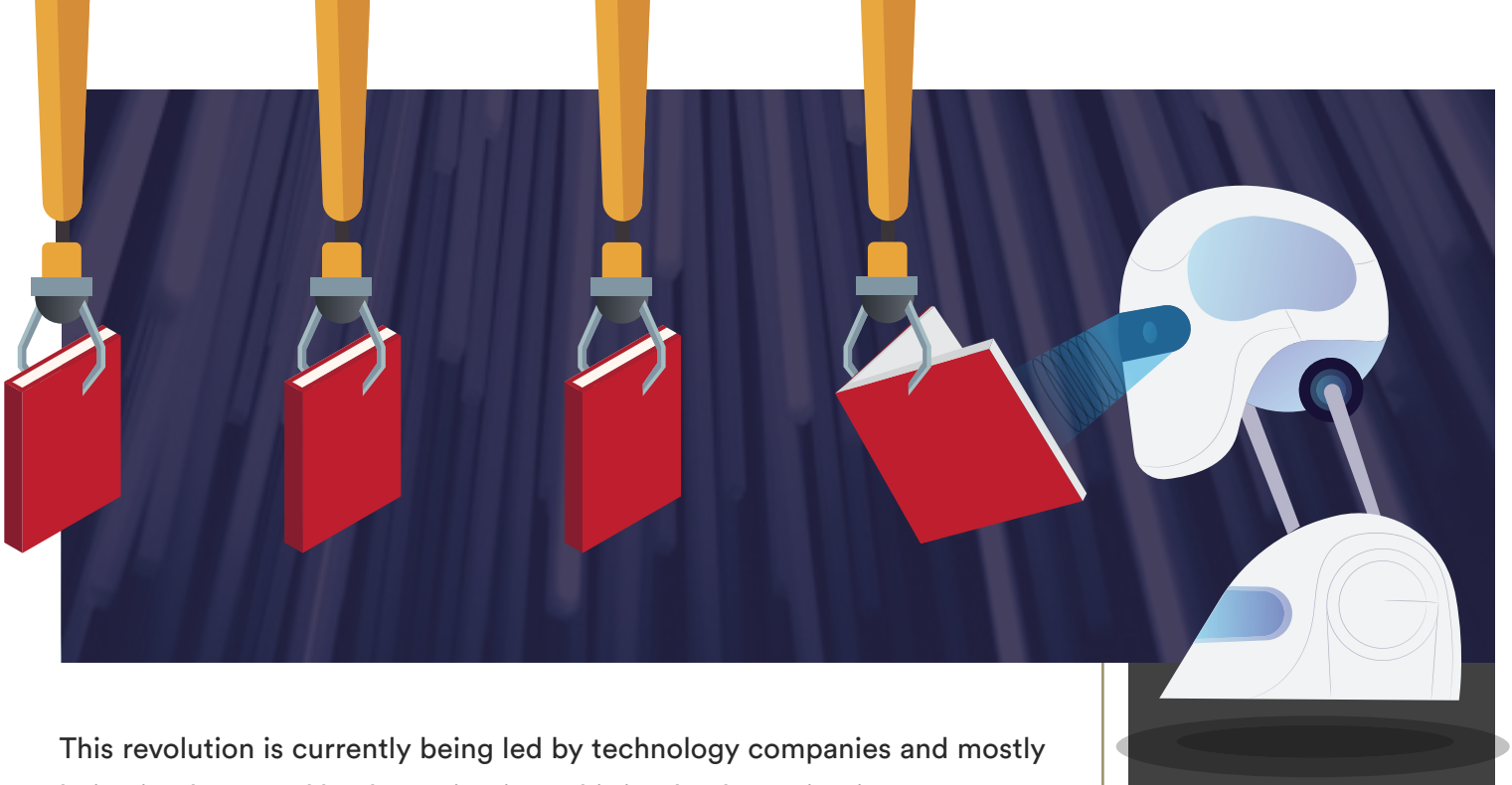
The innovations produced at the global scale are merely incremental. A few years back, most newcomers to the field saw deep learning as the solution to all AI problems. Nowadays, more people have started to understand the limitations and can see **how far we are from general or strong AI**. The focus thus turns to robust engineered solutions that make use of well-known techniques.

Marc Torrens

Marc Torrens is a computer science engineer from the Polytechnic University of Catalonia (UPC) in Barcelona. He holds a PhD in Artificial Intelligence from the Swiss Federal Institute of Technology (EPFL) in Lausanne. Prof. Torrens has published more than 20 papers in journals and has attended numerous international conferences. He is also the inventor of more than 20 patents on recommendation and personalization technologies.

Prof. Torrens's research focuses on how artificial intelligence can be applied to solve problems that people and businesses commonly face. He is convinced that artificial intelligence technology will help humans overcome longstanding challenges and dramatically improve our lives.

Rather than following a traditional academic career, Prof. Torrens spent more than 20 years creating startups related to artificial intelligence. He cofounded Strands, Inc. in 2004, an established and recognized global fintech company working for top-tier international banks, including Barclays, Deutsche Bank, BBVA, ING, Bank of Montreal, BNP Paribas, Santander and Discount Bank, to name just a few.



This revolution is currently being led by technology companies and mostly being implemented by data scientists. This is why data scientists are among the most sought-after professions nowadays. Data scientists understand data and know how to create ML models that discover hidden patterns in large data repositories. They are enthusiastic about fine-tuning models and finding the right parameters for a specific scenario.

However, data science is not enough for organizations to benefit from ML in production. We are seeing a process of democratization of ML: various platforms and libraries[1] are lowering the barrier to the incorporation of ML in non-technology companies. From my point of view, the data-science and experimental part of ML will be less relevant and **good leadership and engineering practices** will make all the difference. The ML industry therefore also needs a new kind of profiles corresponding to leadership and engineering.

There is a huge difference between building a ML model for a specific task and embedding such a model in the heart of an organization. In other words, there is a huge gap between having a model that works in the lab and preparing a model for people to use in their products and services. Most organizations nowadays aim to include ML in their businesses, but **few are effectively embedding those models** into the organization's actual processes.

As ML has matured, it has become clear that leadership and software engineering are essential to any ML initiative. Although most attention has been focused on data science, specialized **leadership and engineering** are also needed in order to bring ML into the heart of industrial organizations.

> "Machine learning (ML) – a subfield of AI – is transforming all sorts of organizations, businesses and government bodies in unprecedented ways"

[1] BigML.com, DataRobot.com, TensorFlow.org, aws.amazon.com/machine-learning

Software engineers are responsible for embedding ML into production IT systems in order to make model outputs actionable for businesses. This requires integration with data sources, automation of ML workflow, and links between ML predictions and production IT systems.

Leadership and business development are essential to the ML lifecycle. ML initiatives must be driven by the needs and goals specified by business developers. This new job requires a **new type of leadership with knowledge of ML** from a business point of view. New leadership should:

- Understand the overall ML lifecycle, from problem definition to maintenance in production.
- Be familiar with the main types of ML models, in particular what they do, what they need and what output they produce.
- Understand the various ways to evaluate a model in order to estimate the benefit for the business of a given model and task.
- Be able to interpret a model that is gaining new knowledge of a domain in order to improve decision-making.
- Understand that ML is based on an experimental science that is not yet automated or industrialized. ML projects should therefore be managed iteratively to deal with uncertainty.

There is no doubt that ML is changing all sorts of organizations in unprecedented ways. In the recent years, most attention has focused on data science, which is the expertise needed to develop models in order to discover hidden patterns in large datasets. However, **this new era requires a new type of leadership** and engineering that is capable of a) making business sense out of ML through new actionable business insights, and b) bringing ML models into production IT systems at the heart of organizations.

> “Software engineers are responsible for embedding ML into production IT systems in order to make model outputs actionable for businesses”

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