To succeed in AI, unlearn IT:
Cognitive automation is not data logistics

1 Predictions on the impact of artificial intelligence (AI) in our society vary, but they all share a common theme:

It will be massive. Management consulting firms have estimated AI's total contribution to the global economy by 2030 in about 14 trillion US dollars, a figure larger than the GDP of any country except the United States and China.

A survey of 979 experts by the Pew Research Center concluded that by the end of this decade the rise of artificial intelligence will make most people better off, but will also challenge our conception of what it means to be human, to be productive and to exercise free will. More dramatically, think tanks like the Brookings Institute, have warned of its geopolitical implications, "Whoever leads in artificial intelligence in 2030 will rule the world until 2100".

Biotechnology and pharmaceutical companies are not exempt from the opportunities posed by AI. Novel algorithms, greater computing power and huge datasets will support dozens of applications across the pharma value chain. Pharmaceutical R&D can benefit from AI through applications that go from de novo small-molecule design and new biomarker identification to targeted therapy development based on genomic data and prediction of drug interactions, permeability and patient response.

Commercial and medical units in pharmaceutical corporations can also leverage new computational techniques. Comprehensive KOL mapping and landscaping algorithms, virtual patient engagement assistants, marketing predictive analytics, sales force optimization and nonlinear relationship estimation with HEOR real-world-data are some of the use cases that can benefit commercial or medical affairs functions.

Despite this range of opportunities, pharmaceutical corporations still struggle to integrate AI in their operations. From incomplete data or technical capabilities to unclear strategic intent or poor timing, artificial intelligence projects face significant and unexpected roadblocks to success. After delivering over fifty projects in the field of machine learning and data science, we have identified three challenges that executives need to address to ensure success.

2 The three core challenges to successful corporate AI

First, there is a lack of understanding of AI's capabilities and limitations among decision makers.

Artificial intelligence is a new and still immature technology. While specialists may grasp its technical details, there are no established conceptual frameworks or standard strategies that help non-specialists to understand where the value lies and how to fit it into the organization.

One common problem is to conceive of AI as a new form of IT. In our experience, this approach inevitably leads to failure. Traditional IT can be broadly summarized as automating information logistics (storing, sorting and transporting). However, the aim of artificial intelligence is to automate much more complex cognitive tasks. A good illustration of this is the difference between an airplane's autopilot system, a form of AI, and the pilot's cockpit dashboard, a form of IT.

In this metaphor, the artificial intelligence system is not merely transporting or presenting information, it is making decisions about the plane's direction. Every genuine artificial intelligence project is also a strategy project because AI impacts decision making, and thus the overall direction of the company.

Second, corporations face significant data constraints.

Most AI solutions depend crucially on historical data, which is often lacking in terms of quality, legal hurdles, or simply, availability. Many organizations struggle with these barriers as they require a long-term, sustained and cross-functional effort to overcome them. To scale data capabilities, the organization needs to implement and adhere to data capture points into crucial workflows. If the frontline worker does not care about data quality, all effort is lost. To capture data, corporations need to care.

In addition, the right data may not be found internally. Strategic partnerships, acquisitions or licensing agreements might be necessary to make the organization rich in high quality data assets. Data readiness is a responsibility for corporate development and, albeit seemingly technical, it should land directly on the agenda of senior management.

And third, there is often confusion regarding the type of talent and organizational structure needed to implement AI solutions.

One common misconception is the myth of the "AI expert", that has led many organizations to compete in a furious arms race for that perceived missing ingredient to unlock value. Costs are high and results often disappointing.

The true bottleneck does not lie in specific technical skills, but in people who can navigate the big picture, based on a thorough understanding of technical capabilities. Many organizations already have in-house what is now called "AI". The underlying enabling technologies are not new. Rather than building new technical silos, corporations should empower existing people, and build the organizational foundations to accommodate artificial intelligence, integrating them tightly with industry expertise and corporate vision.

3 A comprehensive formula to tackle the challenges

The three limiting factors above must be considered together to create a coherent approach to AI.

Reaping the benefits from artificial intelligence is a long-term effort at the intersection of fast-moving, converging technologies. This calls for a strategy, not a one-off initiative, to manage risks, limit costs and navigate through uncertainty towards real value.

Deploying an artificial intelligence strategy should start with opportunity discovery. This step combines an analysis of the external artificial intelligence landscape, considering data resources and technology state-of-the-art, with a review of the organization's requirements. Both efforts will allow the organization to brainstorm, evaluate and map opportunities into three categories: opportunities to implement immediately, options for which the company must build data, technical or talent foundations, and ideas that will benefit from strategic pathfinding. We have found that a narrow focus on quick-wins or lighthouse projects, often chosen for feasibility alone, can be distracting from the long-term sources of competitive advantage.
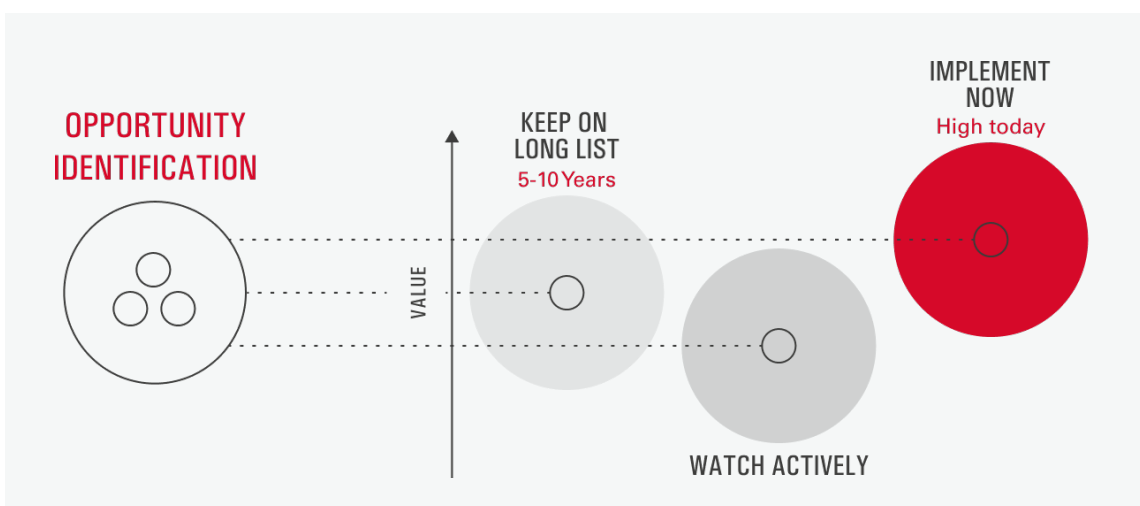
Opportunities that seem ready to be implemented immediately go through four phases:

Proof-of-Value, Proof of Concept, implementation and, once operational, lifecycle management. From our experience, proper execution of the Proof of Concept phase is the most critical step. It brings science and its methods, to data science.

Firstly, it is all too easy to get carried away by new technological possibilities, thus forgetting to look at ROI in a sober manner. It may be exciting to be able to predict the number of customers arriving within the next 24 hours, but does that really change anything? Secondly, we have found that doing PoV first allows us to do the PoC in a more focused manner because the key value drivers often only become clear when looking at ROI in a structured way. We treat the Proof of Concept phase as an experimental effort that rigorously establishes the capacity of AI tools to deliver value within the scope of the opportunity. The ideal way of executing the Proof of Concept is through a set of sprints that finish with a go / no-go decision gates at the end of each sprint. Sprints and gates allow us to re-categorize early on ideas that lack feasibility, thus mitigating risks and costs.

If an opportunity cannot be implemented immediately -and that can be observed both during the opportunity discovery or Proof of Concept phases- it might be because either the company lacks foundational capabilities to execute it, or because AI technology is still immature to deliver the expected use case.
To build the right foundations and create data readiness, corporations need to orchestrate various lines of work. Historical data needs to be excavated, gathered and curated to assure quality. IT systems must be adjusted to expand information capture. Employee workflows should be remodeled to guarantee that everyone cares for data capture and acts accordingly. Company talent must be trained to understand the basics of data science and its value. A communication and scoping bridge must be built between AI specialists and the rest of the organization.

Finally, when current state of the art technology cannot deliver the desired results, the company should be disciplined in strategic pathfinding to keep the opportunity alive on the strategic horizon. The biggest opportunities may lie in technologies that are just emerging. Strategic pathfinding integrates AI technology monitoring and evaluation with a roadmap to build the enabling and foundational requirements to leverage them. Through pathfinding, executives and their teams can prepare themselves now to be in the pole position for applications of artificial intelligence that will blossom in three, five or ten years.
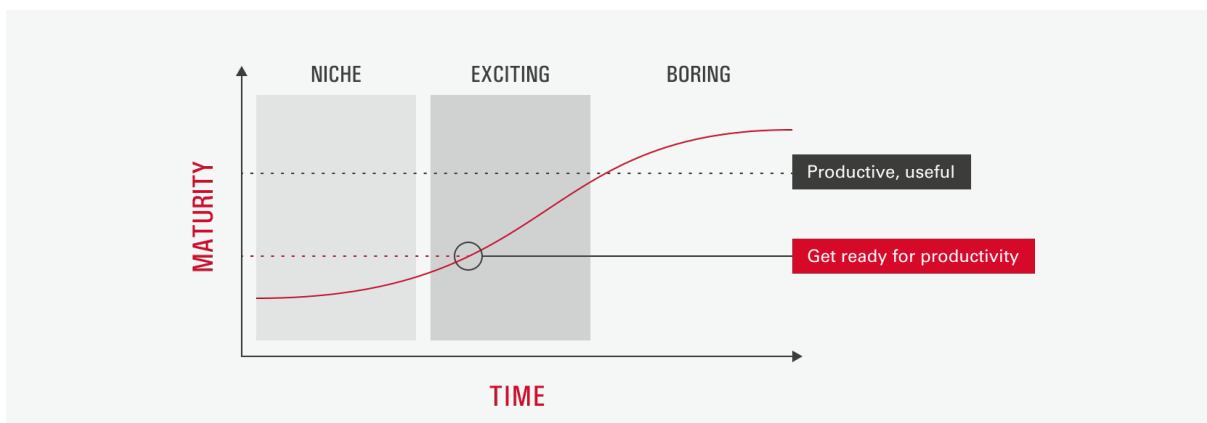
The range of AI use cases in the pharmaceutical and biotechnology industry is rapidly expanding. From the application of old-school decision trees to predict drug adherence to the use of massive deep learning models trained on the whole corpus of scientific literature to help researchers support or reject biomedical hypotheses; opportunities abound. However, to leverage successfully these opportunities, managers need two things: to be aware of the challenges and to have a plan to overcome them.

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