# Embracing innovation

## Artificial intelligence and real opportunities

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# Artificial intelligence explained
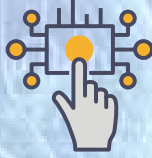## Everything you need to know
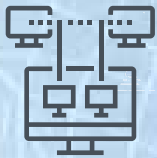
### Decision management
Introduces rules and logic to AI systems so they can be used for setup, training, and ongoing maintenance

### Deep learning
A type of machine learning that builds, trains, and tests neural networks that predict outcomes and/or classify unstructured data

### Expert system
Emulates and mimics human intelligence, skills, or behaviour; usually has expert knowledge in a particular field, topic, or skill

### Inference engine
Makes logical deductions about knowledge assets to enhance business intelligence

### Knowledge-based system
Understands the context of data being processed; used in problem-solving procedures and to support human learning, decision-making, and actions

### Machine learning
Allows computers to learn by employing pattern detection for improved decisions in subsequent situations

### Natural language generation
Generates language from non-language sources such as spreadsheets or metadata

### Recommendation engine
Identifies and provides recommended content or digital items for users

### Reinforcement learning
A machine learning technique that enables software to learn in an interactive environment by trial and error using feedback from its own actions

### Robotic process automation
Mimics and automates human tasks to support corporate processes

### Speech recognition
Identifies, categorises, and cross-references the actual substance or meaning of speech, not just individual words

### Virtual agents
An animated, human-like graphical chatbot embedded with a predefined script and responses

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# What Watson did for the AI conversation

**Jim Boland**, **IBM Project Management Global Centre of Excellence leader, discusses the development and evolution of the company's supercomputer**

The year 1997 was a defining moment for artificial intelligence. That's when IBM's supercomputer Deep Blue defeated the reigning world chess champion Garry Kasparov. And following that success, in the early 2000s, the company sought to accomplish what was previously thought to be impossible – building a computer system that could process and understand massive amounts of data in the realm of human language and knowledge.

The tech giant settled on developing a computer system named Watson – in honour of IBM's founder, Thomas J. Watson Jr – that could compete on the TV show *Jeopardy!* When Watson again emerged triumphant in 2011, AI had officially entered the mainstream.

Project Management Institute (PMI) recently recognised Watson as one of the 50 most notable and significant projects of the past 50 years. The ranking highlights the ways in which project management transformed these groundbreaking ideas into reality.

Here, Jim Boland, IBM's head of the Project Management Global Centre of Excellence, shares his insights into the development and evolution of Watson and AI.

**What was the initial goal with Watson?**
The first challenge was to develop a software application running on the right hardware that could digest a huge repertoire of information and sort through a wide range of questions to win a competition like *Jeopardy!* The broader goal was to create a new generation of technology that could derive answers from unstructured data, in a way that is more effective than the standard search technology that existed at the time.

IBM wanted to move computers from being back-office calculating machines and bring them to the front office, helping to improve decision-making.

**How has Watson changed from its *Jeopardy!* days?**
Watson has evolved into a suite of AI applications and open source APIs. Watson evolved from a specific application developed for a particular challenge to a very broad suite of offerings. By combing near-instantaneous data analysis, precise decision-making, and the ability to understand human speech, Watson can help solve a number of AI challenges.

**From a project perspective, was having the very simple — though not easy — and measurable goal of winning on *Jeopardy!* helpful in the successful development of Watson?**
Like any large, first-of-its-kind project, you need to have a goal so that you can understand what success looks like. But at the same time, you need to, or should try to ensure that the foundations exist so that the technology can build

# Data provides companies with powerful insights

into something greater and more impactful.

If you look at the version of Watson that appeared on *Jeopardy!*, it needed to have the networking connectivity from the box that was there in the studio back to the infrastructure. It needed to have the right architecture, the software running it, and the speed and performance.

And then there was the body of knowledge. To bring all those components together in a complex project was of course very difficult, and that's why it's critical to know what success looks like.

**Do you think giving Watson a persona, if not necessarily a personality, helped the**

**public become more comfortable with the idea of artificial intelligence?**
Yes. For example, our Project Management Centre of Excellence recently developed a chatbot called Hugo for all of IBM to use. If anybody has a project management-related question across our 350,000-plus employee population, they can access Hugo and will receive the correct answer the vast majority of the time.

Hugo is now well known across IBM, and is a virtual member of our team. You can access Hugo 24/7 from anywhere in the world, via Instant Messenger, over e-mail, etc. All the ways you can contact a human, you can also now contact Hugo. And I think that's becoming an industry norm now in relation to chatbots and the

their jobs done quicker but also in a way that improves the overall customer experience? Customers want the right answer quickly. Sometimes that can be automated; other times it's less than optimal to interact with an automated answering service or a chatbot rather than a human. You can integrate it with robotic process automation where it's automating manual or repetitive tasks. There's huge potential in this space.

### In what other fields does Watson represent great potential?

There's tremendous opportunity to make improvements in health using technologies like AI. Take life sciences, for example. Currently, only 3-5 per cent of patients are enrolled in clinical trials, and it takes an estimated ten years from initial discovery to bring a new drug or treatment to market.

IBM offers solutions that help streamline clinical trial processes – not only helping patients to get on the right trial faster, but also shortening study build time and data capture. Our technology can help clinical research teams accelerate timelines, trim down costs and more efficiently launch and complete studies, bringing needed tools to patients sooner.

From a research perspective, Watson's doing a huge amount of work with some of the major clinics, academic institutions, and hospitals around the world, especially around Parkinson's disease, cancer, and diabetes.

### When the average person thinks of Watson, do they think about Watson being a *Jeopardy!* champion?

Watson was one of the founders of AI that is paving the way in which AI is applied to real-world challenges. And Watson, as important as it was, was one of a number of significant "firsts" that IBM has played a part in. We pride ourselves on our computer systems being instrumental in putting the first man on the moon. IBM machines even supported the first open-heart surgery. There are countless other historic events in which we have been involved from the start.

agents that interact with humans.

### What are some of the challenges or situations Watson is being used for now?

We're doing a lot of work with external customers in areas like knowledge gathering. Artificial intelligence is

# Artificial intelligence has already shaped history

really transforming how knowledge is extracted and then made available in an intelligent way to workforces within a customer's organisation.

A lot of organisations are looking at their most experienced employees potentially coming up to retirement over the next 10 to 15 years. The challenge for those organisations is taking all of that information and making it available to more junior employees or those who are just starting off their careers. That information has to be extracted, stored, analysed, and presented in ways to help those employees learn. Accordingly, it's a tool to help organisations become learning organisations.

And then there's customer care. How can we use AI to help customers get

AI signals opportunity for project managers, not obsolescence, writes **Mike DePrisco**, vice president, global solutions at Project Management Institute

# The future of work is nothing to fear

**A**rtificial intelligence has unleashed a wave of projects and possibilities, changing the way organisations and their employees live, work, and play. A recent survey by Gartner shows that close to 60 per cent of organisations have deployed AI. And more change will come. While those organisations currently have an average of only four AI projects in the works, respondents expect that number will jump to 35 by 2022.

But AI has also unleashed enormous anxiety and misconceptions among practitioners within the project management space. Quite simply, people are afraid for their jobs, convinced that AI and other technology means that humans will have limited roles and reduced impact going forward. To a great extent this fear is unfounded.

AI is no different in terms of disruption than any other technology that has been introduced in the last 50 years. For project practitioners, they need to learn about the technology, embrace it, and recognise the value-add that it brings to their organisation and to the customers they aim to serve.

For project managers, the impact of AI will be especially beneficial. As I travel around the world and meet with Project Management Institute members, I'm often asked: "Will AI replace what I do?" What PMI's most recent Pulse of the Profession® research highlights and confirms is that AI will actually create more opportunities for PMs, not less, and it will improve the opportunities for adding value. Certainly AI will likely automate many of the mundane tasks associated with a person's job. But it

# AI projects could jump from 23% to 37% in 3 years

will enable people to engage in more strategic work – work that needs to be managed by humans. And only humans can be creative and strategic, and lead and influence people as they adapt to change and disruption.

Our research also reveals that AI is changing how projects are managed. Over the next three years, project professionals expect the proportion of projects they manage using AI to jump from 23 per cent to 37 per cent, according to *PMI's AI Innovators: Cracking the Code on Project Performance*. In that context, project managers need to view AI as another tool to help deliver value for their organisation. They need to leverage AI's disruptive nature in a way that allows their organisations to achieve their most important and strategic projects and outcomes.

To do this, project managers don't need to be experts in AI. They don't need to be application developers or software engineers to know how to build the algorithms that inform machine learning, for example. But they do need to understand how they can leverage the data that AI produces in a way that enhances and optimises the team that they are leading and the outcomes that they are trying to achieve.

That means they have a responsibility to educate themselves on the various types of AI technologies that are being used and to understand what is most prevalent and most relevant for their particular industry. Project managers are going to have to manage projects that include multiple disruptive technologies – whether it's knowledge-based systems, voice assistance, speech recognition, or something else. And they need to be the conduit to help translate the power of that technology to drive project success.

The danger is not in the technology itself but in the fear of it. As has been the case too many times with disruptive technology, organisations talk about it, recognise the importance of it, and accept that it will change things and improve how value is created and delivered to customers. But they are slow to react when it comes to actually integrating it into their daily work.

They are slow to react not only because they don't fully understand it but also because integration requires a large investment of time, money, and resources. And organisations are sometimes hesitant to be leaders in terms of adopting this technology, unless they're in an industry where it is absolutely essential and is already part of their work.

The true test of AI will come down to the value it delivers, whether to customers or in terms of producing expected business benefits – or exceeding them. That's why I encourage project managers to understand AI and educate themselves about it. They need to recognise that it's another tool at their disposal, not something that will make them disposable.

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