Pace of change in AI, data and analytics

Highlights

Highlights from the Major Projects Association event held on 25th June 2024

MAJOR PROJECTS ASSOCIATION

Background

The pace and scale of both the development and the application of artificial intelligence (AI) tools is mind-boggling.

While it took Netflix 3.5 years to reach one million users, ChatGPT achieved this in just five days, achieving 100 million users just two months after launch.

The major projects professions cannot ignore this technological transformation. With proper coordination and focus, these new tools could help to unlock substantial value in terms of improved efficiency and increased outcomes, leading us towards a more efficient and insightful future.

This seminar was hosted by the Major Projects Association to help professionals to understand what is meant by AI as it covers a complex multi-layered landscape, involving a raft of new roles, new thinking and new opportunities.

It also shed some light on the implications for individuals and businesses and unpacked some of the technology, skills, data and cultural challenges presented by this new landscape, such as:

- What is AI and what can it do for us now and in the future?
- What are the opportunities and threats, in particular within major projects?
- What do we have to do to keep up?
- Which roles will stay and which will go?
- What can we learn from AI from outside of major projects?

'It's really good for us to recognise that underneath all the exciting possibilities of AI, there needs to be some really hard work to get our data right, because if the data isn't right, then the AI isn't right either. And then there also needs to be some really hard work to sort out the skills that we need to work appropriately with AI and to deploy it well. Put simply, data and skills are essential foundations for effective AI.'

Mark Enzer OBE, Strategic Advisor, Mott MacDonald

Appreciating bias in AI

The mindful design and use of AI to prevent the perpetuation and amplification of existing biases is becoming increasingly important.

The consequences of failure include the reinforcing of inequalities, the creation of new forms of discrimination, and an erosion of public trust in technology. Such biases arise from three primary sources:

- **Data bias** – where the training data is unrepresentative, leading to skewed predictions.
- **Algorithmic bias** – when lack of diversity among developers results in biased code design.
- **Human bias** – which influences the interpretation and application of AI outputs.

Notable examples of such AI bias include Amazon's recent hiring algorithm that disadvantaged women; the realisation that some AI facial recognition systems have been shown to be less accurate for non-white individuals; and in healthcare, where AI may offer lower-quality care recommendations for minority patients due to biased modelling.

To mitigate AI bias, more diverse and representative data must be sought while ensuring algorithmic transparency and ongoing monitoring and evaluation.

The goal is to create responsible AI systems that are just, inclusive, and beneficial for humanity and the planet.

'Tackling AI bias is not just a technical issue. It's a societal issue, because AI reflects where we are and who we are. Collaboration between data scientists, ethicists, people who deal in ethics, sociologists and other stakeholders, is going to make a big difference in helping us understand how to make sure that AI is just and unbiased and used for the betterment of human beings and the planet.'

Huda As'ad, UKI Capital Projects Lead, Accenture

AI bubble 'debunked'

Based on the standard definitions of 'artificial' and 'intelligence', a simple definition for AI might, therefore, might be a tool with the 'unnatural ability to reason and make judgements'. Put this way, it becomes clear that AI is not inherently frightening or magical.

A lack of understanding and absence of clarity around the potential opportunities from AI tools versus the risks presented still leads to reactions from professionals that range from excitement to apprehension and confusion.

AI's primary applications in construction involve planning, risk management and predictive maintenance – mostly within office settings, using large data sets – and encompass technologies like machine learning and natural language processing. Despite many fears, it should not be considered as a replacement for human jobs but instead, a tool that can enhance productivity and decision-making.

AI faces several barriers:

- A lack of understanding about implementation
- High perceived costs
- Cultural resistance
- Data privacy concerns
- Fears about transparency and accuracy

For instance, only 30% of professionals feel confident in implementing AI in their projects, and just over half believe it can reduce costs due to high initial investment. There is also a clear cultural resistance to change, and concerns that AI may not align with desired project outcomes or provide the desired – or designed – solutions.

To overcome these barriers, education and training must be increased across the profession to increase AI literacy. Pilot projects can also help organisations to integrate AI gradually, learning from small-scale implementations before broader application. Partnering with technology companies specialising in AI can also provide valuable insights and training.

'In general, in major projects, we are often slow to change, and with a pace of change that we have with AI, we find ourselves falling behind the curve. But it's not too late to catch up.'

Dale Foong, Chief Operations Officer, Movar

What are the opportunities for major projects?

Since 2007, when Google Maps was first introduced on mobile phones, the public's use of transport networks has been revolutionised.

This evolution has pressured operators to adapt their physical assets to these new demands, but effective asset management has historically been impeded by data silos and different teams working in isolation.

AI creates fantastic tools to help asset managers and designers use data to make better decisions about how networks operate. In particular we see machine learning offering solutions to uncover patterns, enhance decision-making and optimise operations.

Such tools can provide insights, predict trends, and detect anomalies in infrastructure assets which traditional methods may overlook.

However, at the heart of these data-hungry systems is the increasing need for effective data hygiene and integration of multiple sources.

While AI and machine learning can greatly enhance efficiency and productivity, their success depends on the organisation's readiness to adopt the new technologies, workflows and culture required to maintain this flow of useable data.

Two use cases illustrated these points. The first involved optimising maintenance schedules on the M25 highway by predicting traffic flow, allowing for more dynamic planning to reduce project time by 12%, thus improving safety and cost-efficiency.

The second use case focused on improving bus corridors' reliability by identifying and addressing infrastructure-related pinch points, thereby enhancing bus service efficiency.

'There will always be those who are a little bit more fearful, and always those who are trying to take a bigger step forward. The biggest tool that we've been able to use to help bridge that gap is pointing at real-use cases and the outcomes that demonstrate the deployment of AI and the benefits that it can bring.'

Anna Jordan, Co-Founder & CEO, Alchera Technologies

What should we do as individuals and organisations?

Construction has a long history of innovation and progress, spanning from early advances in the use of scaled drawings, to the industrial age of new technology's continuous improvement in efficiency. Yet by comparison, more recent efforts to innovate and improve productivity have largely just focused on reduced cost and have driven down quality.

The need to simultaneously drive out carbon from our built environment means a paradigm shift is imminent, and will be primarily driven by technological advancements such as AI.

Current challenges demand a new approach, particularly in decarbonising buildings and improving efficiency. AI is positioned as a transformative tool, offering solutions for carbon reduction and asset management. Moving construction efforts from sites to factories, where waste is minimal, is highlighted as a crucial step forward.

However, there is a risk of overhyping technology as the panacea. Instead, we must focus on practical applications and address foundational issues, such as the lack of machine-readable data in the construction industry, which hampers AI integration. Fragmentation and siloed working mean there is often a lack of unified data structure.

The use of AI tools must therefore be balanced with human intuition and decision-making to reverse traditional construction narratives. Success will be when we see a shift from carbon-intensive materials to sustainable ones, exemplified by the metaphorical challenge of retelling the 'Three Little Pigs' story backwards.

'We've really run construction into the ground in the last 20 years. We've just not really managed to move the dial on reducing cost or time – we still have variable quality, productivity is static and there is a pressing need is to decarbonise. We need to do things differently and for me, artificial intelligence offers the opportunity to change what we do.'

Dale Sinclair, Head of Digital Innovation, WSP

Future of the workforce

While AI is not set to take over all future employment, it is expected to automate some jobs, augment others and create new ones. This will see the need for a shift in job focus and skills development, and a new emphasis on the importance of so-called 'power skills' like communication and emotional intelligence, which AI cannot yet replicate.

The impact of implications of AI on the workforce fall into four main categories: jobs, efficiencies improvements, skills and learning and ethical considerations.

When considering the future adaptation of jobs to the AI era, a four-phase approach is recommended:

1. Deconstruct the existing jobs and roles.
2. Assess task performance.
3. Explore automation options.
4. Optimise roles.

Continuous learning and skills development are essential to keep pace with technological advancements and maintain competitiveness. In particular, ethical considerations such as fairness, bias, transparency and accountability are paramount.

A case study from a Dubai Government department illustrates AI's potential for enhancing existing work roles.

By using a machine-learning system, a methodology to first observe employee behaviour then predict productivity, allowed changes to be recommended that led to significant productivity improvements and cost savings.

'We can't just accept that AI is coming and that we're going to simply use it to replace tasks. As individuals we have to take some accountability and learn [about AI] because there is going to be a growing demand for these tech skills. That means continuous learning and skill development will become more important than it has ever been in the past.'

Dave Millner, Consulting Partner, HR Curator

Outside the echo chamber

'To generate financial returns from AI you have to have the technology and you have to have the people. But the big thing that really increases the probability of success is managing that human/machine collaboration – figuring out how to share knowledge between humans and AI. Structuring those interactions is all about the people – that is actually what makes it work.'

Dave Edwards, Co-Founder, Artificiality

The use of generative AI has huge potential for enhancing creativity and productivity, through its ability to use vast datasets to produce unique responses to identical queries.

However, this vast range of potential outcomes underlines the importance of managing the human–AI collaboration as AI becomes more and more deeply integrated into everyday decision-making.

In particular we are seeing the shift from algorithm-centric AI to the use of massive foundation models that are accessible on local machines via application programming interfaces (APIs).

This shift reduces cost and so democratises AI capabilities, allowing more organisations to leverage advanced AI without the need for huge investment.

However, the shift also centralises power within a few large companies capable of developing these models – leaving us potentially, subject to their preferences, biases and business models.

Three key trends shaping the future of AI productivity and decision-making are highlighted:

1. **The intimacy economy:** where trust in AI becomes paramount as machines handle more personal data. This transition follows the information and attention economies, emphasising deeper AI–human interactions.
2. **The rise of the agentic web:** characterised by overwhelming AI-generated content, making it challenging to discern human from machine-generated information.
3. **The post-humanist world:** a future where AI plays a significant role in decision-making, demanding new strategies to integrate AI with human judgement.

'Daniel Kahneman said that an organisation is a factory that manufactures judgements and decisions. That's what we do when we're at work. That's what we do as humans. So how is AI going to impact this?'

Helen Edwards, Co-Founder, Artificiality

'AI is out there already. This is not some kind of super-duper future thing that we're waiting for. It's with us.'

Mark Enzer OBE, Strategic Advisor, Mott MacDonald

Points for further discussion

- How do we communicate the opportunities of AI in a way that becomes accessible to people, in order to encourage adoption rather than reject it as too scary?
- How should we balance the focus on large language models with other developments in AI?
- What are the implications of integrating AI-based models in digital twins for infrastructure modelling and decision-making?
- How can we ensure the quality and reliability of data used in AI, especially in critical applications like infrastructure?
- What are the environmental and ethical considerations of AI development and deployment, including energy consumption and data privacy?

Chair

Mark Enzer OBE, Strategic Advisor, Mott MacDonald

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