

DELAY ANALYSIS WITH A HUMAN TOUCH



ANDREI SOLTAN
ASSOCIATE DIRECTOR
HKA

The article will look at what delay analysis involves now and opine if the traditional delay expert's days are numbered or how to adapt to remain relevant.

Given the current pace of technological development and how artificial intelligence (AI) already manages complex tasks (e.g. self driving cars) by processing large amounts of data, I am genuinely interested to know what delay analysis will look like in 10 years.

As we cannot predict the future, we cannot say for certain if we will be debating in 10 years from now about prospective vs retrospective, concurrent delays, the differences between the as-built and actual critical paths, the types of delay methodologies etc. Nevertheless, we could interpret the signs of our times to discern where the construction industry is heading and understand if we need to change how we do our work.

“When evening comes, you say, ‘It will be fair weather, for the sky is red’, and in the morning, ‘Today it will be stormy, for the sky is red and overcast.’ You know how to interpret the appearance of the sky, but you cannot interpret the signs of the times.”¹

Unlike the Pharisees and Sadducees back in Biblical times, we could interpret some of these signs to have a better understanding about the course of the construction industry and how that might affect the services we are currently providing, such as delay analysis:

- Climate change is upon us and ambitious plans and projects are put in place to contain the effects of greenhouse gas emissions;
- Technology is omnipresent and embedded in everything that we do, as we experience a digital transformation;
- We rely on computers to collect and digest a lot of data through machine learning (ML) and artificial intelligence (AI) to resolve complex tasks;
- Infrastructure owners and suppliers are creating communities like Project² committed to change the face of the construction industry by developing new business models embracing *“the creation of value driven, collaborative teams that can deliver investment programmes that secure the outcomes demanded by clients and the public”*,³

1 Matthew 16: 2-3, The New International Version Bible.

2 www.p13.org.uk/ (ICE, 2019).

3 Project 13, [From Transactions to Enterprises](#) (ICE, 2019).

- Nine out of ten projects with a value of over US\$1 billion go over budget or over deadline around the world, hence the objective need for improvement;⁴
- There is a urgent need for change in the construction industry which stems from the current low profitability rates with an average profit less than 0.5%.⁵



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We seem to be living in the age of urgency where waiting “*is not an option anymore, it’s a death sentence.*”⁶

I believe that changes in the construction industry will be dictated by the following main factors:

1. The need for innovation to meet the level of the challenges that we face (e.g. climate change, sustainable agriculture, desalination, scarcity of resources etc.).
2. The need to provide more accurate project forecasts around scheduling and cost for better performance.
3. The need to increase rates of profitability for participants delivering construction.
4. Interest within the industry to changing the business models from a traditional construction programme to an enterprise model.⁷
5. The future benefits of using AI and ML with their increased power for processing data, unmatched by human operators.

So, if changes in the construction industry and in our society are inevitable, what should delay analysis and its analysts do?

4 [Reducing the gap between cost estimates and outturns for major infrastructure projects and programmes](#) (ICE, 2019).

5 [Top 10 contractors under the cosh as margins slip to less than 0.5](#) (Building, 2019).

6 McKinsey - Quarterly 2018 page 44: [The tech-and data-enabled organization of the future](#) (McKinsey, 2019).

7 Project 13, [Blueprint](#) (P13, 2019).

Remain relevant - AI prospects

Is there an artificial intelligence (AI) transformation of industries? Great! Let's be part of that and understand the transformations brought by AI and ML.

According to a report from The Economist Intelligence Unit⁸, “over the next years, survey respondents expect AI to have a positive impact on growth (90%), productivity (86%), innovation (84%) and job creation (69%)”, and “94% describe AI as important to solving their organisation's strategic challenges”. According to the same report, “this widespread transformation of business and society enables machines to use powerful algorithms to perform tasks that previously required human intelligence. In many cases, machines can perform these tasks faster and with a higher degree of accuracy than human workers.”

Rings a bell? Remember when you had to go through giga bytes of information to prepare that delay expert report? Well, in the near future, the information could be processed much faster through machine learning with more insightful outcome.

I believe that understanding the mechanisms and applicability of AI & ML is key, as it will be part of our future. So, how to do that? Is it enough to read various articles or simply attend nPlan's⁹ presentations about their “analysis of the world's largest data set of construction schedule”? No, but it is a very good place to start. For example, nPlan's approach is to work “with a number of companies on a confidential basis to gather data which allows for analysis which can predict schedules and costs and labour models respectively”, as it was featured in the ICE's Report.¹⁰

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Time for a prediction

Considering the information at hand I dare to make a prediction that **AI, ML (technology in general) and delay analysts will need to coexist and find ways to work together**: no matter how fast and capable AI and ML becomes at interpreting data and making projections, it should foremost be transparent, understandable and easily explainable. The ML models cannot be some “Black Box” as branded by many, as the industry and certainly tribunals and the courts might reject or have little faith in their outcome.¹¹ What good is it to replace a Dark Art¹² with a Black Box, if you know what I mean.

Looking at time related issues and decoding the complexities of engineering projects will always require human interpretation as long as engineering projects remain the result of human ingenuity and creativity. Even though ‘AI will change the world in the next 10 to 20 years and will be the third technology revolution and change the way we do our jobs’¹³, we have the great advantage of human creativity and innovation.

Since we continue to experience changes and challenges in the construction industry we need to adapt and embrace the technological revolution to remain relevant and be part of the solution.

8 Business Intelligence, White paper: [Intelligent Economies: AI's transformation of industries and society](#) (Business Technology Media Company, 2019).

9 nPlan is a company “founded by experts in construction project delivery, mathematics and machine learning”, <https://www.nplan.io>.

10 [Reducing the gap between cost estimates and out-turns for major infrastructure projects and programmes](#) (ICE, 2019).

11 [Interpretable Machine Learning article](#) (Medium, 2019).

12 [Beware the dark arts! Delay analysis and the problems with reliance on technology](#) article by David Barry published in January 2009.

13 Jack Ma, on [creativity and innovation](#). He is a [Chinese businessman, Founder of Alibaba Group](#), “the largest commerce site in the world, bigger than eBay and Amazon.com combined”.

Play a proactive role

Since turning back time is not an option, it is perfectly understandable for contractors, project managers and clients to focus on finding solutions soon after problems arise during the execution of a project and not to have a wait and see approach.

I do not claim that the proactive approach to solving issues is a novelty today, but I have seen it emphasised more and more by Contractors and it makes perfect sense. So, we should firmly establish a proactive role for a delay analyst as well.

One example of proactive involvement is nPlan and their promised solutions to the construction industry. But, based on my current understanding of their approach, the solution of “*predicting the outcomes of construction projects to help understand [...] complexity and risk*”¹⁴ using machine learning seems to exclude the delay analyst or even delay analysis when generating predictions based on schedules. On the other hand, I was told by the CEO of nPlan¹⁵ that the predictions from the ML model cannot be explained in the sense that you cannot interrogate it to pinpoint the inputs (from the schedules) that led to a particular prediction (delay and risk related). I think this is an opportunity for the delay analyst to use his knowledge and experience and work alongside the ML models, if this is one of the ways forward.

Having said that, I dare to make other predictions.

The delay analysts will not code any time soon and AI and ML will not perform delay analysis for us and, more so, will not testify in Courts, but will have an impact on how the analysis is carried out and will assist with some of the repetitive and time consuming tasks. I see no danger in this as I consider it an amazing opportunity for machine-human collaboration to deliver fast, fact based, comprehensive, easier to understand delay related expertise addressing the past, present and the future status of the project.

The use of AI and ML will have to start small with processing of data, but, eventually, a more advanced form of AI will leave the delay analyst free to focus on assisting the client to handle more complex issues and playing a proactive role rather than being an observer and decoder of the projects' complexities.

Conclusions

As Wayne Gretzky once said, ‘*I will skate to where the puck is going to be, not where it has been*’.

I would venture that the traditional delay expert's days are not numbered, and AI and ML will not become a replacement, but the way delay analysis will be done in 10 years from now will have to keep up with the changes in the construction industry and not be estranged from the technological revolution.

No matter how technologically driven the construction industry becomes, delay analysis will always need a human's touch.

¹⁴ <https://www.nplan.io>, (nPlan, 2019).

¹⁵ Dev Amratia, Co-Founder and CEO at nPlan.