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Smart Contracts & AI in Construction

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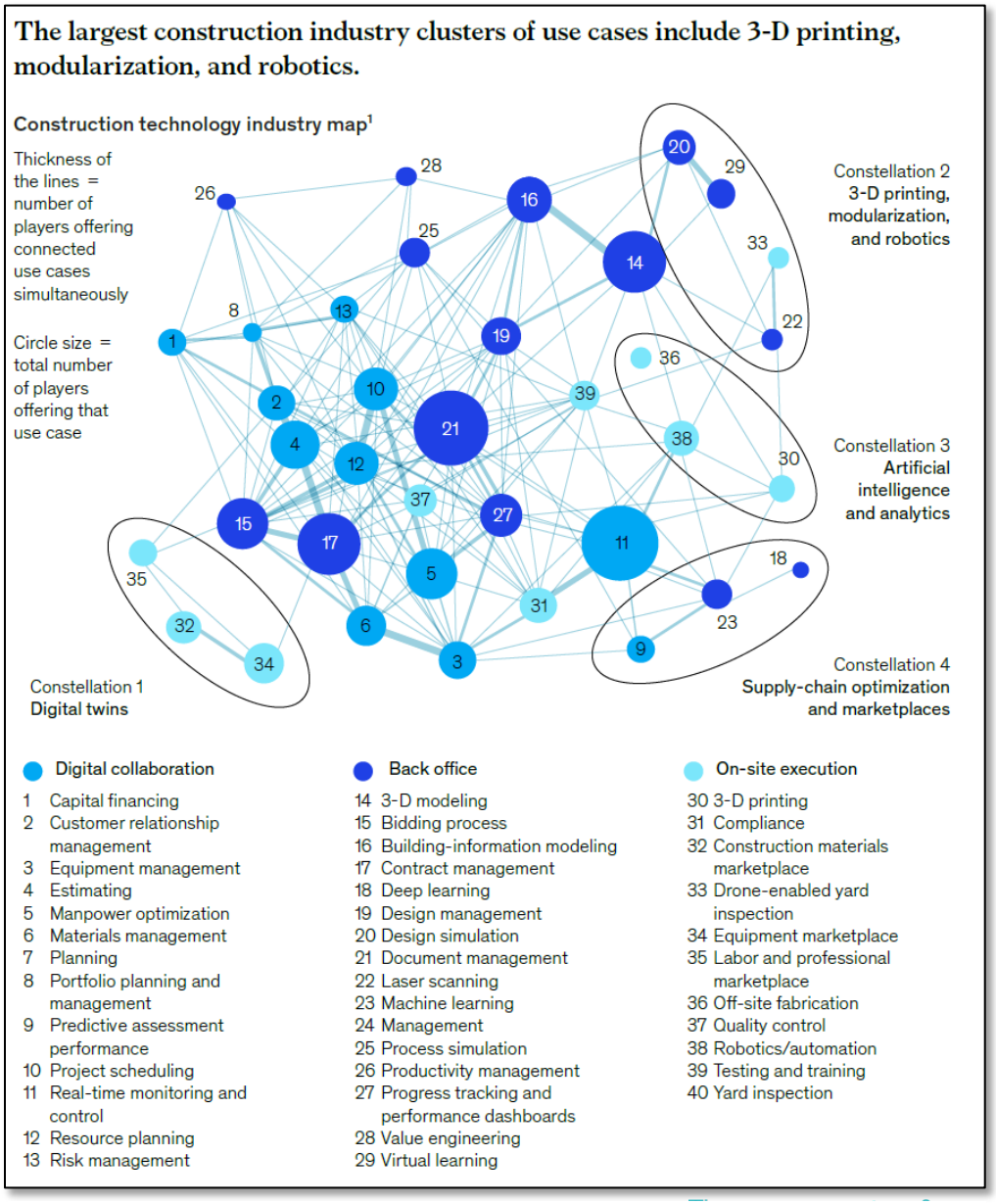
Digital Technologies: Already a reality

Construction Tech

- Robotics
- Drones (UAVs)
- The Connected Jobsite
- 3D Printing
- VR / AR
- Digital Twins
- Smart Buildings
- AI/Machine Learning
- IoT, sensors



Rise of the platform era: The next chapter in construction technology, October 2020, McKinsey

Here now & on the horizon…

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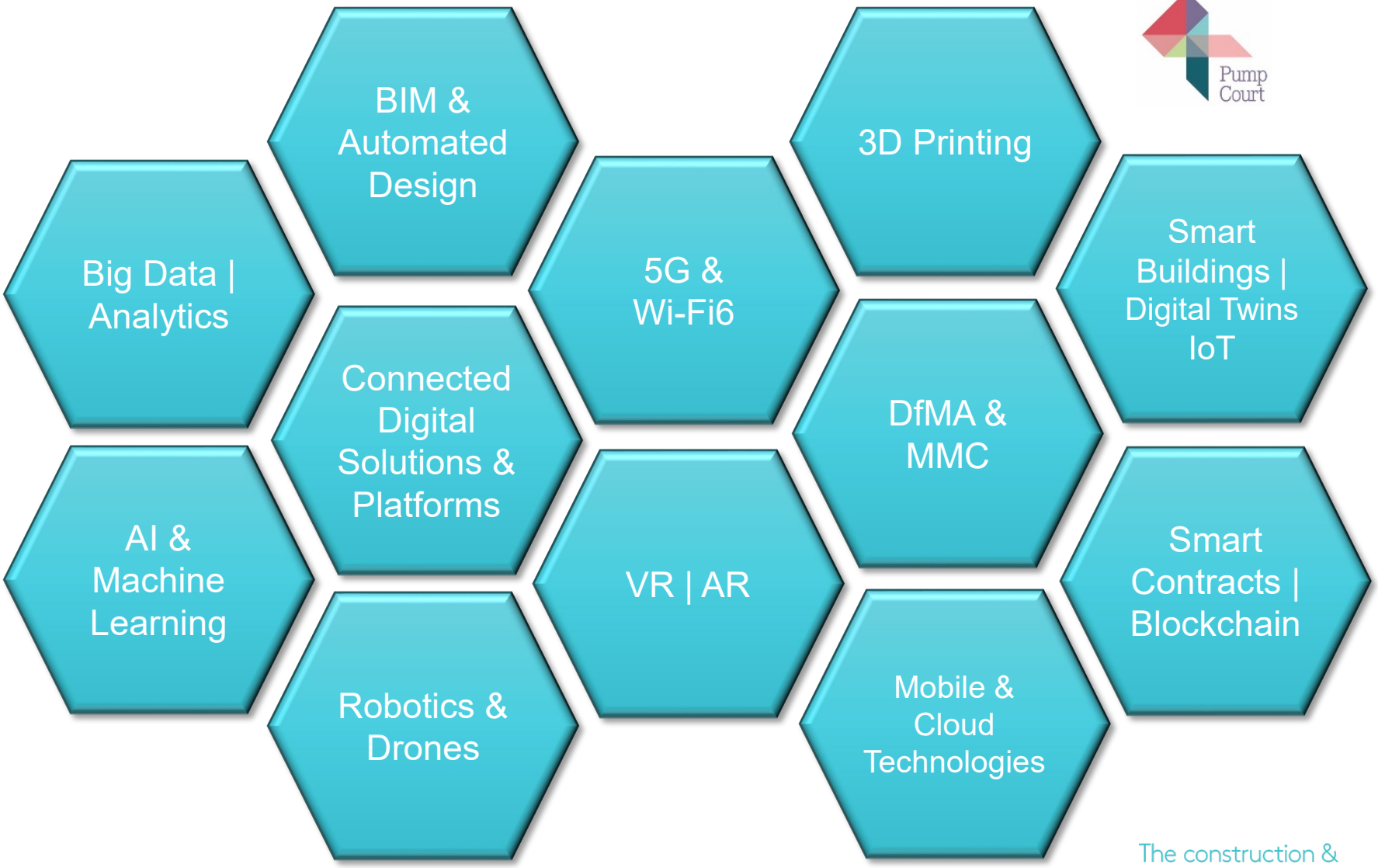

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Today's Agenda

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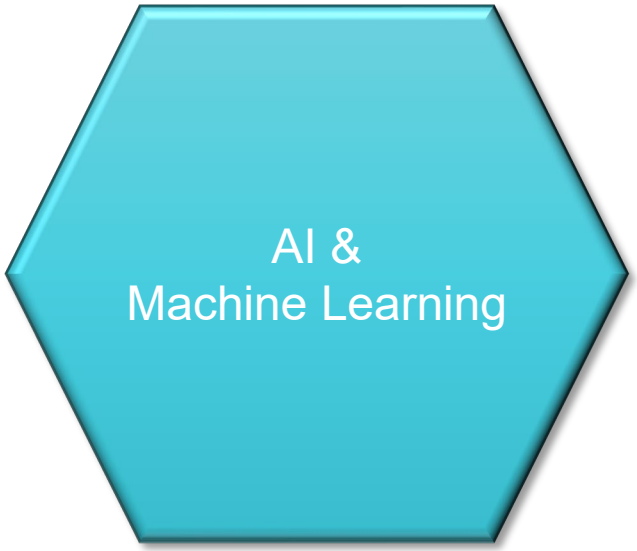

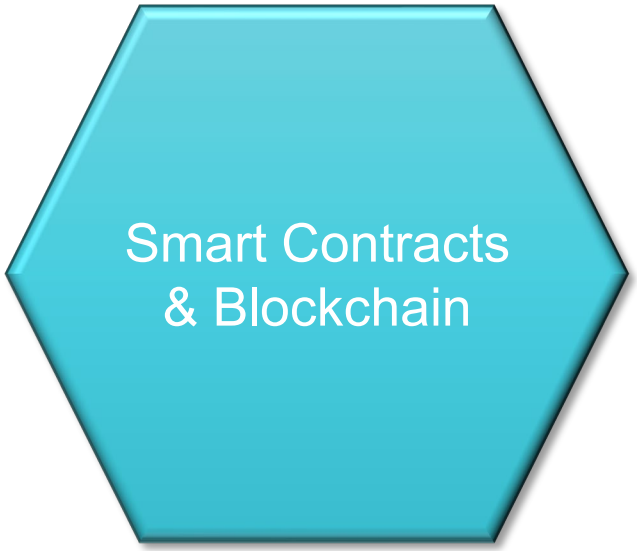

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Today's Agenda

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- The tech: defining "smart contracts" and "AI"
- Example use cases of AI and smart contracts in the construction and energy industries
- Legal issues

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The tech:
Defining “smart contracts” and “AI”

The tech: smart contracts

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- What is a smart contract?
  - Where blockchain fits in.
  - A set of promises, specified in digital form, including protocols within which the parties perform on these promises.
  - A recording of a legal agreement between parties that is written in a language that is both human-intelligible and machine-readable, whose text incorporates an algorithm which automates some or all of the performance of the agreement

The tech: smart contracts

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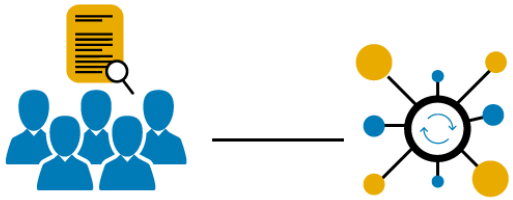
1

An option contract between parties is written as code into the blockchain. The individuals involved are anonymous, but the contract is the public ledger.

2

A triggering event like an expiration date and strike price is hit and the contract executes itself according to the coded terms.

3



Regulators can use the blockchain to understand the activity in the market while maintaining the privacy of individual actors' positions.

Source: Deloitte University Press, DUPress.com

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The tech: smart contracts

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- Automaticity – a key feature.
- The need for AI?

The tech: AI

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- What we mean by AI
  - The machine learning element.
  - ML: A form of data processing which identifies patterns from that data.

The tech: AI

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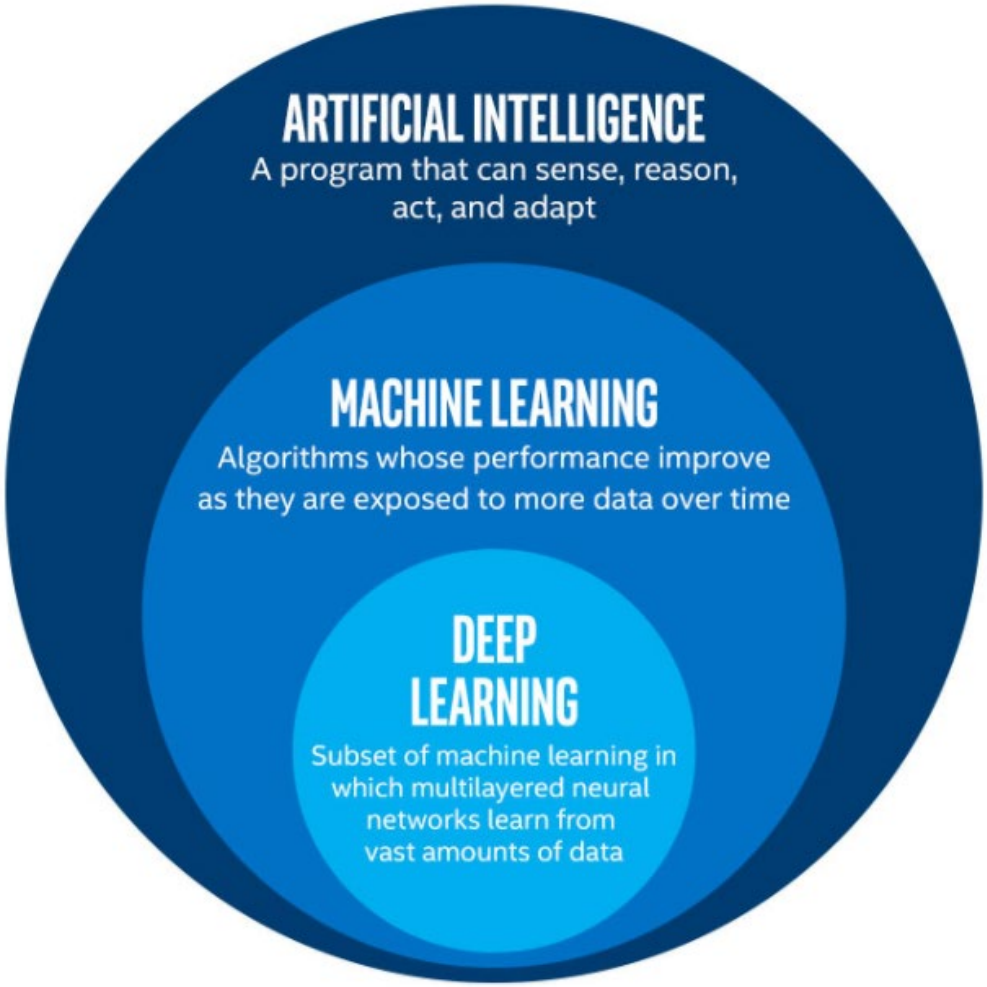

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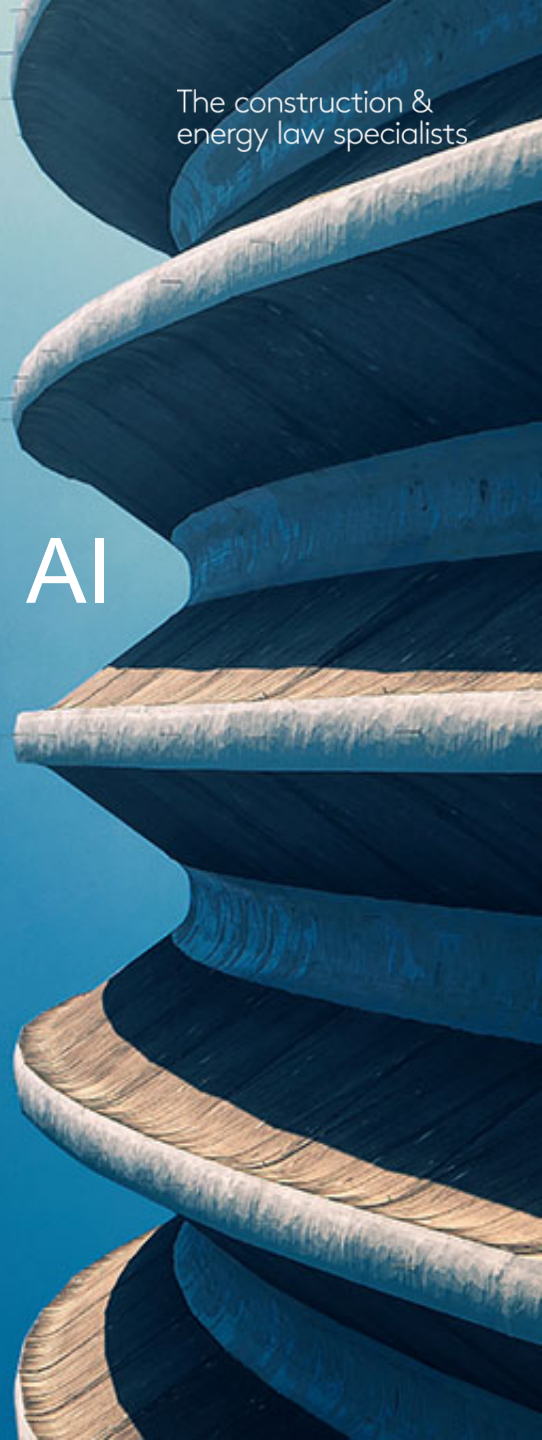
Use cases: smart contracts and AI



Use cases of smart contracts and AI

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- AI: Design – DNN and generative design
- Automated vehicles: Volvo Construction Equipment and Build Robotic
- Anomaly detection in design, construction and operation
- Smart contracts
  - Weather Ledger (NEC) example
  - Payment Transactions | Data Transactions

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AI enhanced design

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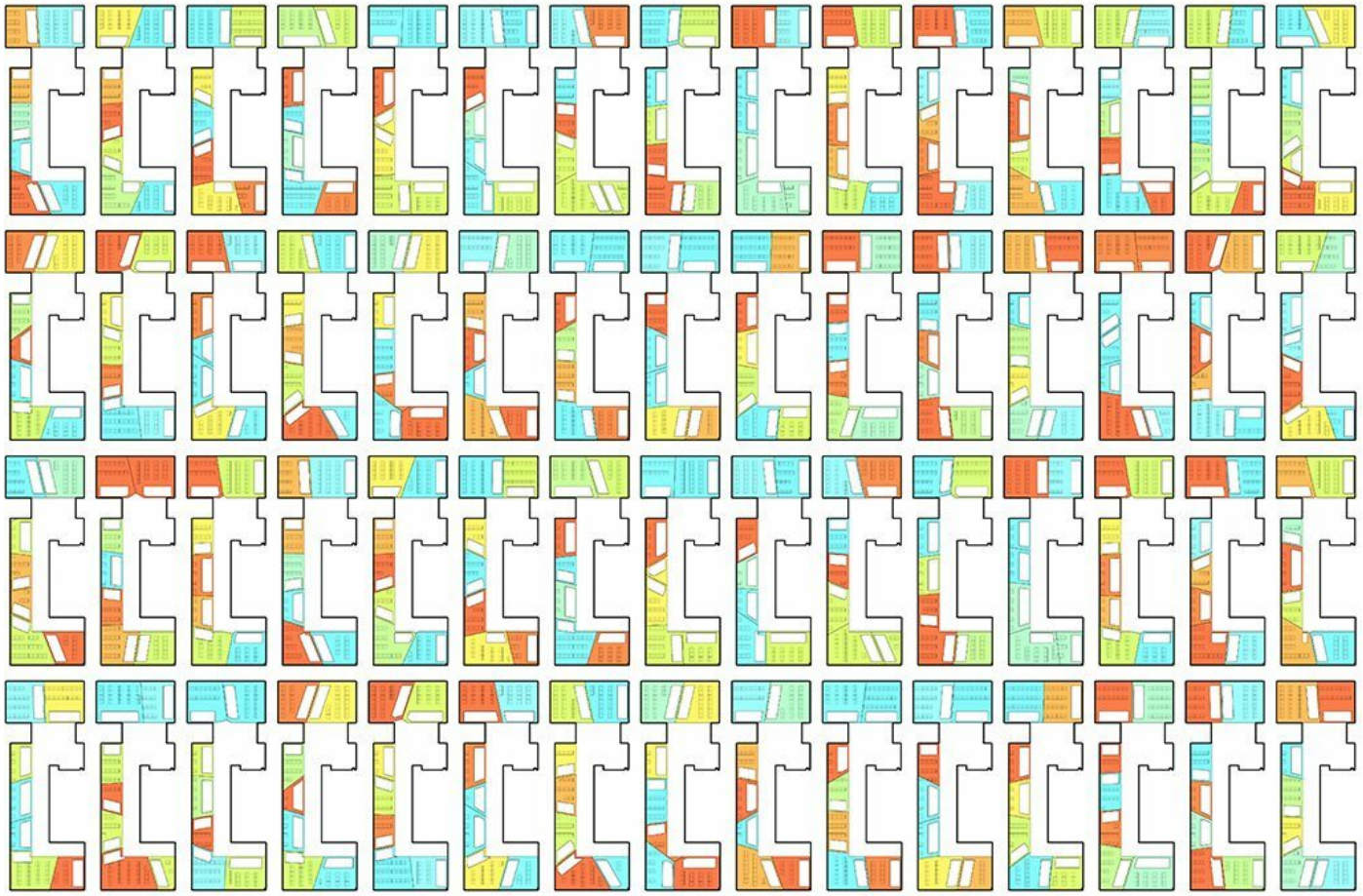

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Automated vehicles

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ML: Anomaly Detection (Pattern, trend and image recognition)

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- **Design**
  - Anomalies in models or documents
- **Construction**
  - Anomalies in design v as-built
- **Operation**
  - Analyse data in real-time
  - Digital twins | Smart buildings
  - Predictive maintenance to help with delays and downtime

Smart Contracts | Smart Clauses

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The Weather Ledger (Digital Catapult)

- IoT and distributed ledger technology to automate the execution of weather-related clauses in standard NEC contracts.
- Sensors are used on site, data and databases collected and connected.
- Not automation of the entire of the contract, but rather elements of the weather-related clauses using blockchain and smart contract technology.

Smart Contracts | Smart Clauses

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The Weather Ledger (Digital Catapult)

```
money + snack selection = snack dispensed
```

(Nick Szabo)

```
weather data + contract conditions met = CE
```

(Oversimplified)

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Smart Contracts | Smart Clauses
Blockchain | Distributed Ledger

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Recording & Executing Transactions: Payment | Data

- Automation of payments (milestone based, event based)
- Automation of ordering materials
- Tracking and documenting deliverables
- Record and monitor events, transactions, documentation/data
- Shared visibility / project dashboard
- BIM & Blockchain – asset management

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Legal issues

The importance of data

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The data…

Drone and video footage, photos, texts, WhatsApp, Slack, emails, Teams chats, BIM models, contracts, sub-contracts, sub-sub-contracts, specifications, schedules, site diaries, turnstile/biometric clocks, CDE, shared project platforms, timesheets, asset databases, electronic invoicing and payment records, weather records, correspondence, order forms, social media, programmes, etc…

"…***a watershed moment***…"
(WEF, *Digital Transformation: Powering the great reset*)

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The importance of data

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The data…

- The increased use of new technologies has highlighted the significance and importance of data and data management.
- It is no longer about static, siloed 2D drawings/documents, transferred intermittently and manually, but rather:

  real-time connection of models, data and databases

- Consider data issues throughout the course of the project and afterwards:
  - *access to data*
  - *data usage and expectations*
  - *licensing*

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The importance of data

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Access to data

- Consider throughout the course of the project and afterwards:
  - Who has the right to access the platform? Even in the event of non-payment?
  - Will the platform exist in 6-12 years' time?
  - Who hosts/licenses the platform(s) during the project and after?
  - Is the data backed-up and/or extracted on completion of the project?
  - ***Trant Engineering Limited v Mott MacDonald Limited*** (2017)

The importance of data

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Right to use the data / database

- ***77m Limited v Ordnance Survey Limited*** (2019)
  - Did 77m infringe on OS's database rights, if it had any such rights, when it created a dataset called "Matrix", which consisted of geospatial coordinates and addresses in Great Britain, a competitor of OS's product called AddressBase?
  - 77m used at least 18 datasets from different sources to do so, several of which came from OS.
  - Yes – OS did have database rights as it had substantially invested in a verification process, and 77m did not have a license to use it.

The importance of data

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Right to use the data / database

- The use of other companies' data and databases in design, construction and operation, or for the purpose of developing new products and processes to do so, is part and parcel of construction and energy projects.
- Whether a company has rights over particular datasets depends on the facts.
- ***Software Solutions Ltd v 365 Health and Wellbing Ltd*** (2021)
  - Issues of copyright and database rights
  - Important to understand what rights and licenses, both express and implied, are in place prior to embarking on the development of new innovations and advancements in technology.

The importance of data

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Data usage and expectations

- What data will be used to value the works?
- ***Premier Engineering (Lincoln) Limited v MW High Tech Projects UK Limited*** (2020)
  - Premier provided labour to MW – charged on an hourly rate.
  - Premier considered that it was underpaid £1.3m.
  - Timesheets and turnstiles records did not align – biometric clocks introduced. All three told a different story. What data was to be used to evidence the hours worked: timesheets, turnstiles or biometric clocks?
  - Judgment: an agreement between the parties that timesheets and biometric clocks would be used to calculate payments and not the turnstile data.

Legal issues: where we are now

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- The Legal Statement on Smart Contracts and Crypotassets.
- In respect of smart contracts – cryptoasset cases (including ***B2C2 Ltd v Quoine Pte Ltd*** [2019] and [2020]).
- Legislative examples which apply to the use of AI:
  - Autonomous vehicles;
  - Copyright of designs generated by an AI; and
  - AI specific aspects of data protection law.

Interpreting a smart contract in the event of disagreement

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- The usual rules of construction
- Expert input
- Points to consider:
  - What is there to gain.
  - How the protocols are phrased.
  - Parameters for risk.

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Physical damage/pure economic loss/professional duties

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Who should be liable for design and construction errors when elements of the design and plan for construction were the product of AI?

- Breach of contract.
- Professional negligence.
- Product liability.

Physical damage/pure economic loss/professional duties

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"the categories of negligence are never closed"

(*Donoghue v Stevenson* [1932] AC 562, Lord Macmillan at page 619).

"Special considerations come into play where the professional is dealing with design or techniques which are "state of the art".

Jackson and Powell on Professional Liability, 8th Edition,
Chapter 9, Section 3(a) at §9-098

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Assigning liability in the event of breach

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A starting point:

- Do you understand the protocols or the parameters?
- Do the terms of the agreement limit the use of AI in any way?
- In the case of AI and smart contracts, what are the terms of engagement with the software developer? Who is liable if there is an adverse event? Have they limited or even excluded their liability perhaps altogether?
- Is there an entire agreement clause with the developer? If so, have all their representations been reflected in the agreement?
- Is the developer who is coding your smart contract or designing your AI model recognised in this area?
- Insurance.
- Training and monitoring.

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Thank you!
Questions?

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