



Understanding and maximizing the value of AI

ROWAN BRAHAM



WA

- Armadale Road to North Lake Road Bridge Project
- Rio Tinto Gudai-Darri – SMP
- METRONET Morley-Ellenbrook rail line
- MRWA Great Eastern Highway
- MRWA Swan River Crossing



NT

- Larrakeyah Redevelopment and HMAS Coonawarra Naval Operations Facilities



QLD

- Australia-Singapore Military Training Initiative
- Inland Rail - CWP Central Program



NSW

- Central Station Main Works
- Parramatta Light Rail
- Sydenham Station & Junction
- Novo Rail
 - Redfern Station Upgrade
- More Trains More Services
- Muswellbrook Bridge Replacements
- ARTC Muswellbrook Bridges
- Inland Rail - CWP Central Program
- Transport Access Program



SA



VIC

- Princes Highway East, Kilmany
- SEPA Level Crossing Removal Program
 - SEPA Maroodah Highway, Lillydale
 - SEPA Manchester Road, Mooroolbark
 - SEPA Hallam Road South, Hallam
- SEPA Cranebourne Line Upgrade – Package B
- SEPA Union Road, Surrey Hills
- SEPA Mont Albert Road, Mont Albert

NATIONAL SPECIALIST BUSINESSES

- Rail Operations
- Select



One of Australia's Top 10 Most Innovative Companies. **Again.**



Laing O'Rourke
Engineering the future

laingorourke.com



Laing O'Rourke has been named at #8 on the *BRW* 50 Most Innovative Companies list for the second year in a row.

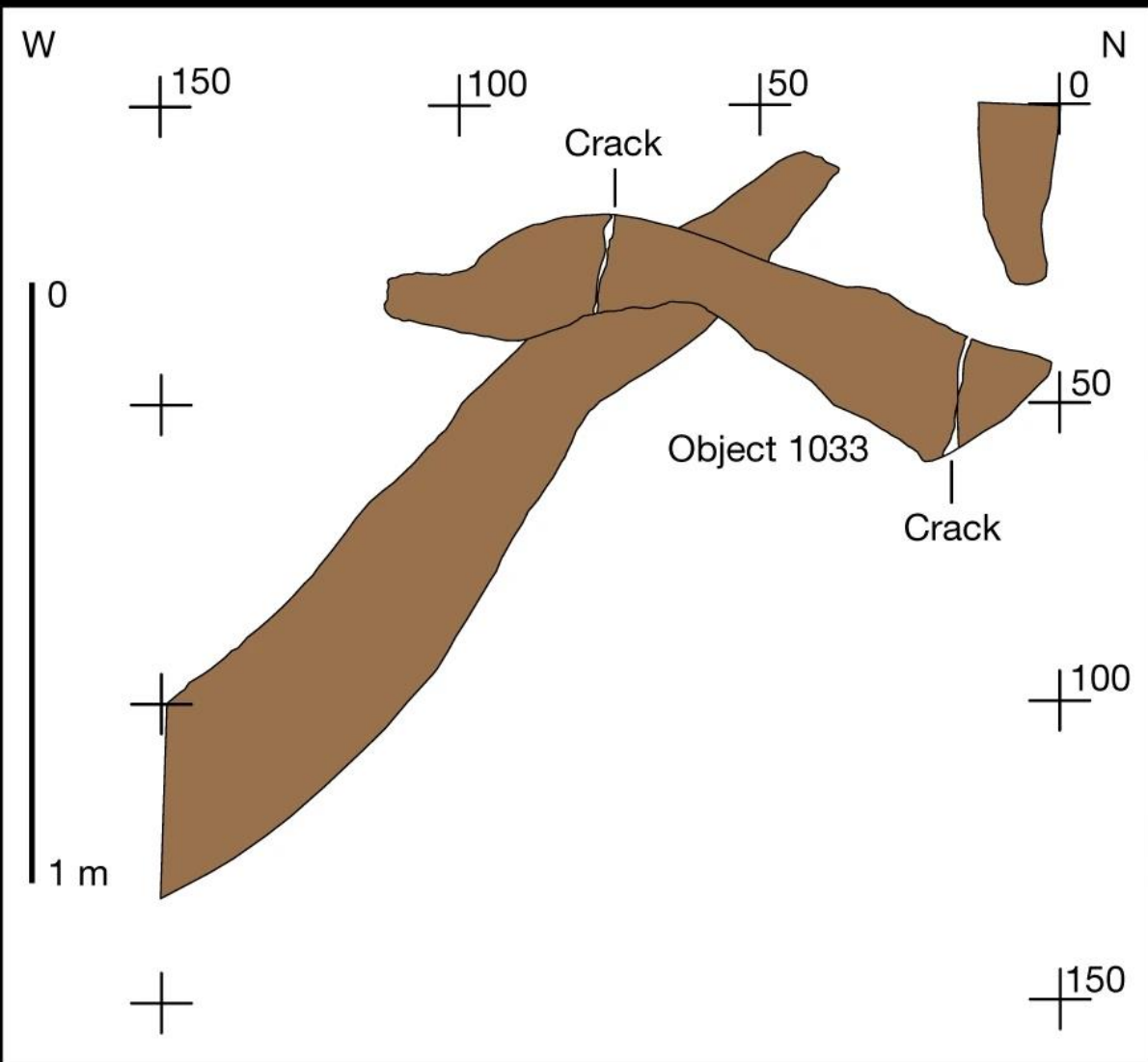
We've continued to develop our unique in-house R&D operation, the Engineering Excellence Group, as well as showcasing new innovations like our patented SunShift hybrid solar diesel solution for remote infrastructure, a smart hard hat to monitor the health and wellbeing of construction workers, large-scale 3D printing and robotic prototyping for complex construction modules, an internal innovation platform that allows our people to explore, rate and recommend each other's ideas, and the LORAR+ Augmented Reality app, that allows clients and communities to step inside infrastructure before it is even built.

These are just some of the ways we're committed to engineering the future.

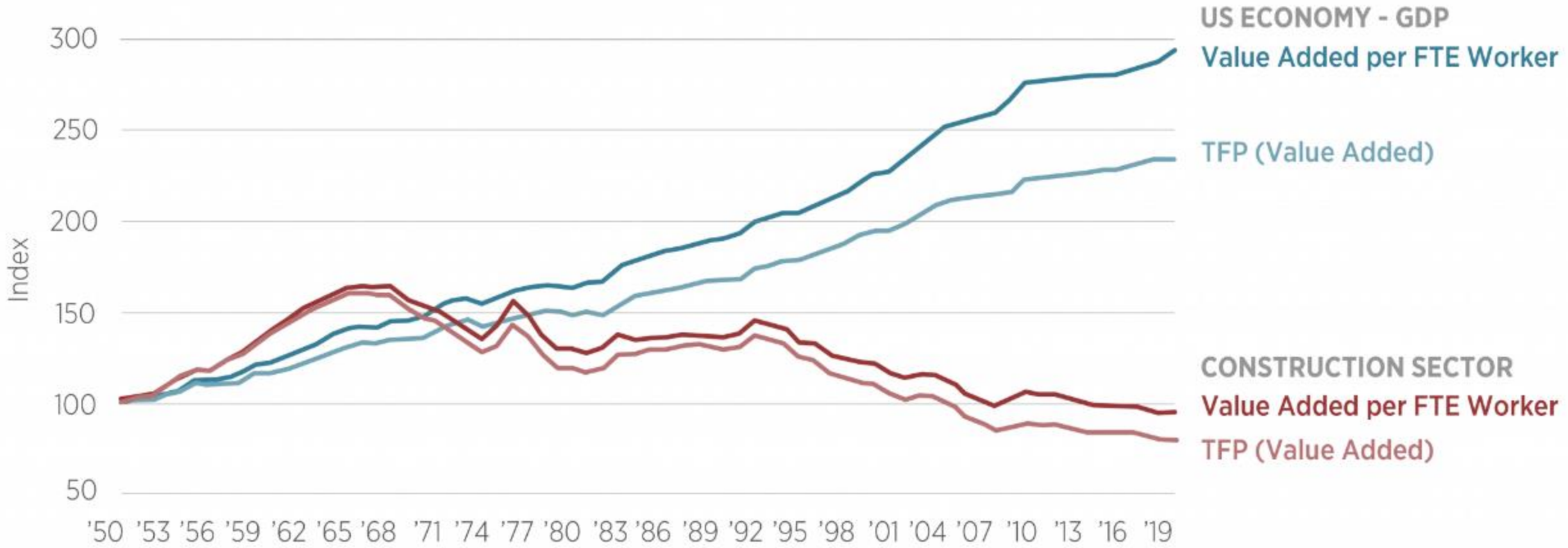






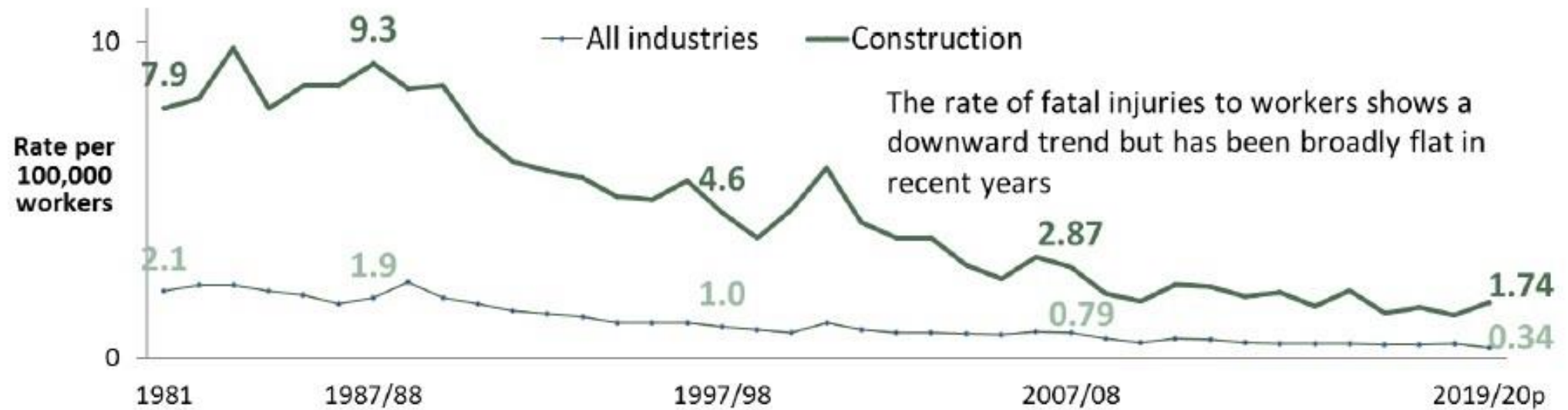


Indexes of Value Added Per Full-Time-Equivalent (FTE) Worker and Total Factor Productivity (TFP), Overall US Economy and Construction Sector (BEA Data)

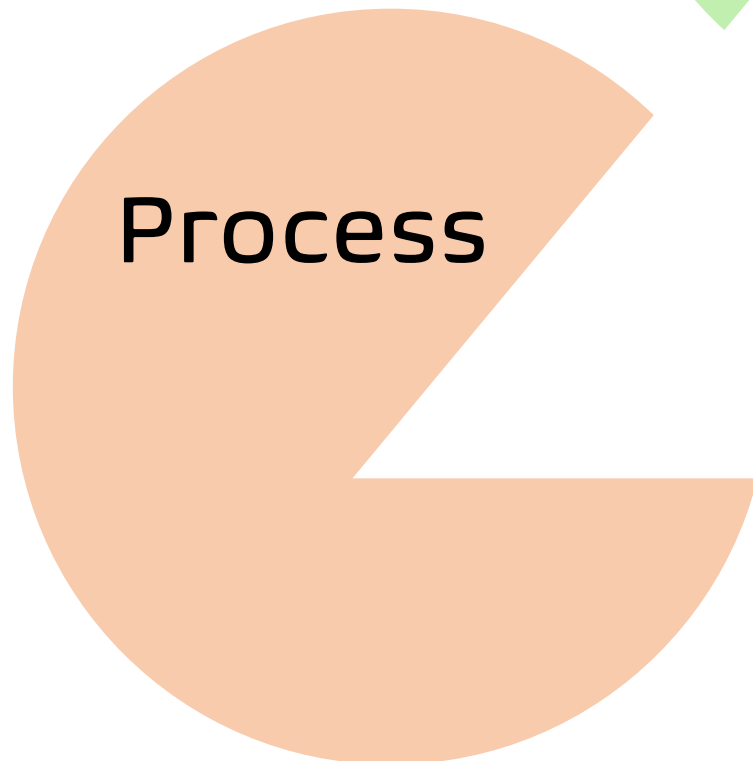
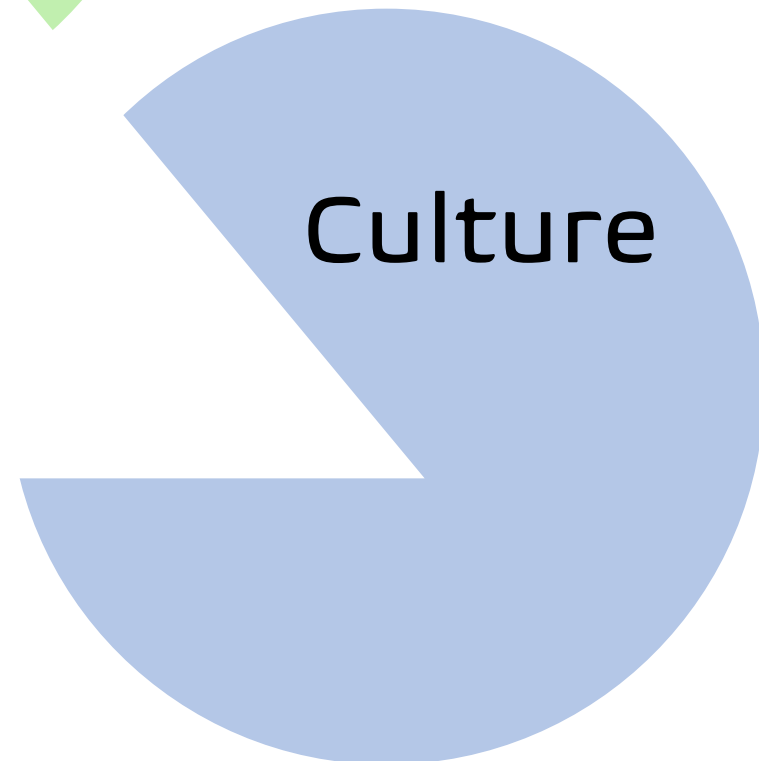
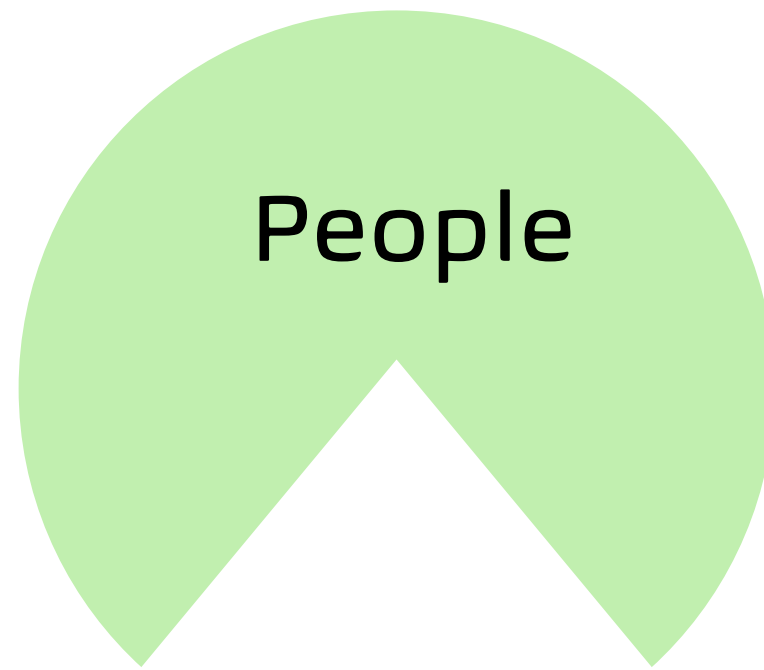


Rate of fatal injuries

Changes over time



Source: RIDDOR, 1981 to 2019/20



Process - \$1 billion in infrastructure



Pre-contract

3%

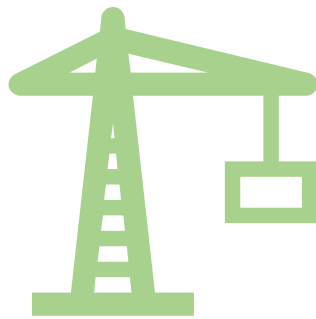
\$30 million



Design

14%

\$140 million



Delivery

65%

\$650 million



Handover

4%

\$40 million



Overhead

14%

\$140 million

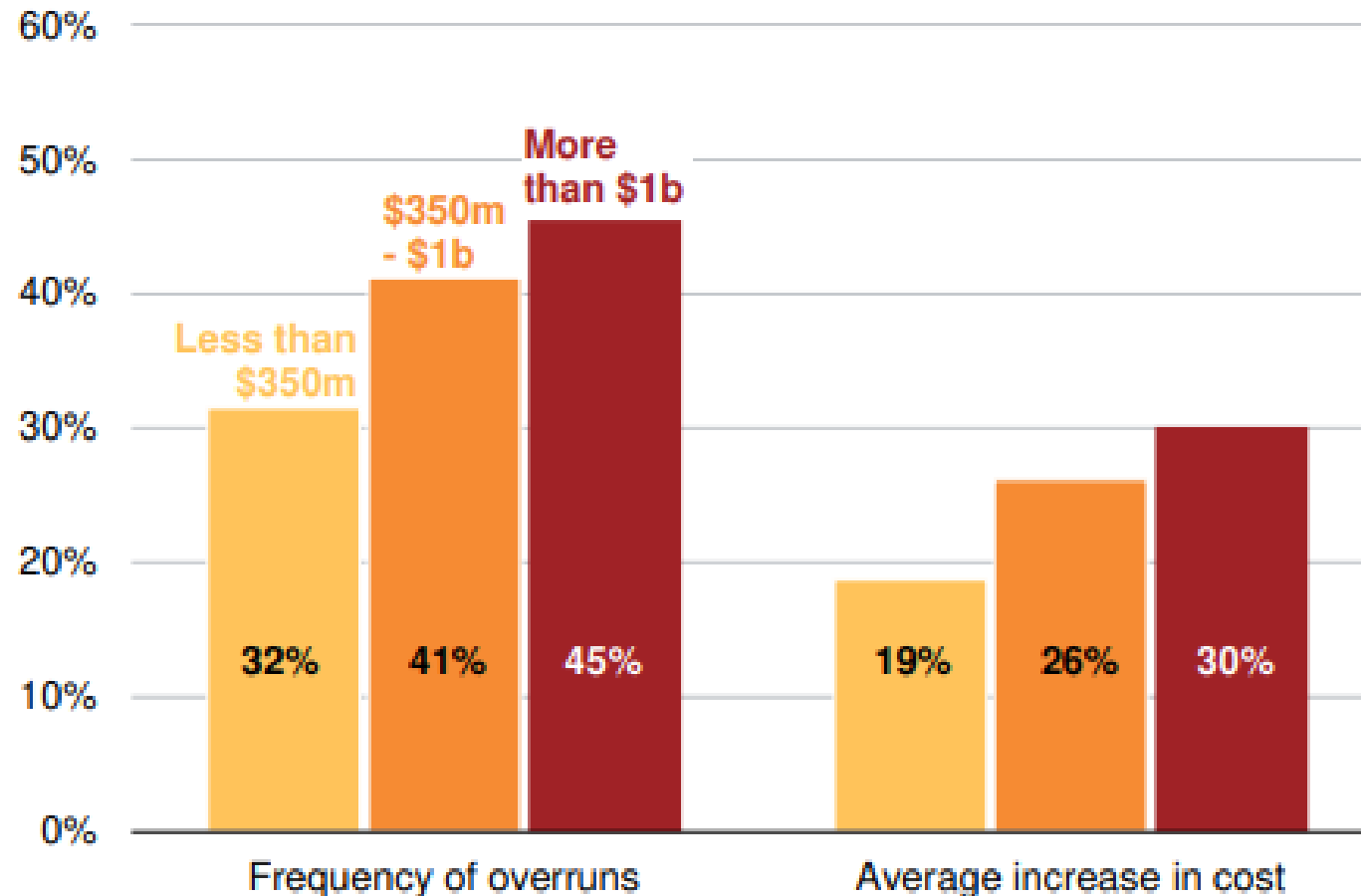
Pre-contract – The cost of failure

30%
win rate



70%
waste!

Size and frequency of cost over-runs



Note: Includes all public road and rail projects costing more than \$20 million that were completed between Q1 2001 and Q1 2020.

Source: Grattan analysis of Deloitte Access Economics Investment Monitor.

Design and planning – embedding safety

AI and the transformation of social science research

June 2023 · Science 380(6650):1108-1109

380(6650):1108-1109

DOI:[10.1126/science.adf1778](https://doi.org/10.1126/science.adf1778)

Analysing PC1's with AI

Pairwise potential thought processes and remediating suggestions

Describe the Event:

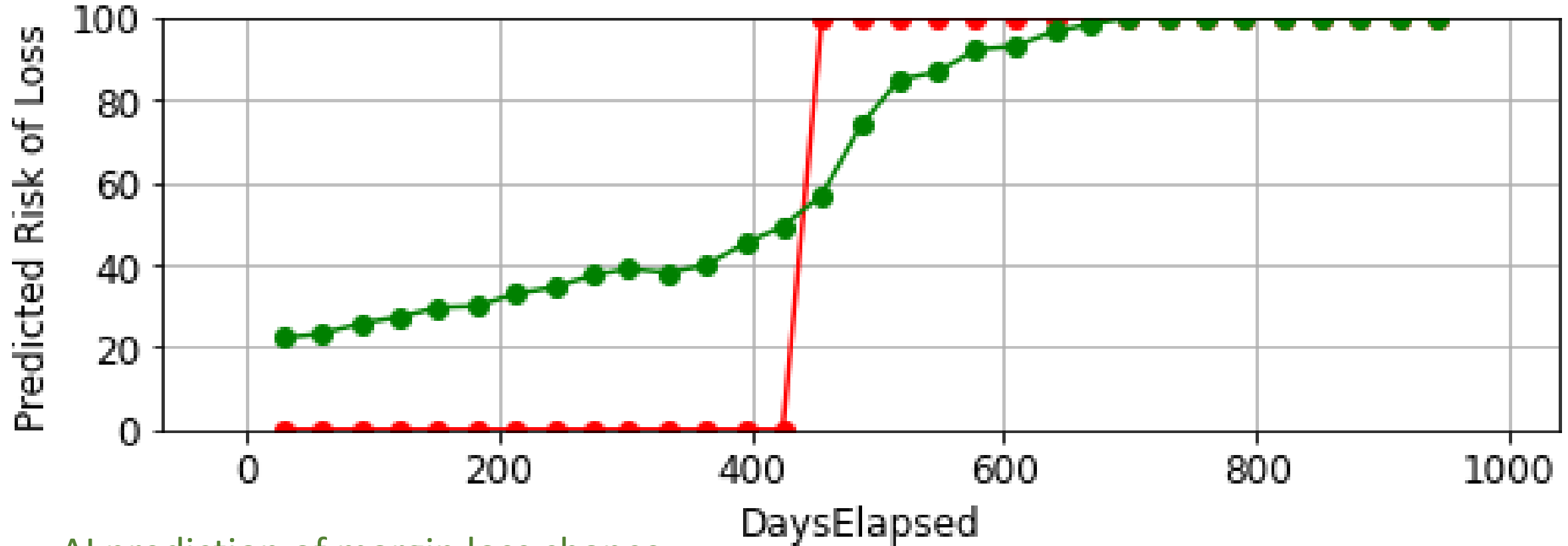
The worker was tasked to install roof safety mesh and the planned method for install was by use of the scissor lift EWP. During the process, a structural steel beam impacted the EWP access to the work area. The worker has unsafely exited the EWP basket and positioned themselves on the structural beam, exposing the worker to a potential fall from height of 3 meters.

Summon the AI agent:

"Imagine that you were the worker in this scenario...given the context, what thoughts led you to this outcome?"

Thought Process	Suggestions
Frustration with the EWP's inability to access the work area due to the structural beam.	Provide proper training on how to assess and address obstacles in the work area.
Underestimating the risk of falling from a height of 3 metres.	Regularly conduct safety briefings emphasizing the importance of fall protection.
Believing that the task would be completed quickly , minimizing the exposure to risk.	Encourage workers to report issues and ask for assistance when faced with challenges.
Assuming that my balance and ability to hold onto the structural beam would prevent a fall.	Implement a buddy system , where workers must consult each other before taking risky actions.
Feeling pressure to complete the task on time , prioritizing efficiency over safety.	Foster a safety-first culture, emphasizing that safety is always more important than speed.
Lack of awareness of alternative methods or equipment that could have been used to complete the task.	Offer toolbox talks and regular training on the proper use of equipment and alternative methods.

Delivery – Cutting through the noise



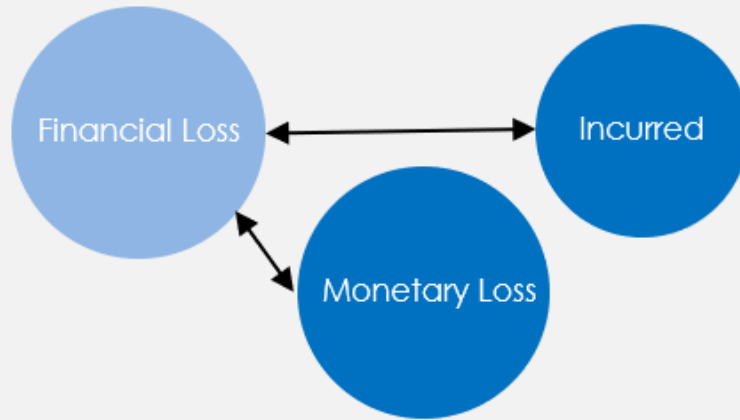
AI prediction of margin loss chance

Actual reporting of margin loss

Delivery – Cutting through the noise

Context-based Similarity

“Closeness” of the words derived from the training material



Tackle the unknown unknowns by giving visibility to relevant records that would previously be excluded from the search horizon.

Remove reliance on specified search words (seed)?

Example Case:

Searching “Financial Loss”

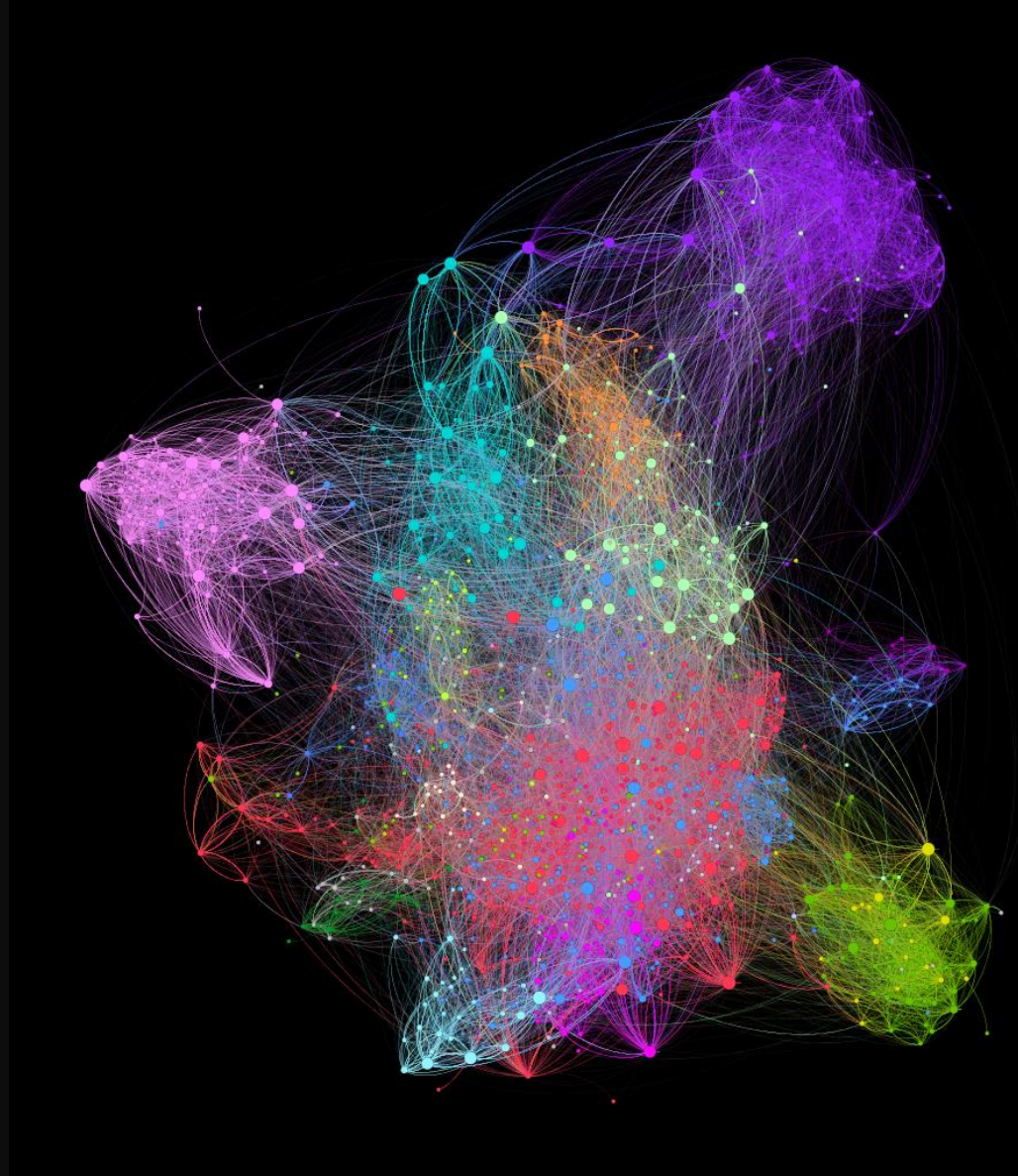
Relate to semantically similar terms/phrases

One of the relevant records identified

R-0012: Global: Local road conditions deteriorate during the course of the project - difficult to apportion responsibility where there are multiple contractors / projects operating resulting in **Additional costs incurred** repairing roads to council satisfaction

Increase the relevant results from **3** to **112**

Handover – Forgotten legacy



Overhead – Augmenting potential

We've interviewed **early adopters across various corporate roles and projects** who use ChatGPT in their workflows. They **unanimously agree** that ChatGPT significantly **enhances productivity by 20-50%** in their diverse work areas, including contract management, site communications, and digital development.

Example Use Cases

Automating Value-neutral Work:

"You can respond in 8-9 minutes, which you would otherwise do in an hour." – **Creating contractual responses to Extension of Time and finetuning the message**
– Project Engineer

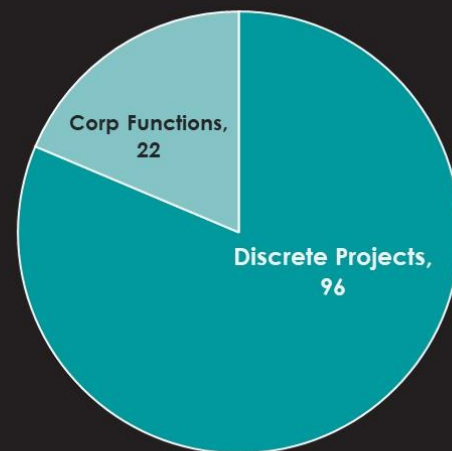
Creating New Ways of Working:

"Several hours a week saved, and others in the team can also use the macro." - **Automating arduous data filtering with complex Excel Macro, created with ChatGPT**
– Graduate Engineer

Enable Upskilling/Development:

"Usually takes half a day – but now I can get it done in 30 minutes." – **Researching and Proofreading to create new site processes** – Site Engineer

Consistent Users



*Consistent Users – Users that have accessed ChatGPT at least once in all time slice records.

118 Users in AU consistently used ChatGPT since May 2023.

81% of these consistent users are from **individual Projects**.

Graduates are the largest group (5%) among consistent users, followed by **Project Engineers**.

NELP accounts for the most consistent users (**12%**) among projects, with a diverse range of positions.

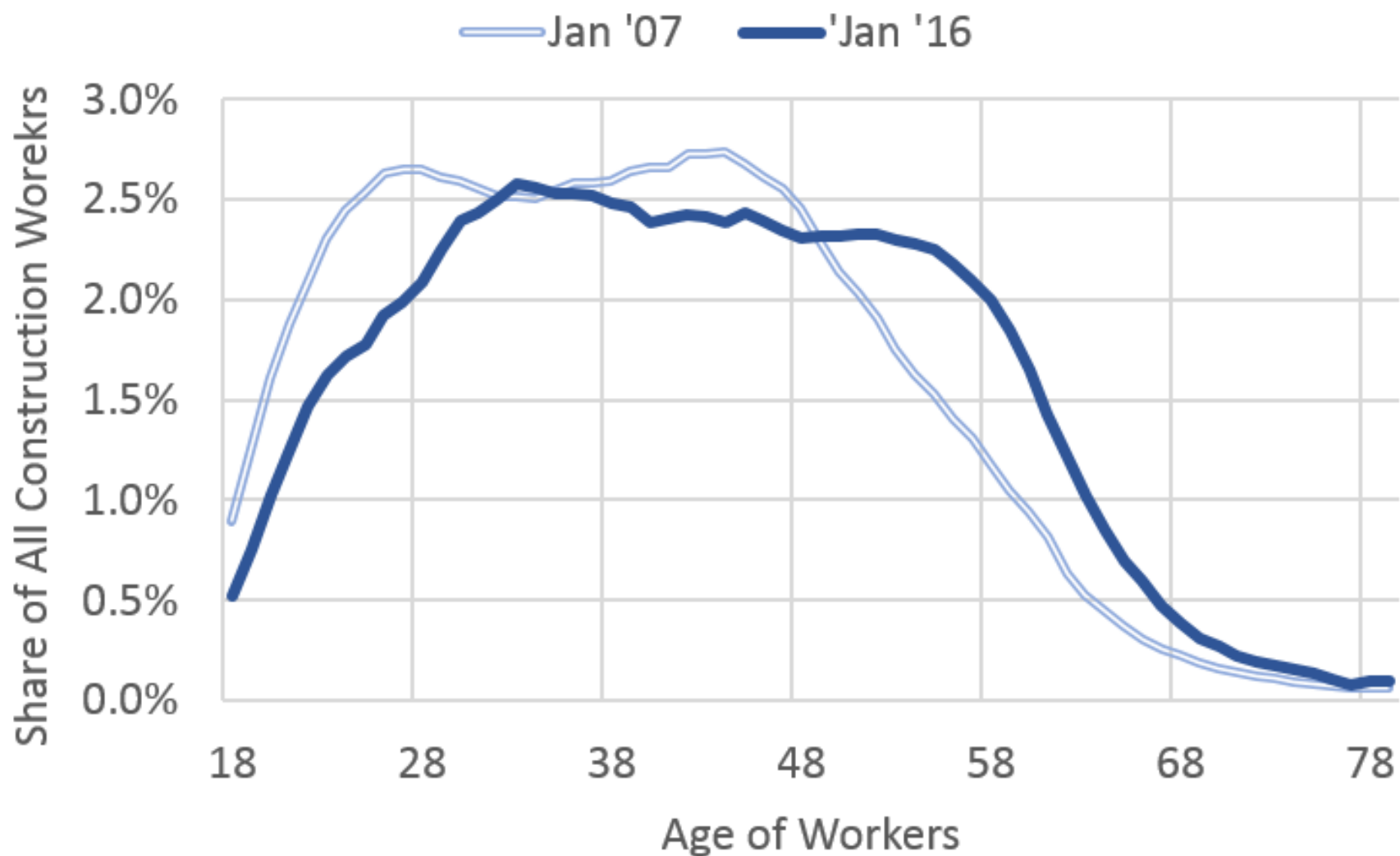
20% improvement achievable...

if implemented correctly

People – an average construction worker



U.S. Construction Employment by Age



Data are 12 month averages of smoothed 5 year age groups. E.g. values for 18 year old workers represents workers between 16 and 20 years old. Source: BLS, Census, Oregon Office of Economic Analysis

Dirty

Demeaning

Dangerous

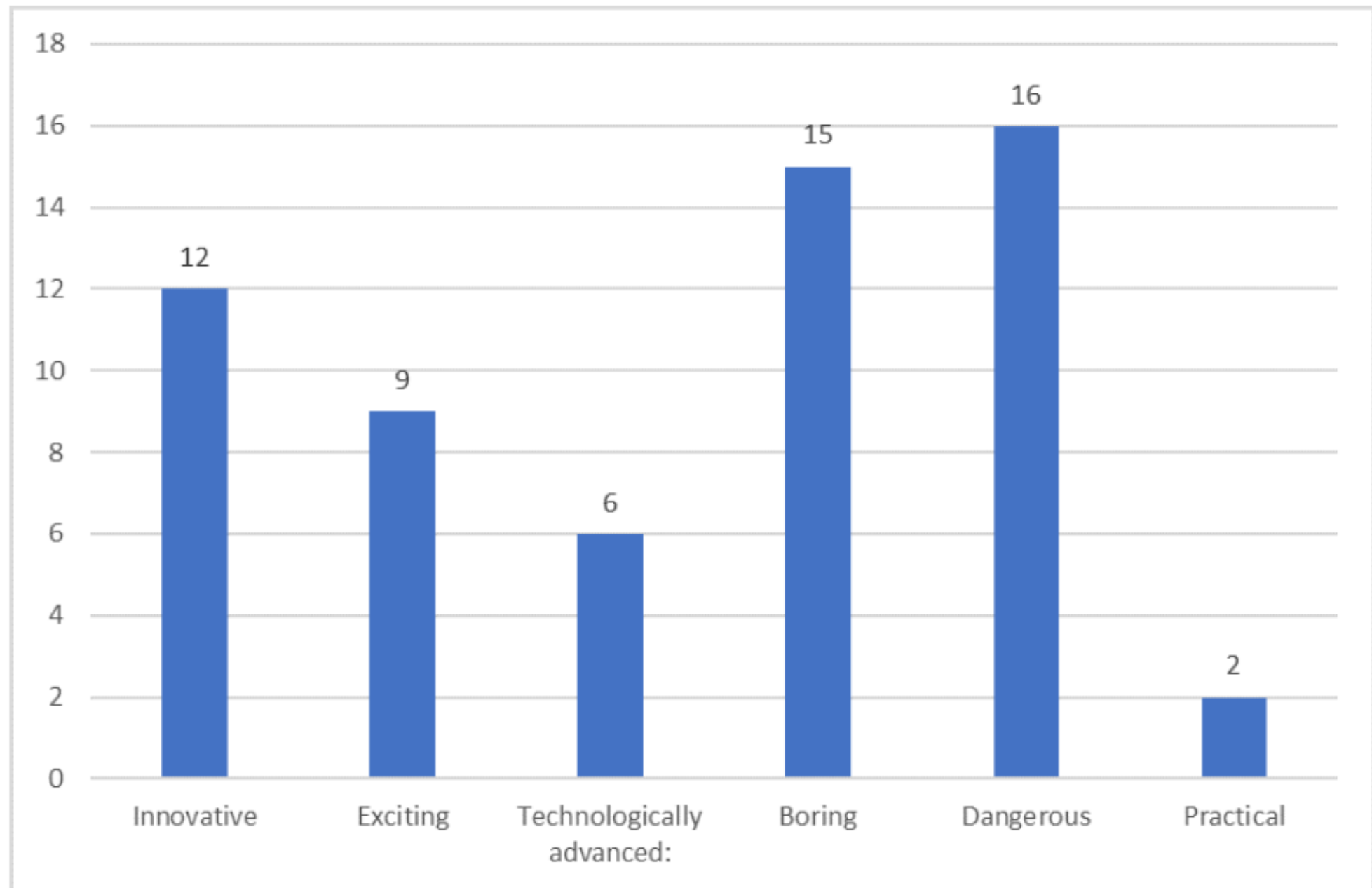


Figure 5.4: Industry perception

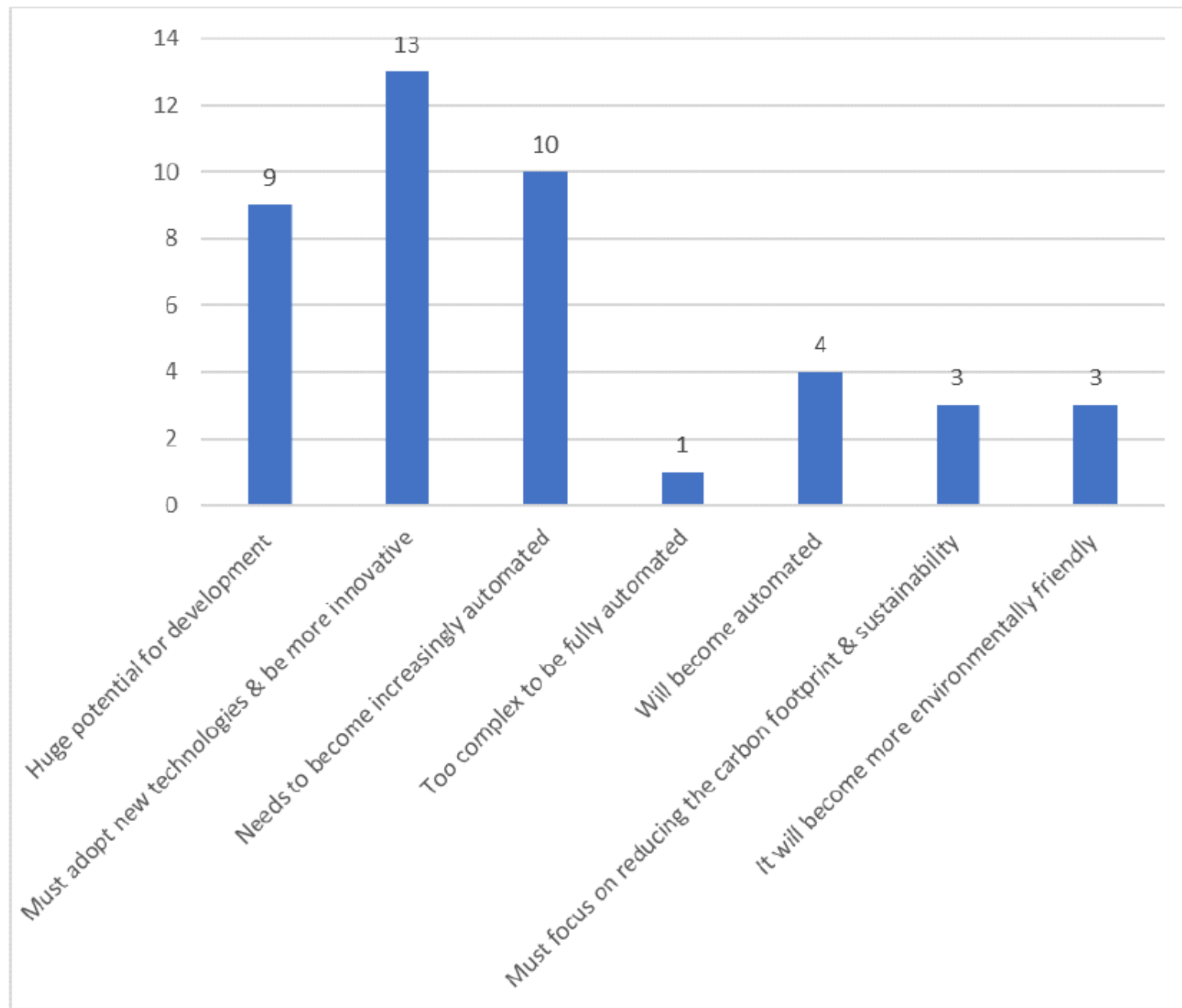
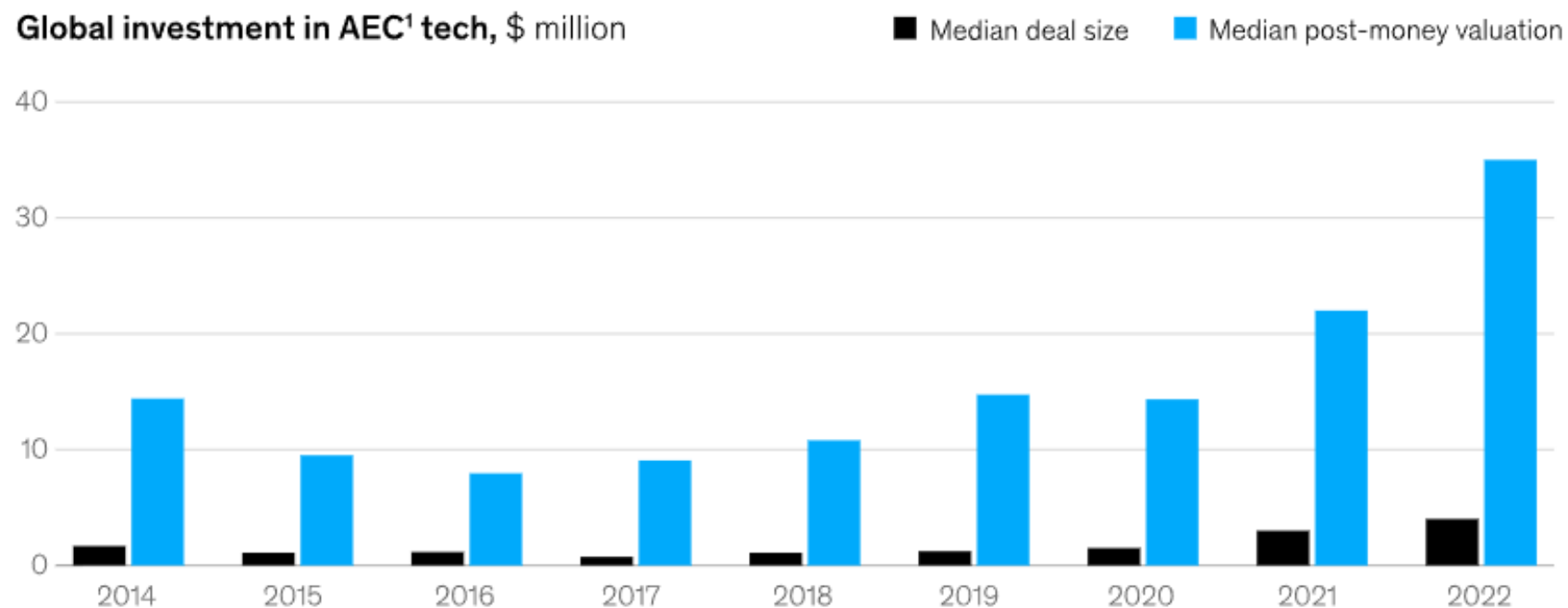


Figure 5.5: Thoughts on the future of industry



Culture – opening to the world

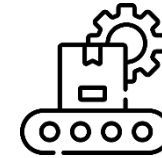
The rapid growth of architecture, engineering, and construction tech since 2017 is reflected in increased median deal size and post-money valuation.



¹Architecture, engineering, and construction.
Source: PitchBook, November 15, 2022

Value of AI: Amplifying Human Potential

Less Time on Routines:
Shift from Repetition to Creativity



More Capacity for Insights:
Turning Complexity into Clarity



LOR's AI Philosophy:

Position LOR as a pioneer in AI in construction, empowering our people to transform business performance, focusing their expertise where it matters!

