

Integrated Project Delivery Why, How, When, What?

Prof. Martin Perks PhD. FRICS MICW
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Road aficionados' – which Highway?



Prof. Martin Perks – PhD. FRICS. MICW. LCI-UK

Commercial Programme Director – National Highways

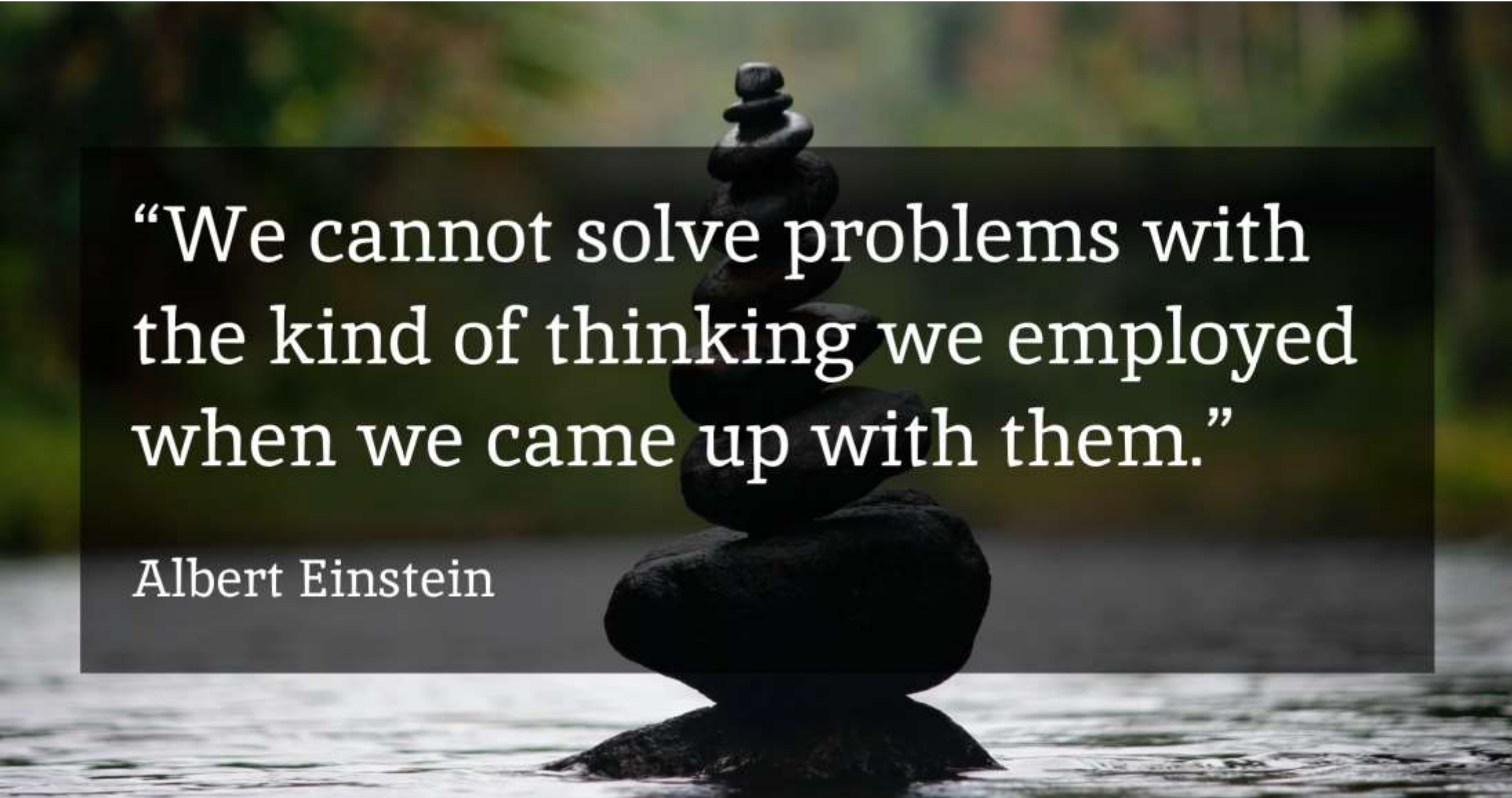
Director for; complex infrastructure; commercial improvement and integration; Contract Management

Author of the *Regional Delivery Partnerships (RDP)*

The RDP is an IPD model and reflects [Target Value Delivery](#). It was awarded to 13 Delivery Integration Partners, using open market competition to undertake 38 schemes, with the ability to allocate a further 50 schemes. Individual projects range from £20m to £800m without further competition, purely based on performance.

Some lessons from this unique model and process used in the recent design and procurement of a £9bn, 6-year Highways delivery framework. This expenditure is part of the UK National Infrastructure Delivery Plan ([NIDP](#)) devised by the Infrastructure Projects Authority reporting to HM Treasury and Cabinet Office.

Target Value Delivery is the adaptation of manufacturing Target Costing to the peculiarities of the construction industry and reflects IPD making the use of industrialised construction and Lean Construction beneficial.



“We cannot solve problems with
the kind of thinking we employed
when we came up with them.”

Albert Einstein

WHY?

Government driving for change

"...need for a step change in productivity (*effectiveness and efficiency*) in the ways we plan, design, manufacture, construct and operate infrastructure..."



Project Performance Map

	Solar power	Roads	Rail	Buildings	IT-led change	Dams	Olympics	Nuclear waste storage
Cost overrun	1%	16%	39%	62%	73%	75%	157%	238%
Frequency of cost overrun	4 of 10	6 of 10	7 of 10	7 of 10	4 of 10	7 of 10	10 of 10	9 of 10
Schedule overrun	2%	36%	32%	32%	43%	44%	0%	70%
Benefits overrun	n/a	-5%	-23%	-5%	-28%	-11%	n/a	-23%
Cost Black Swans	0%	4%	10%	20%	18%	23%	57%	43%
Ø duration, years	2.2	4.1	8.0	7.9	3.3	8.0	7.1	6.8
Median cost (USD, mio, 2020 prices)	384	69	383	83	1.0	190	2,173	820

Source: Oxford Global Projects Database (Q2 2022)
 Note: Measured from date of decision to build, in constant prices
 Black Swans are defined as projects with statistical outliers with cost overrun $\geq 88\%$ or $\leq -64\%$
 Cost are in million USD (2020 prices), estimated project cost



“You can’t be that kid standing at the top of the waterslide, overthinking it. You have to go down the chute.”

TINA FEY



2IC = IPD

HOW?

“...construction sector job growth at 12% combine this with 41% of the construction industry’s workforce will retire by 2031. **We have a problem NOW.** Given that the construction sector is 13% of global economic output, if construction productivity matched that of ... the manufacturing sector, there could be an estimated **\$2.2 trillion savings every year.** Faced with these findings, construction sector stakeholders are exploring **Industrialised Construction, a system that uses innovative and integrated techniques** that connect the design-to-make process, to help offset this massive skills shortage.”

The Economist (August 2017). Can we fix it? The construction industry’s productivity problem, <https://www.economist.com/leaders/2017/08/17/the-construction-industrys-productivity-problem>

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Clients' need to lead on...

Contract Structure: a single multi-party contract

Team Formation: all involved from the very start of the project.

Risk Allocation: risks and rewards are shared equitably among all parties

Collaboration: exceptional collaboration and communication; including understanding how each partner's business works.

Decision Making: decisions are made jointly and unanimously by all key participants.

Compensation: National Highways will reward success with pipeline access

Actionable Data

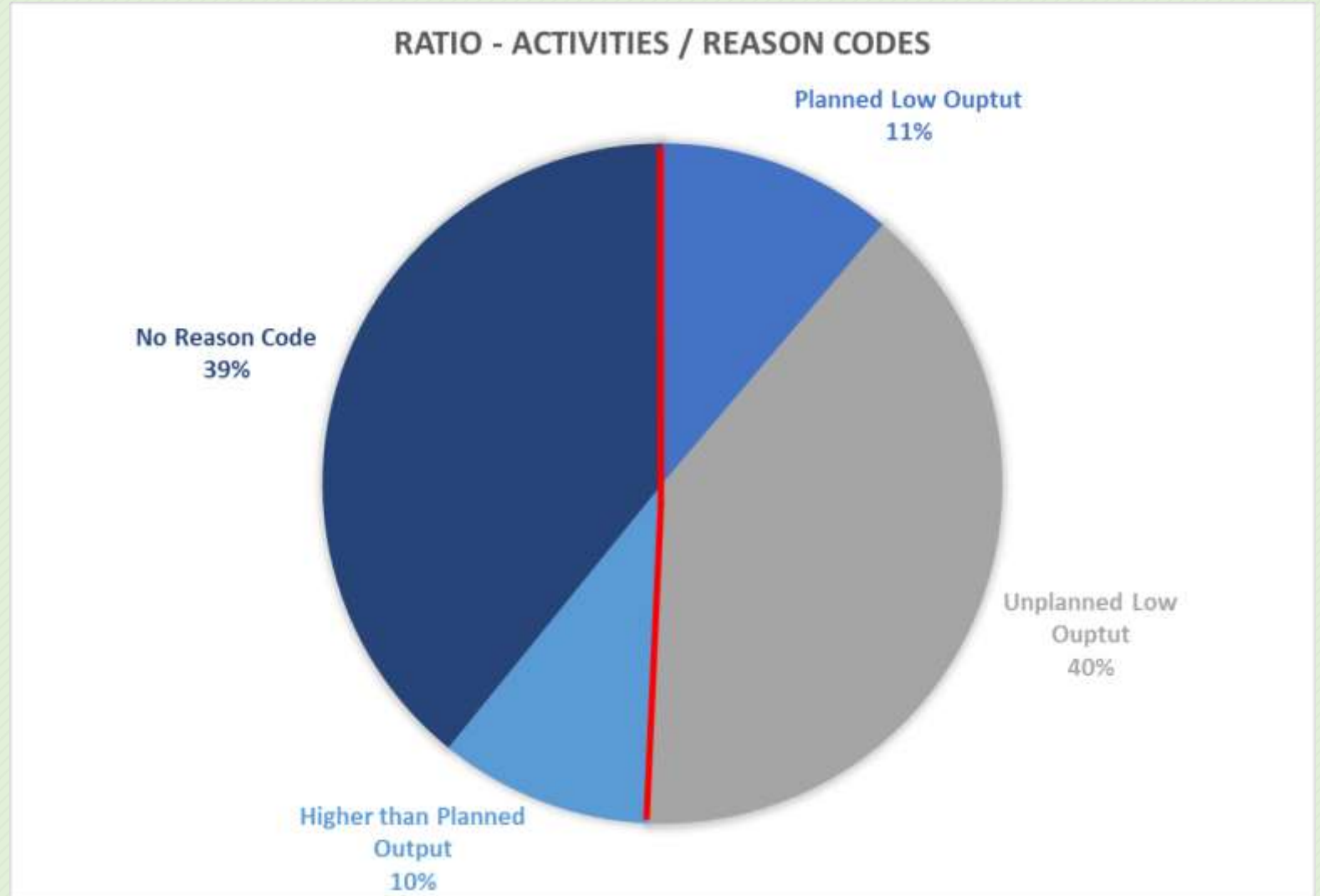
Across a total of **3,600 data entries** from **10 schemes**,

- Drainage (m/shift)
- Earthworks (m³/week)
- Gantries (unit of work)
- Pavement (t/shift)
- Retaining Walls (m/shift)
- Technology: Comms Ducting and Cabinets (m/shift)

Suppliers input a **reason code** against a data entry if productivity is higher or lower than planned.

The **reason codes occurring** are shown as a percentage value in the chart opposite.

The red divisor indicates low productivity reason codes occur **51%** relative to the total number of entries.



Low Outputs – Management & Integration



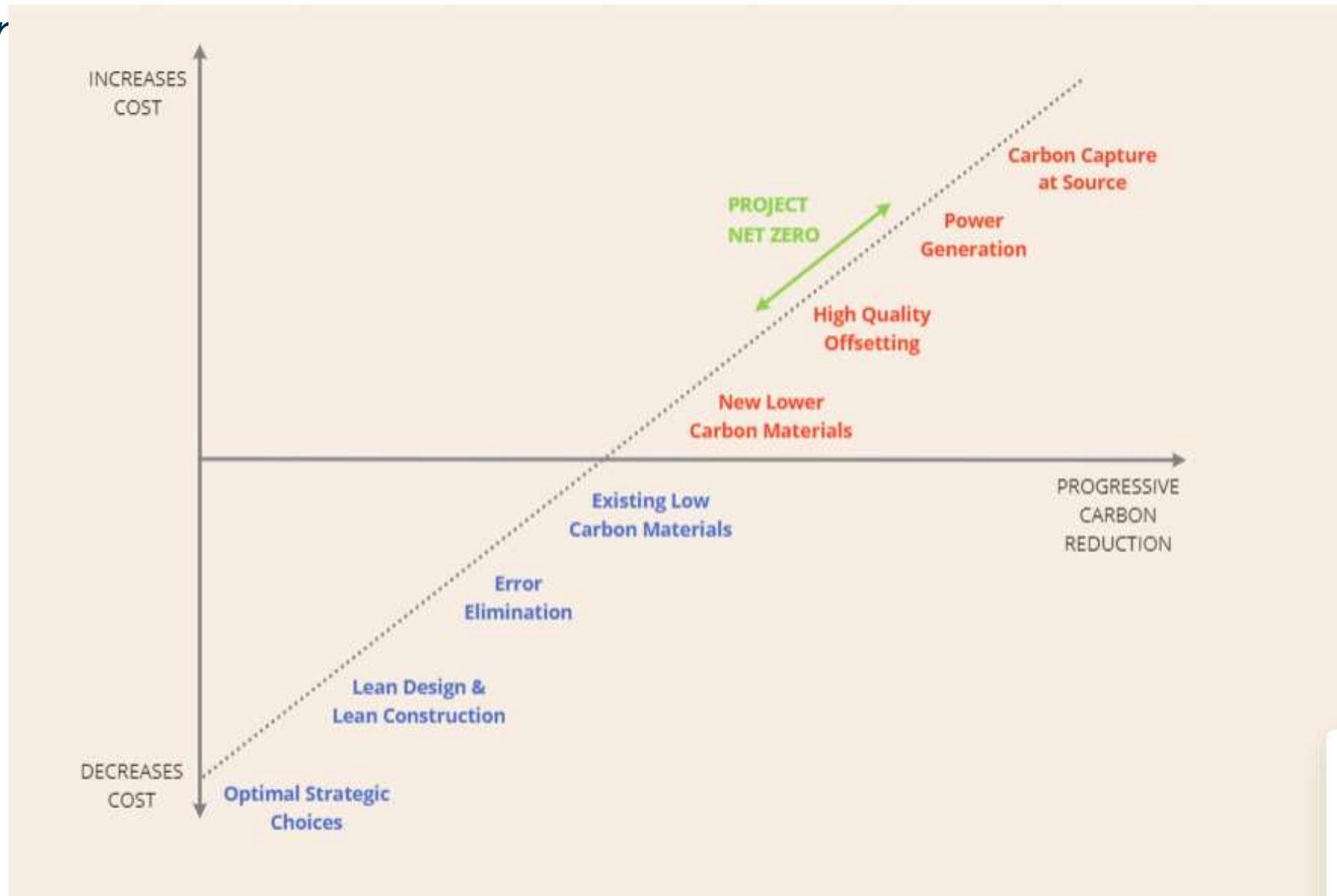
The 40% of **Unplanned low output** attributable to **poor management and integration** are displayed in the chart. **30% of low output** is related to the following 5 factors:-

- ❑ **Incomplete enabling actions (7%)**
- ❑ **Engineering approvals (7%)**
- ❑ **Network access (6%)**
- ❑ **Incomplete documentation (5%)**
- ❑ **Priority changes (5%)**



We need to prioritise actions that deliver most benefit – example for carbon

Minir



Source: Expedition Engineering (Jan 2021)

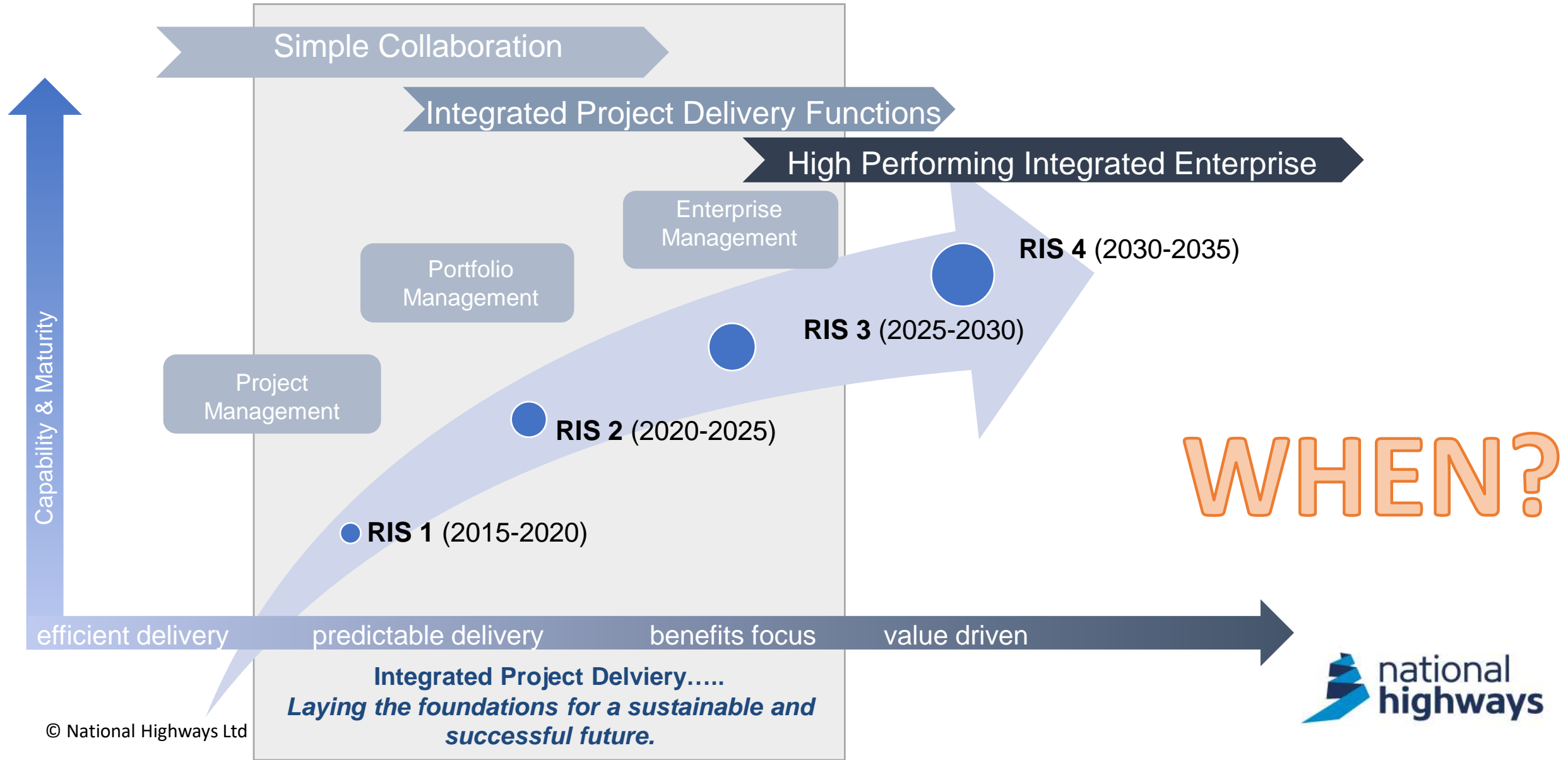
A scenic view of a mountain valley with green hills and a cloudy sky. The text is overlaid on the image.

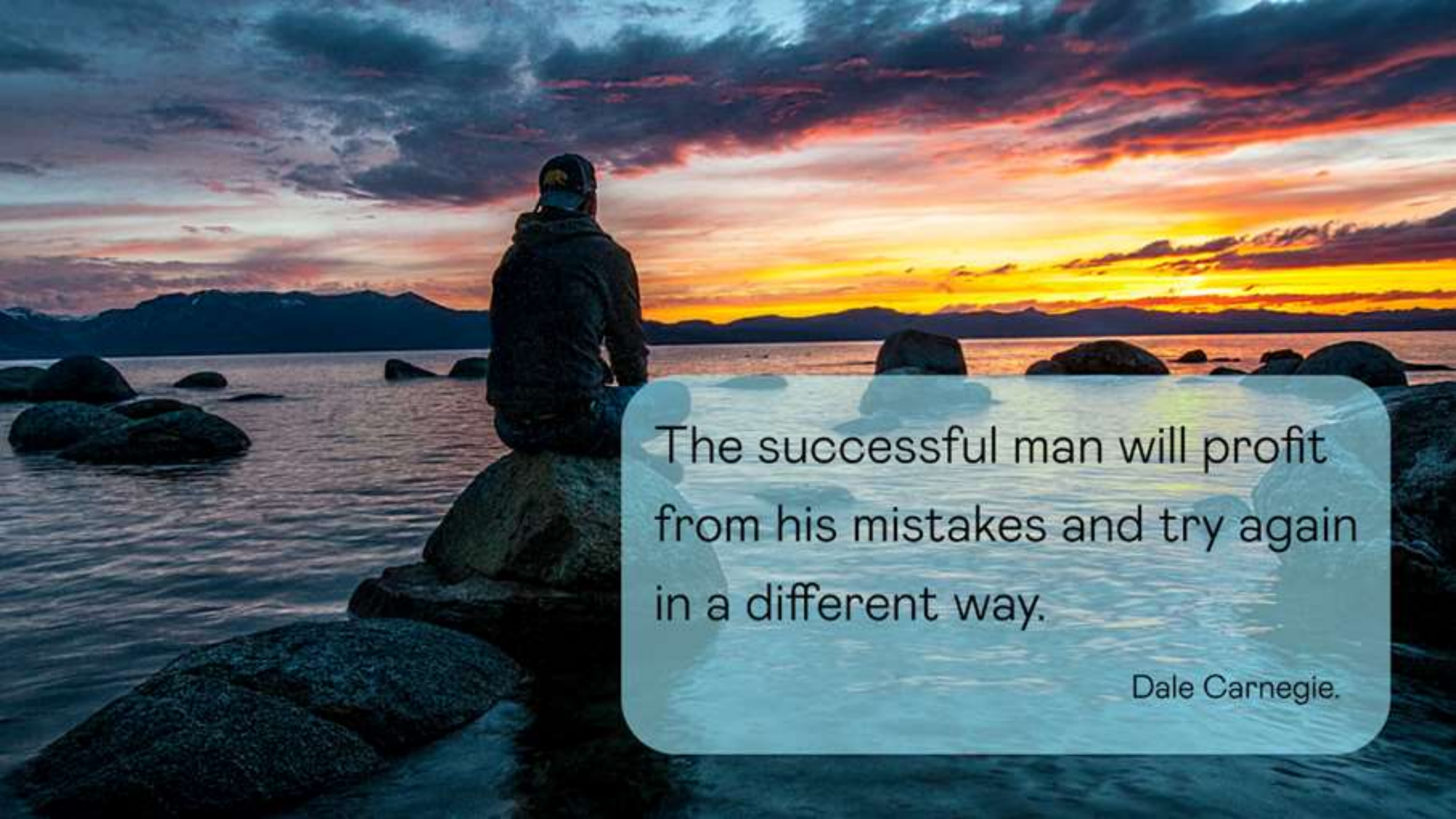
**Transitions are a
time for reflection,
and a time for
looking forward.**

Roy Cooper

The journey to Integrated Project Delivery

A systematic and structured approach to managing the future.



A person wearing a dark jacket and a cap is sitting on a large rock in the foreground, looking out over a body of water towards a sunset. The sky is filled with colorful clouds in shades of orange, yellow, and blue. In the distance, there are mountains. The water is calm with some ripples. Several other large rocks are scattered in the water.

The successful man will profit
from his mistakes and try again
in a different way.

Dale Carnegie.

What's IPD

How will *the way we work* be different?

What?



Construction projects that are more collaborative from the start. **Client, constructors, designers, and suppliers working together early to agree what's needed.** Use modern offsite industrialised construction methods and digital modelling. Move **away from short-term contracts** to longer partnerships where everyone benefits from success.



Contracts focused on **end results not processes**, with shared risks and rewards to keep everyone motivated. Have **integrated teams making decisions together, not working in silos.**



It's about **breaking down barriers**, using technology, and **aligning all parties' interests** to deliver better project outcomes through teamwork.

6 Magic differences



Lower costs - IPD projects cost around 6% less on average



Faster build times - Projects finished over a year sooner in some cases



Less waste - Up to 92% of materials recycled through better coordination



Higher quality - 13% better quality scores and far fewer defects



More productive - Workers up to 25% more productive using IPD methods



Fewer conflicts - Thousands of potential site issues avoided upfront

Re-defining "success" - Built on relationships

- ambitious objectives set to modernise, maintain and operate the SRN.
- To attract and work with the best in supply chain – highly competitive market.
- So, what are the opportunities for the suppliers and what are we doing do attract the best from the industry?

**SUSTAINABLE DEVELOPMENT
CAPABLE OWNER**



*'meeting or exceeding the expectation of
the Investor
improving benefits : maintaining costs'*



**SUPPLY CHAIN PARTNERS AS
TRUSTED DELIVERERS**

What does **EFFECTIVE + EFFICIENT** mean?

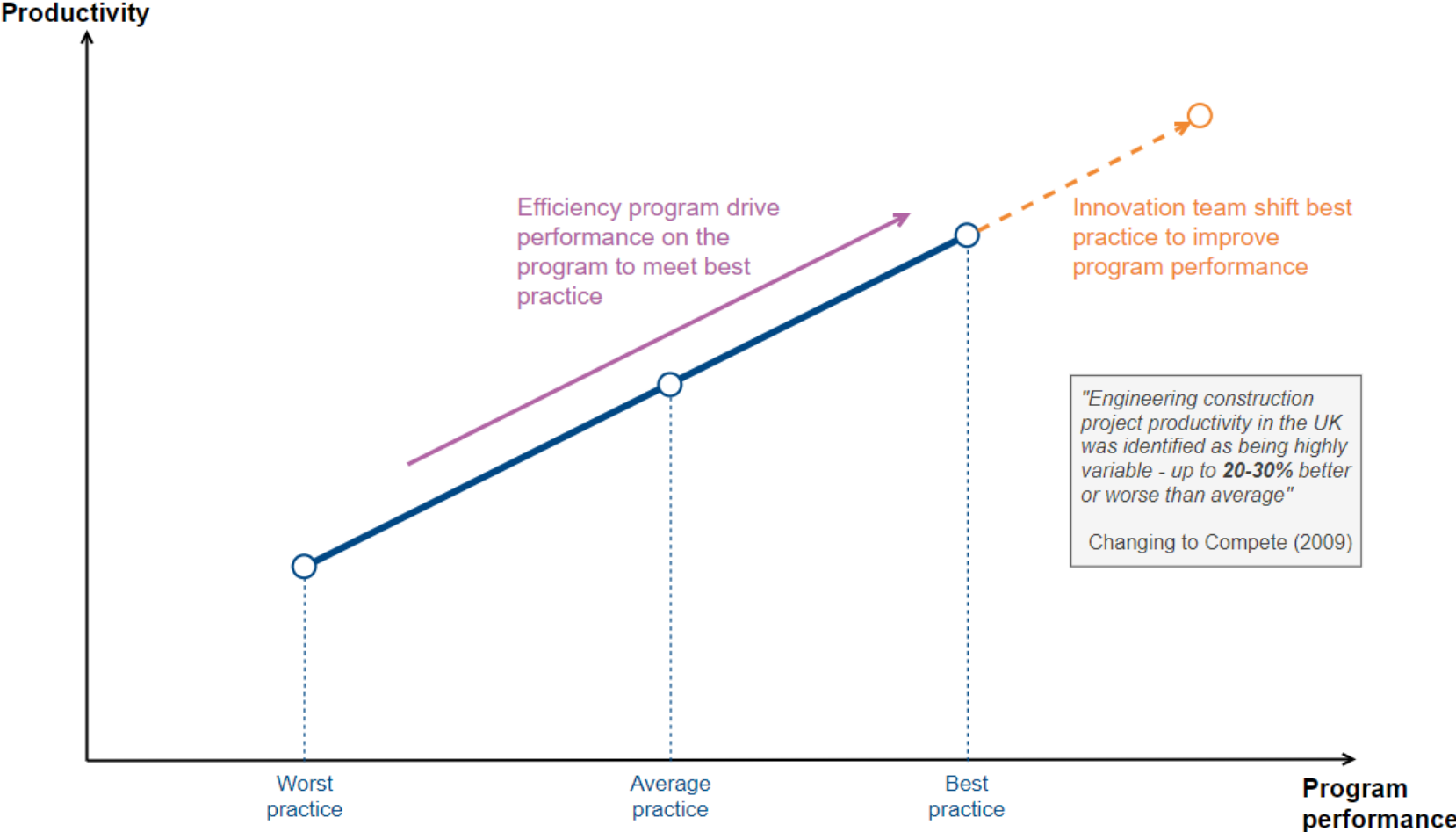
- 50% less disruption to customers
- 50% greener – net zero construction by 2040
- 50% more social value
- 30% more people from local talent
- 150% increase in productivity with wellbeing net gain

“Education is the most powerful
weapon which you can use to change
the world.”

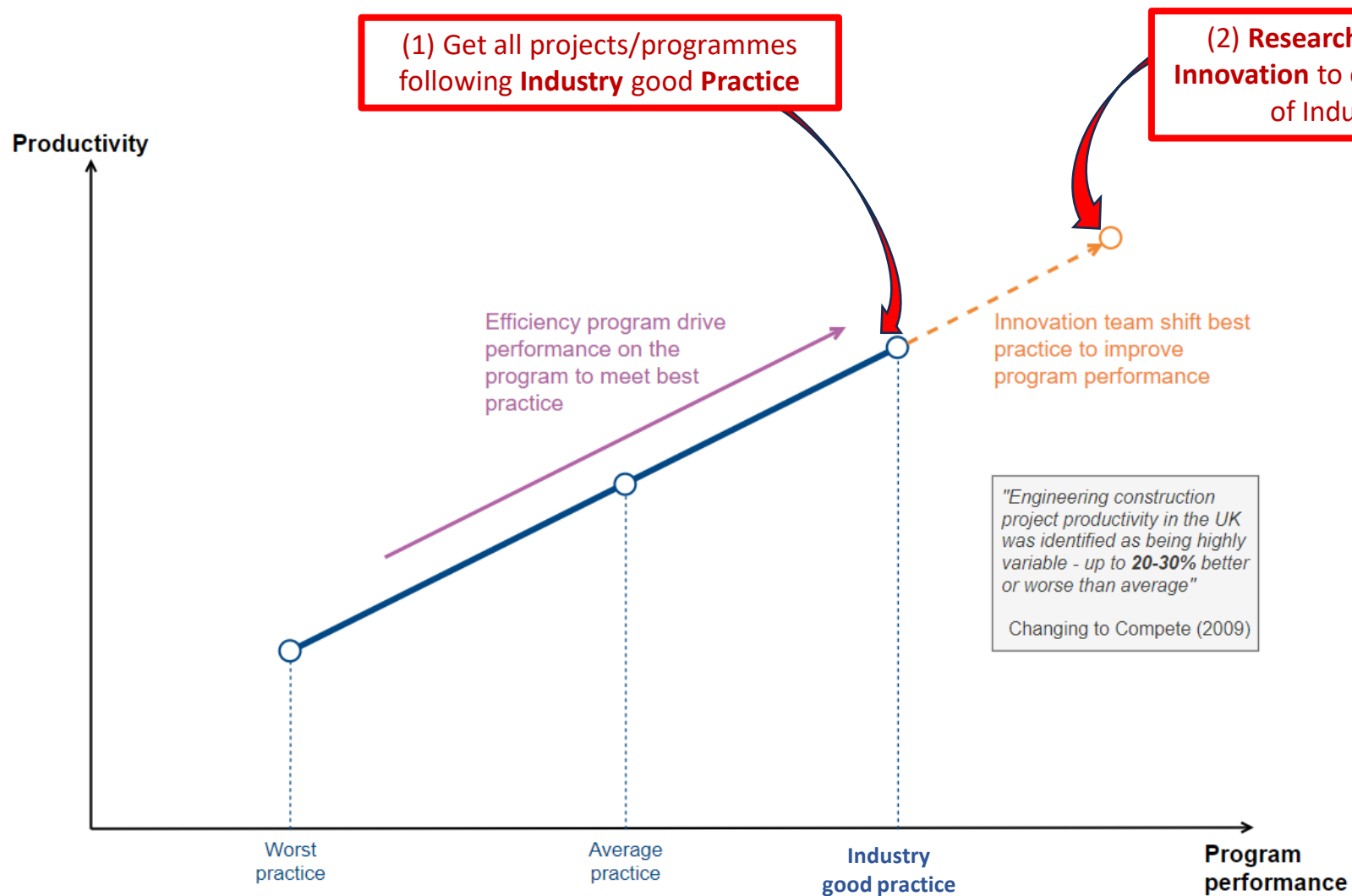
Nelson Mandela



Effective + Efficient = Productive



Easy win to improve Infrastructure Productivity:



What ACTION is required:

- (1) **Ensure Industry Practice is done everywhere**
 - Pull Lean Construction
 - **Effective + efficient** = IPD
- (2) **RD&I to push boundaries forwards**
 - Develop an Investable Agenda for Productivity Improvement (**effective + efficient**)

Productivity and Program Performance in relation to **efficiency** improvements
(ref: HS2 Productivity Improvement Programme and ICG Productivity Strategy)

Commercial strategic thinking that supports a leaner, transformed industry towards 2040 NZC



All Key IPD roles to hold a recognised IPD qualification

Current discussions ongoing with SSCS as deliverer

IPD qualifications may be examined module of other vocational training

Integrated Project Manager is a recommendation from the US

Lean Inclusive Leadership assessments in future bidding evaluations

Client IPD standards to lead the way

Exploring industry productivity standard

Incentives related to:

- Productivity; effective decisions & efficient delivery
- Predictability: Cost out; Value up
- 'Pound in the ground' improving residual value
- Continuous improvement

Future requirements



Future procurement models

- IPD as a minimum
- Productivity strategies
- Lean Leadership capability
- Reducing what we ask for , but holding you to account
- Digital agreements
- Blockchain integrity rewards



Future selection criteria

- Leadership environment – Safe working + psychological safety
- Productivity guarantees – Basic – Better - Best
- Integrated plan, design, manufacture, construct, and operation
- Data format compatibility
- Data transaction speed



Future expectations

- Effectiveness and efficiency as standard
- Less cash incentives - Pipeline access for performance
- Continuously improving product design
- Production system optimization
- Industrialised construction and Lean construction philosophy
- Frictionless data



Future requirements

- Cost outcomes limited to benefit outcomes
- Cost inputs limited by WLC expectation
- Bio-diversity net gain
- Decarbonisation net gain
- Social value net gain
- Enterprise supplier agreements
- Integrated Data

What should you take away?

Why - *Investor led*

How – *Actionable data*

What – *Productivity – Effective and Efficient*

When – *It's happening now!*



Answer – which Highway?

Opened in 1959 the M10 was a 3-mile motorway in Hertfordshire, from the M1 motorway at junction 7 near Hemel Hempstead to the A414 North Orbital Road at Park Street Roundabout, just south of St Albans.

It was however, reclassified as part of the A414 in 2009 having only been a spur motorway for 50 years.