



Cast

REAL ESTATE & CONSTRUCTION CONSULTANCY

‘Modernise or Die’

Risks & Opportunities For The Construction Industry

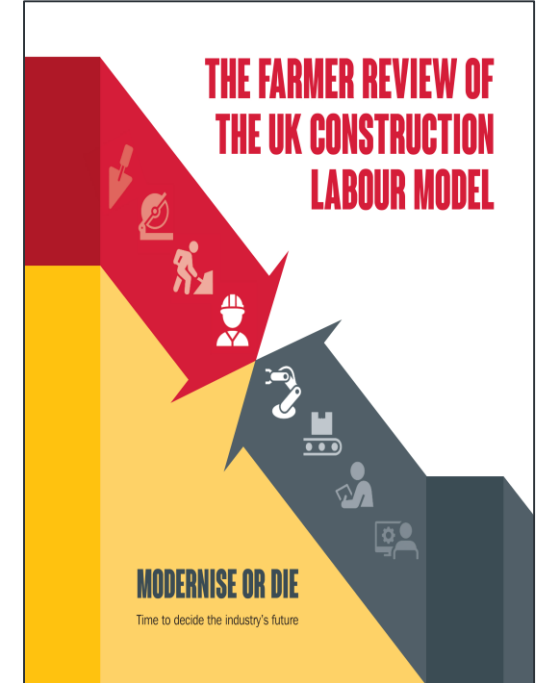
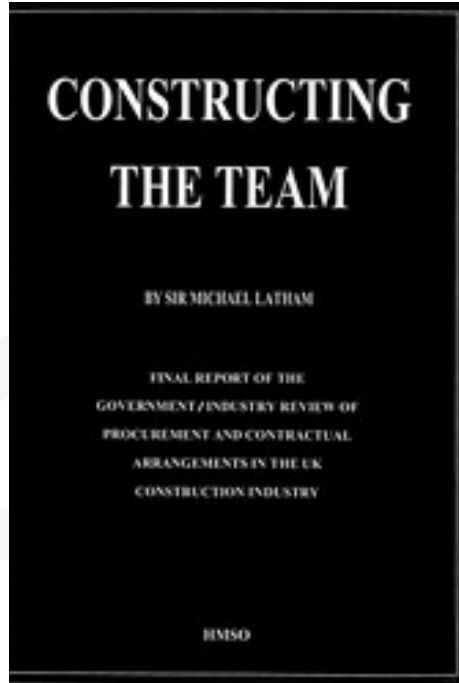
Mark Farmer


BIM Regions East, Digitising Construction Event

Cambridge 21st May 2018

THE RISKS

Four UK Construction Industry Reports – Similar Themes, Different Points in Time But It's Clearly Evident We Now Have Different Drivers For Change





We Have a Burning Platform

Future Prognosis for 'Business as Usual'

- Skilled construction labour now in long term structural decline
 - Quality of new 'backfill' labour force reducing
- Increasing reliance on shrinking pool of experienced & competent labour force
 - Main Contractors not in control of sub-contractors
 - Sub-Contractors not in control of their labour force
- Designers being de-skilled by procurement routes & transactional interfaces
- Surveyors increasingly removed from understanding true cost rather than price
 - Increasing litigation and contentious project failures
- On going commercial failures of businesses unable to control outcomes and hold 'risk'
 - New disruptors and disruptive models emerging challenging status quo

**IF NECESSITY IS THE
MOTHER OF
INVENTION,
DISCONTENT IS THE
FATHER OF
PROGRESS.**

Discontent from Within....



The 'Die' in 'Modernise or Die' has taken on a renewed significance in the last few months!

The Grenfell Tower Tragedy Has Taken This Debate To A New Level

Building a Safer Future

Chapter 6: Building a Safer Future

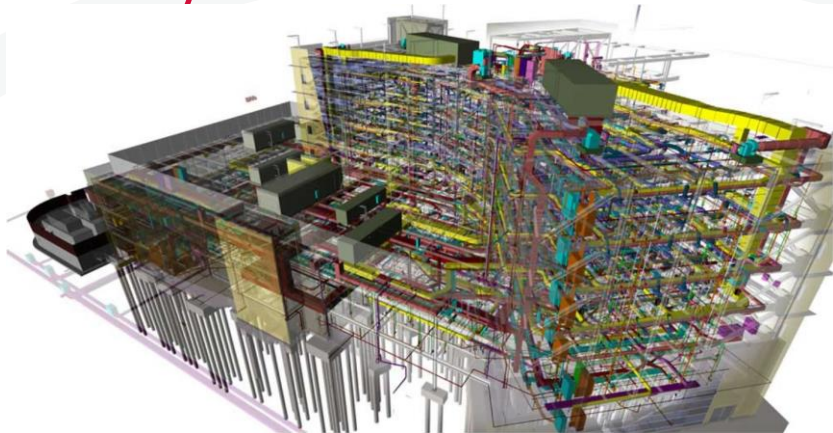
↑ TECHNOLOGY & MANUFACTURING

May 2018

Dame Judith Hackitt DBE FREng

Cm 9607

Focus on BIM & Digitalisation Will Always Have Its Limitations Without Transforming Construction's Fragmented Project Organisational Structures & Analogue Site Based Physical Delivery Model



DIGITAL THREAD DIMINISHES

<h3>3D</h3> <ul style="list-style-type: none"> Existing Conditions Models Laser scanning Ground Penetration Radar (GPR) conversions Safety & Logistics Models Animations, renderings, walkthroughs BIM driven prefabrication Laser accurate BIM driven field layout 	<h3>4D</h3> <h4>SCHEDULING</h4> <ul style="list-style-type: none"> Project Phasing Simulations Lean Scheduling Last Planner Just In Time (JIT) Equipment Deliveries Detailed Simulation Installation Visual Validation for Payment Approval 	<h3>5D</h3> <h4>ESTIMATING</h4> <ul style="list-style-type: none"> Real time conceptual modeling and cost planning (DProfiler) Quantity extraction to support detailed cost estimates Trade Verifications from Fabrication Models <ul style="list-style-type: none"> Structural Steel Rebar Mechanical/Plumbing Electrical Value Engineering <ul style="list-style-type: none"> What-if scenarios Visualizations Prefabrication Solutions <ul style="list-style-type: none"> Equipment rooms MEP systems Multi-Trade Prefabrication Unique architectural and structural elements 	<h3>6D</h3> <h4>SUSTAINABILITY</h4> <ul style="list-style-type: none"> Conceptual energy analysis via DProfiler Detailed energy analysis via Eco Tech Sustainable element tracking LEED tracking 	<h3>7D</h3> <h4>FACILITY MANAGEMENT APPLICATIONS</h4> <ul style="list-style-type: none"> Life Cycle BIM Strategies BIM As-Builts BIM embedded O&M manuals COBie data population and extraction BIM Maintenance Plans and Technical Support BIM file hosting on Lend Lease's Digital Exchange System
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THE OPPORTUNITIES

An Understanding of the Root Causes of Delivery Failure Needs to Define the Solution

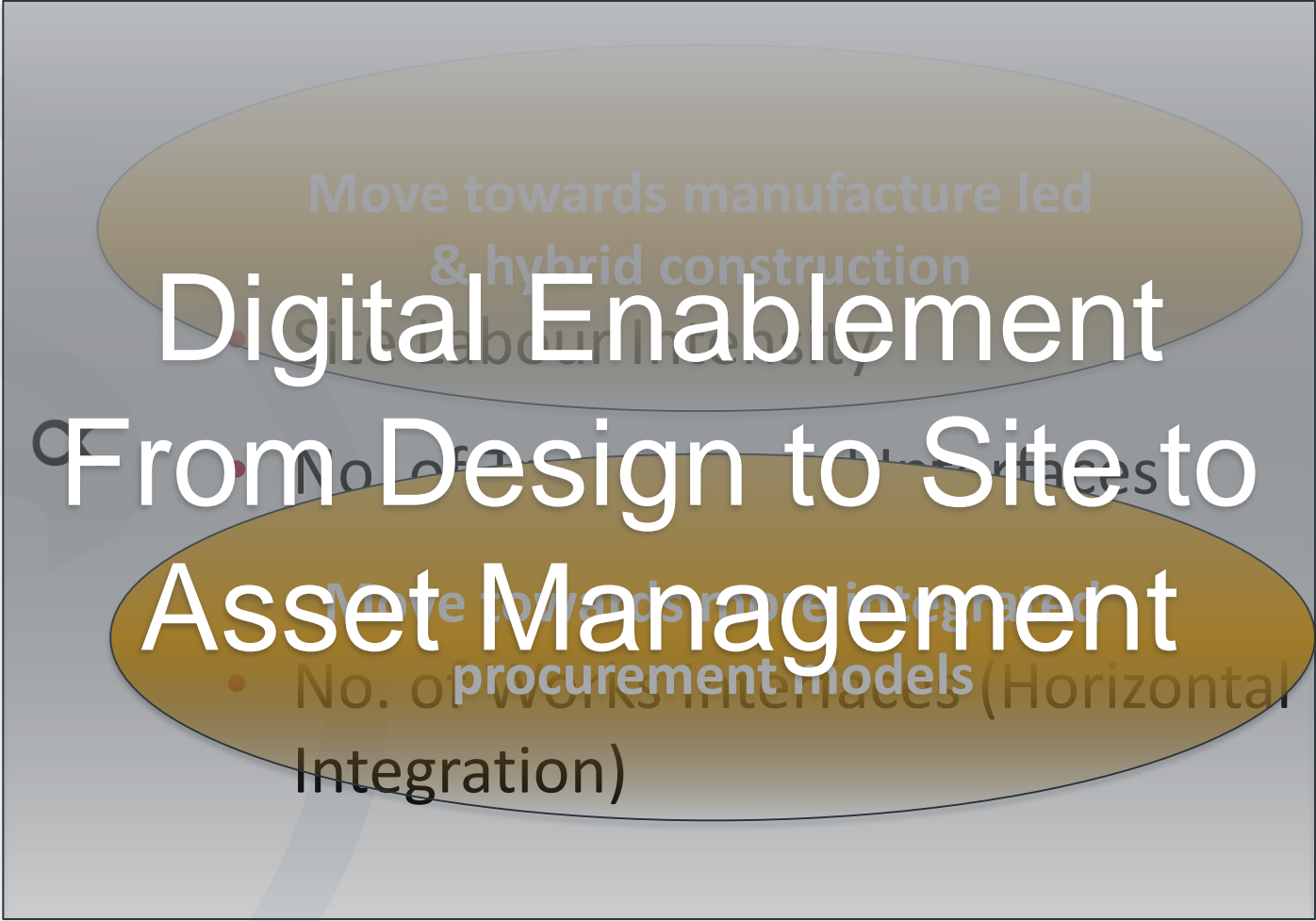
Design, Procurement and
Construction Delivery Failure

∝

- Design Uniqueness
- Site Labour Intensity
- No. of Transactional Interfaces (Vertical Integration)
- No. of Works Interfaces (Horizontal Integration)

The Solution Involves Three Key Parts – Two Primary Axes of Change & One Enabling

Design, Procurement and
Construction Delivery Success



UK Government Is Also Driving Change – Industrial Growth & Major Spend Programmes

Digital Transformation Challenges

Building our

#INDUSTRIALSTRATEGY

WE WILL USE NEW TECHNOLOGIES TO

HALVE

THE ENERGY USE OF NEW BUILDINGS BY 2030


INDUSTRIAL STRATEGY

will

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able



UK Government Is Also Driving Change - Homebuilding

All Party Parli



Dominic Raab MP
Housing and Planning Minister



SAJ
CO



#DesignQualityCont

And In A More Subtle Way In Homebuilding



Boosting productivity and innovation: modernising the housebuilding sector

3.37 The housebuilding industry is less productive than the wider economy, partly because it has been slow to modernise and make use of more efficient and faster ways of building. By increasing innovation and making greater use of modern methods of construction⁶¹ we can change this. Industry reports suggest homes constructed offsite can be built up to 30% more quickly than traditional methods and with a potential 25% reduction in costs.⁶² They are high quality, reliable, more productive and can be highly energy efficient. They are high quality, reliable, more productive and can be highly energy efficient. They can require fewer people on site, helping to mitigate the skills shortage. Some firms are increasing their use of these methods, but we need to go further.

3.40 We will:

- **stimulate the growth of this sector through our Accelerated Construction programme and the Home Builders' Fund.** This will create new opportunities for the use of modern methods of construction to encourage investors into the sector and give current suppliers confidence to expand into the housing market. It will also support the delivery of high quality, energy efficient homes through these programmes;
- **support a joint working group with lenders, valuers and the industry** to ensure that mortgages are readily available across a range of tested methods of construction. This will include encouraging industry and lenders to develop a stronger set of core data to measure the use and performance of different technologies to encourage good decision-making;
- **consider how the operation of the planning system is working for modern methods of**

Ministry of Housing, Communities & Local Government

MMC WORKING GROUP

Full Working Group – Meeting No.2

23rd February 2018

Westminster Conference Centre

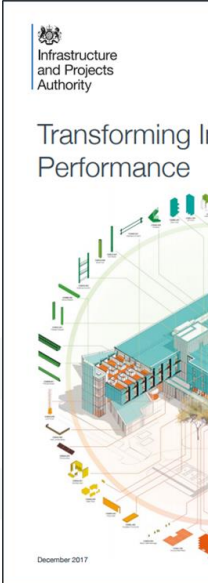
INTEGRATED PROCUREMENT

We Need to Also Recognise that the Traditional 'Tier One Contractor' Model is Broken

WE NEED TO **DISINTERMEDIATE** TRANSACTIONALLY
LED, NON-VALUE ADD MODELS

= **COLLABORATION & TRUST**

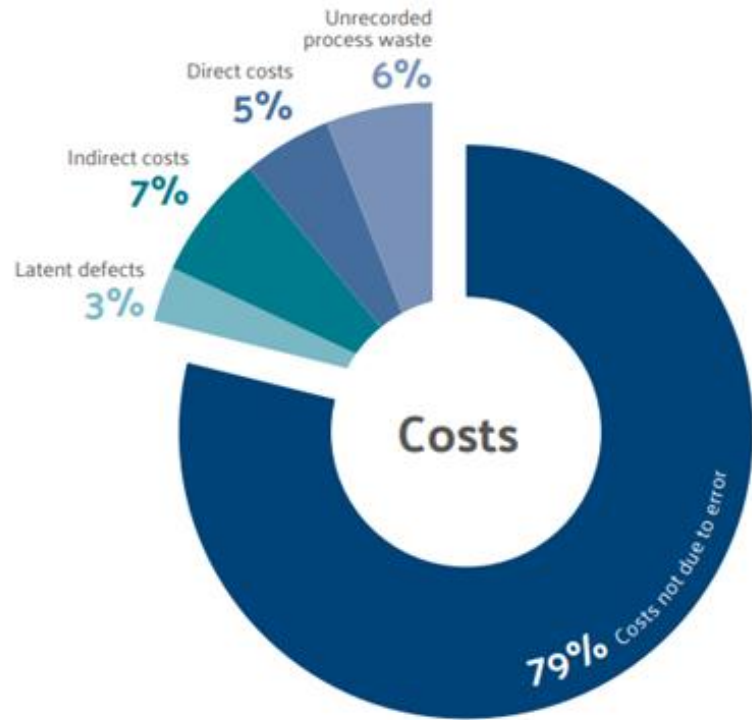
We Need to Move to New Organisational Models Enabling Higher Levels of Pre-Manufactured Value With Less Transactional & Management Hierarchy



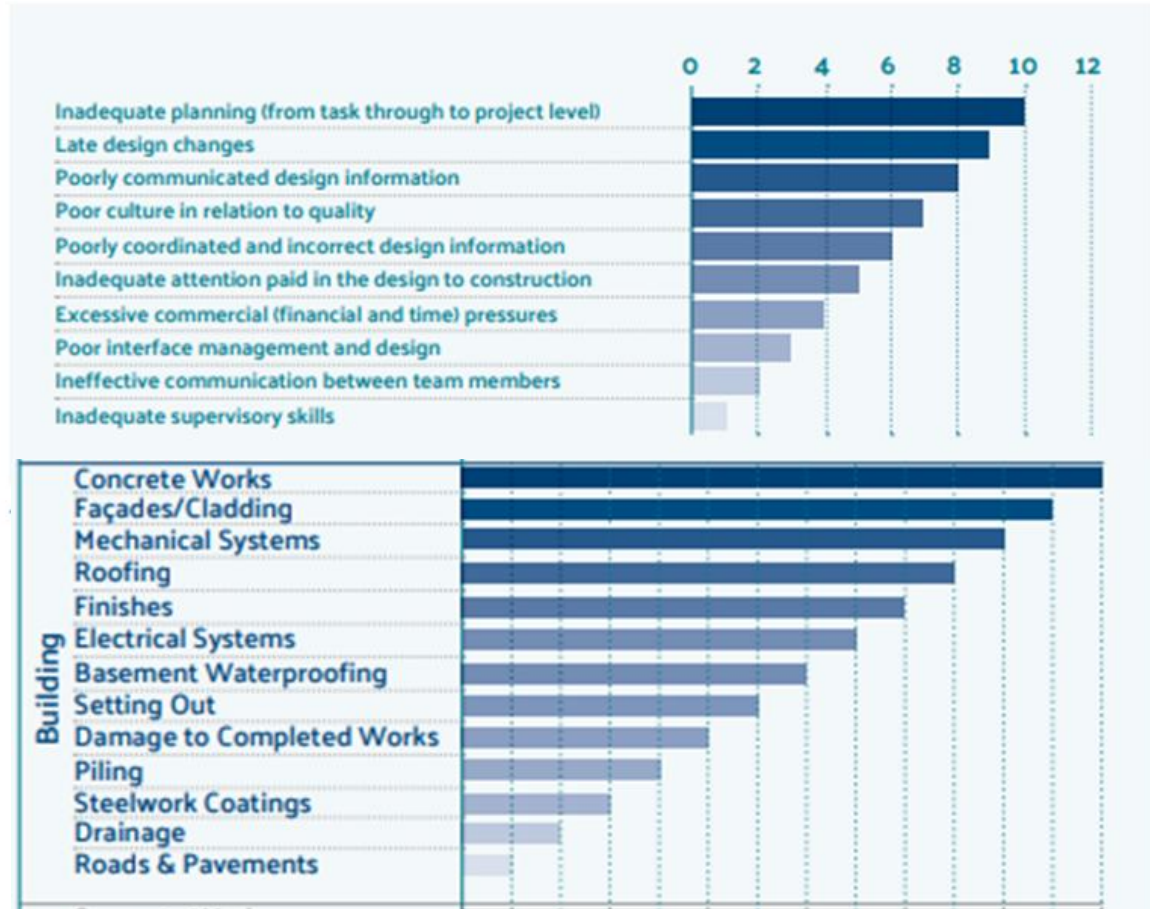
Enterprise Led Outcome Models
Integration Not Contracting
Project & Programme Alliances
DfMA & Higher PMV
Disintermediated Payment
Behavioural Filter Applied to Teams

**INCREASED LEVELS OF PRE-MANUFACTURED VALUE -
MANUFACTURE LED & HYBRID CONSTRUCTION**

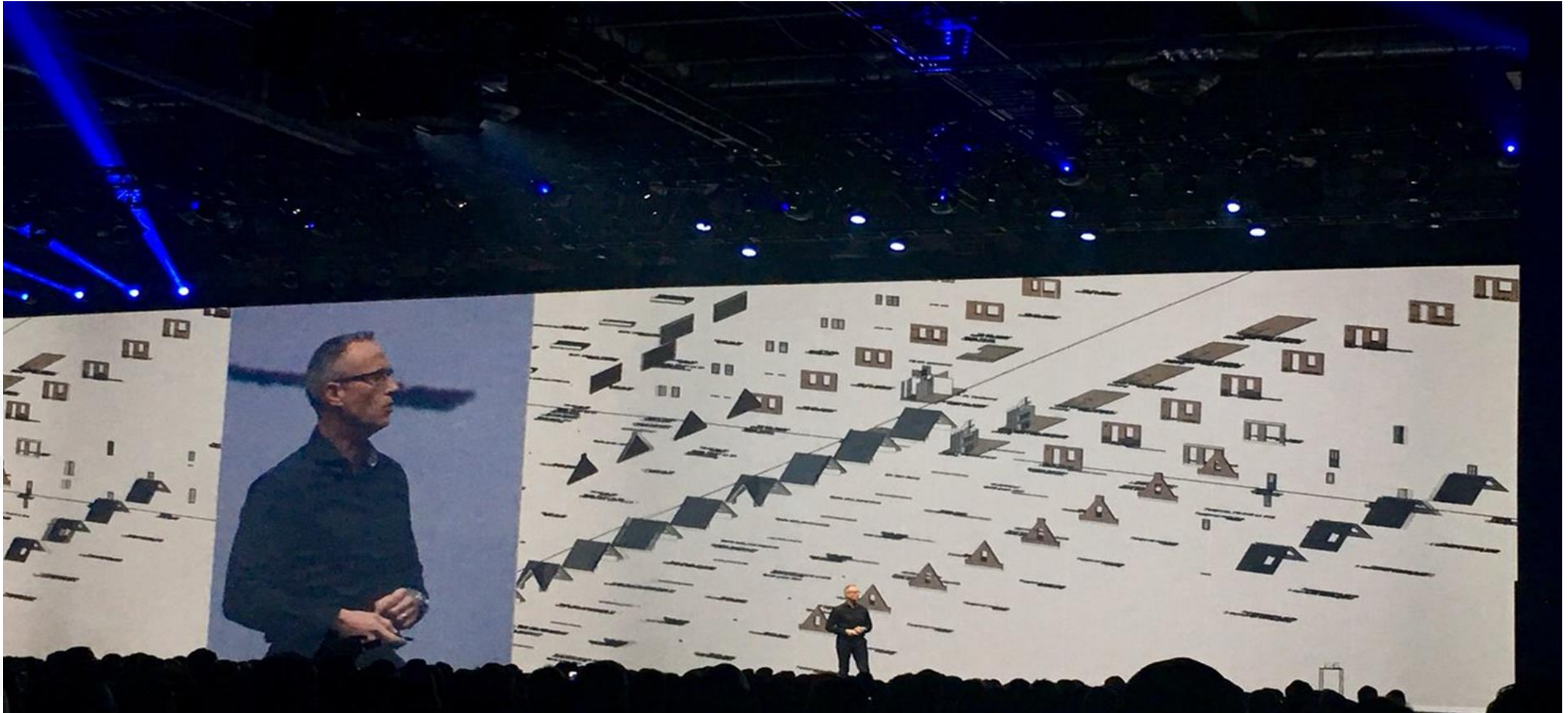
Productivity Improvement Has to Occur Alongside Cutting Transactional Waste



Ranking of the root causes of error (higher values are more significant)



'Construction as Manufacturing' – All Levels of Pre-Manufactured Value



'Construction as Manufacturing' Is Not Just About Big Centralised Factories – It's About Re-Shaping The Entire Supply Chain – SME's Included

FACTORY SHA 



The screenshot shows the homepage of The Architects' Journal (AJ). The main article is titled "London mayor to fund toolkit for offsite homes" by Ella Jessel, dated 12 April 2018. The article features a large image of a modern apartment building by a canal. To the right of the main article is a "MOST POPULAR" section with several smaller article thumbnails and titles, including "Mischievous architect and artist Will Alsop dies aged 70" and "RIBA names 51 London regional award winners with two 'best buildings'". The website header includes navigation menus for NEWS, BUILDINGS, COMPETITIONS, OPINION, AJ100, MAGAZINES, EVENTS, LIBRARY, JOBS, and SUBSCRIBE. Social media icons for Twitter, LinkedIn, Facebook, and YouTube are visible below the article title.

The n
revol

Along with
developing
supply chain



This image shows a large industrial factory floor with various pieces of machinery, including a large blue machine with a yellow component. A worker is visible in the background. The image is partially overlaid by a dark blue navigation bar at the top right with social media icons for LinkedIn and Twitter, and a dark blue footer bar with links for "Campaigns" and "Contact us".

Some Business Models Will Vertically Integrate a DfMA Led Full Development Capability & Start Excluding Traditional Consultant & Contractor Players



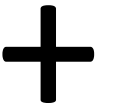
KATERRA



**Legal &
General**



Berkeley
Group



Cast

Some Business Models Will Allow The Industry to Simulate 'Vertical Integration'

The screenshot shows the Laing O'Rourke website. At the top left, there is a 'LOGO' placeholder and the company name 'LAING O'ROURKE'. Navigation links include 'Careers', 'Media', and 'Contact Us'. A search bar contains the text 'I am looking for...'. A main menu lists 'HOME', 'WHO WE ARE', 'WHAT WE DO', 'OUR PROJECTS', 'ENGINEERING THE FUTURE', and 'RESPONSIBILITY'. On the right, a sidebar titled 'Numbers refer to the total number of sites longlisted by each promoter in each region' lists various regions and their associated companies.

SKILLS
create skilled workforce

SUPPLY CHAIN:
Opportunity for SMEs in every corner of the UK to access Heathrow's supply chain

www.heathrow

PRESS RELEASES

PRESS RELEASES
PUBLICATIONS

12 FEBRUARY 2018
A GAME-CHANGING APPROACH TO THE UK'S HOUSING STOCK

Three of the UK's most innovative firms in their respective fields of development, housing management and modern construction have joined forces to help solve the UK's housing crisis.

Stanhope plc, with £22 billion in completed projects, Network Homes, owning and managing 20,000 dwellings across London and the South East and international engineering enterprise, Laing O'Rourke have formed a long-term partnership to deliver and manage precision-engineered homes across the South East.

North East
1 Tarmac Trading Ltd
1 Tees Valley Combined Authority

Yorkshire and the Humber
1 Severfield UK Ltd
1 Bishopdyke Enterprises Ltd
1 British Steel
1 Doncaster Sheffield Airport Ltd
1 Leeds Bradford Airport Ltd
1 Sheffield City Region

East Midlands
1 Corby Land and Development Ltd
1 Laing O'Rourke
1 SEGRO Plc
1 Prologis UK Ltd
1 Tarmac Trading Ltd

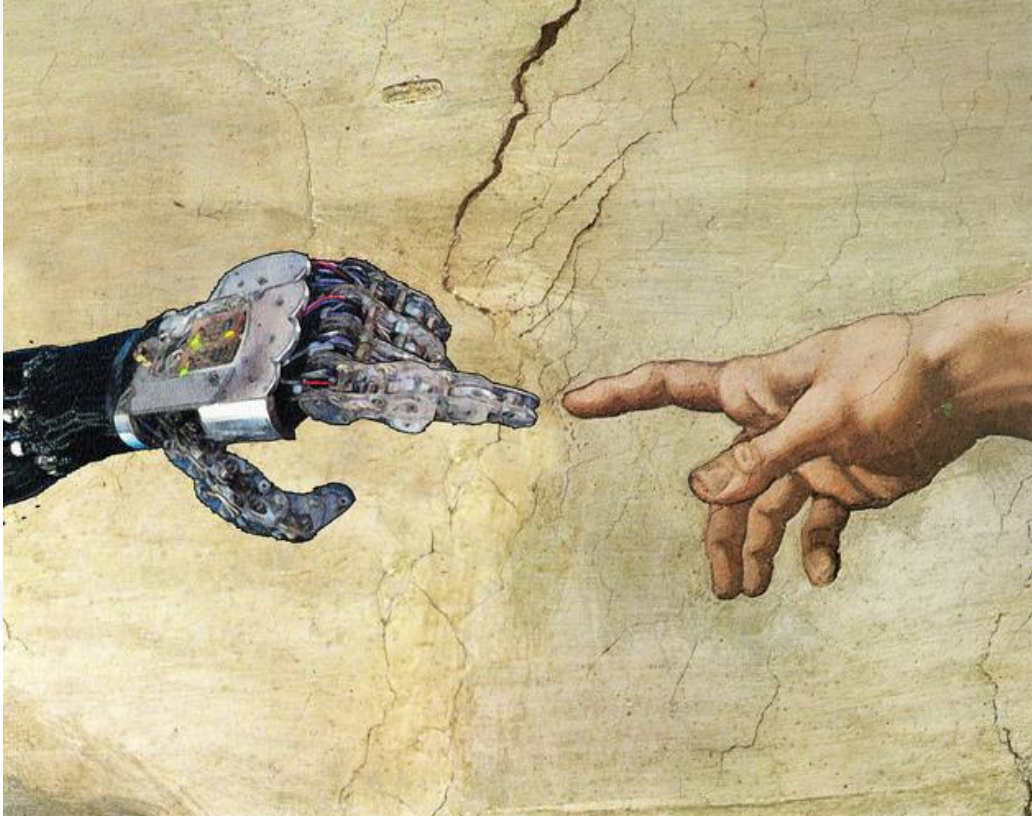
East of England
1 Opportunity Peterborough
1 Peel Ports Investments Ltd

London
1 London Borough of Havering
1 Wincanton

South East
1 Amalga Ltd
1 Peel Ports Investments Ltd

Heathrow

Innovation Should Be Led By How We Organise to Maximise Interface of Technology & Human Experts – ‘Augmentation’



We Should Let Technology Do The ‘Heavy Lifting’ So Creativity, Human Intuition & Interpretation & Validation Is The Focus Of How We Improve The Built Environment

Focus now has to be 'Digitalising Construction' not just Initial Design or the End Assets

We will set Grand Challenges to put the United Kingdom at the forefront of the industries of the future:

- AI & Data Economy**
We will put the UK at the forefront of the artificial intelligence and data revolution
- Clean Growth**
We will maximise the advantages for UK industry from the global shift to clean growth
- Future of Mobility**
We will become a world leader in the way people, goods and services move
- Ageing Society**
We will harness the power of innovation to help meet the needs of an ageing society

https://vimeo.com/252293584

Innovate UK

The immersive economy in the UK

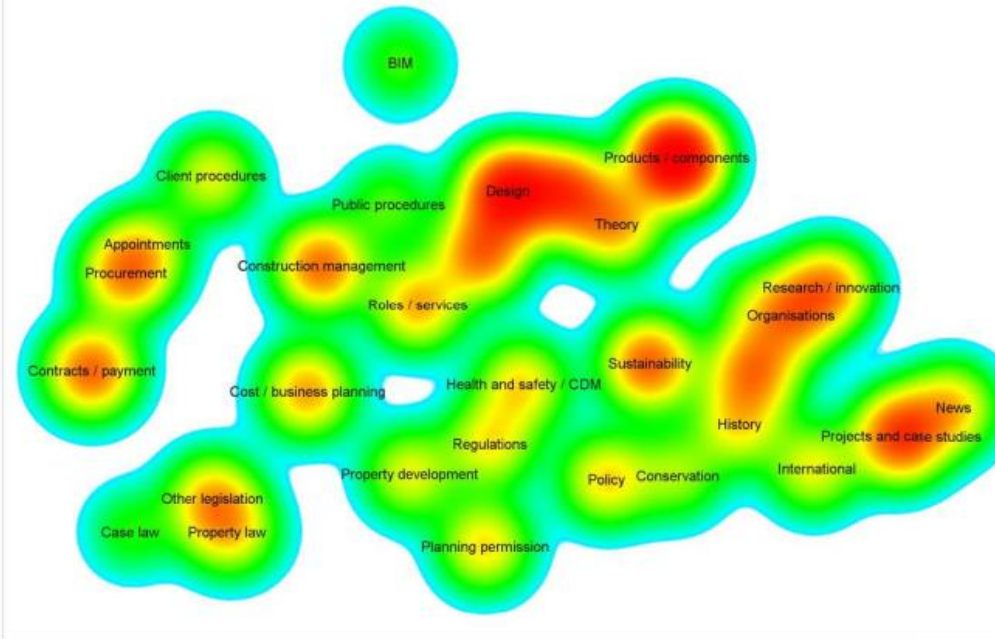
The growth of virtual, augmented and mixed reality technologies

IMMERSE UK.ORG

Innovate UK is part of UK Research and Innovation

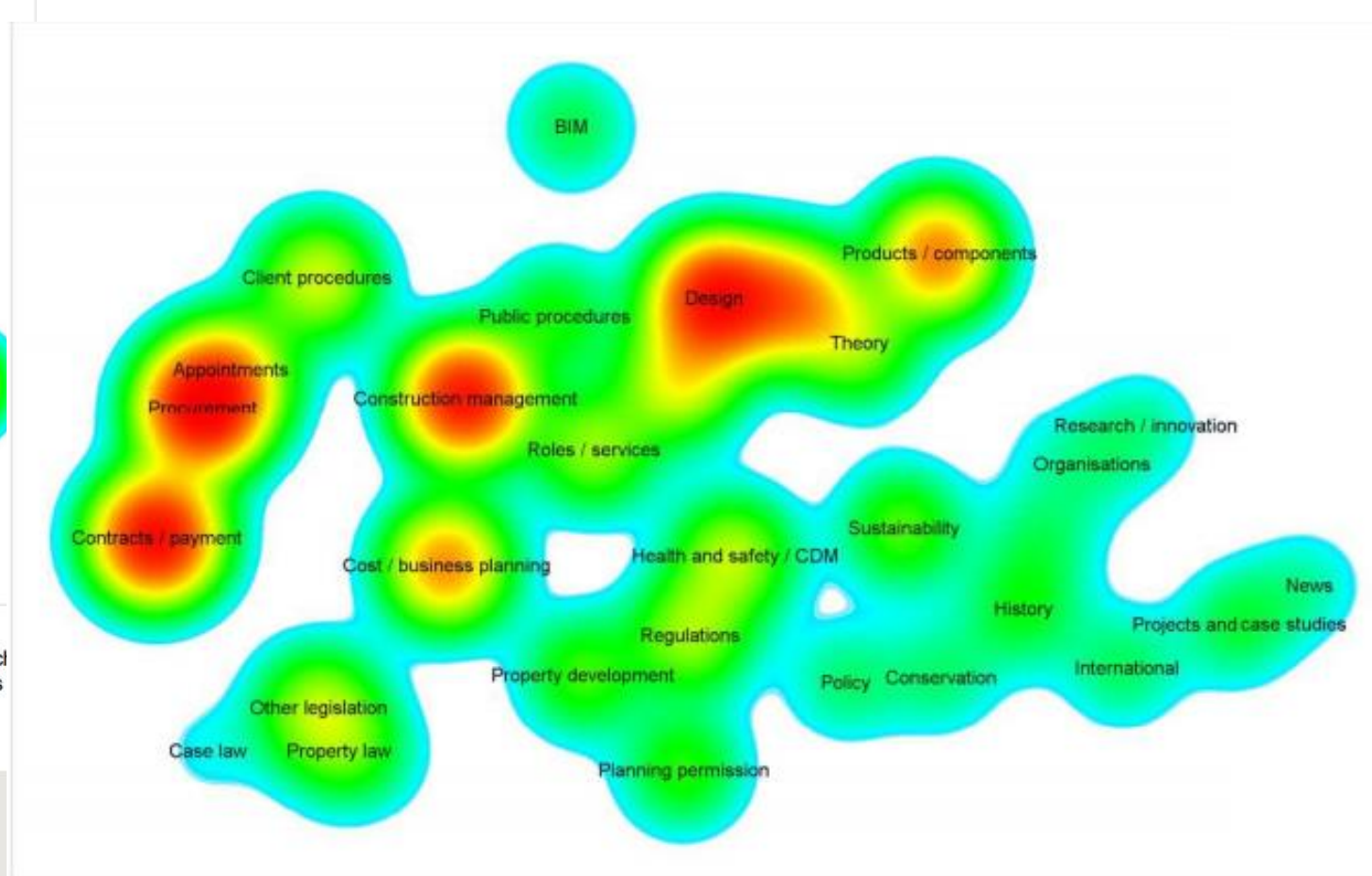
The full potential of digital will not be fully realised until we take it fully into the production process & step changes site productivity & quality

BIM Evangelists & Practitioners Must Avoid Cementing a 'Sub-Culture' – By Arguing About The Detail & Purity – It's Increasingly Less About 'BIM' it's about 'Digital Construction'

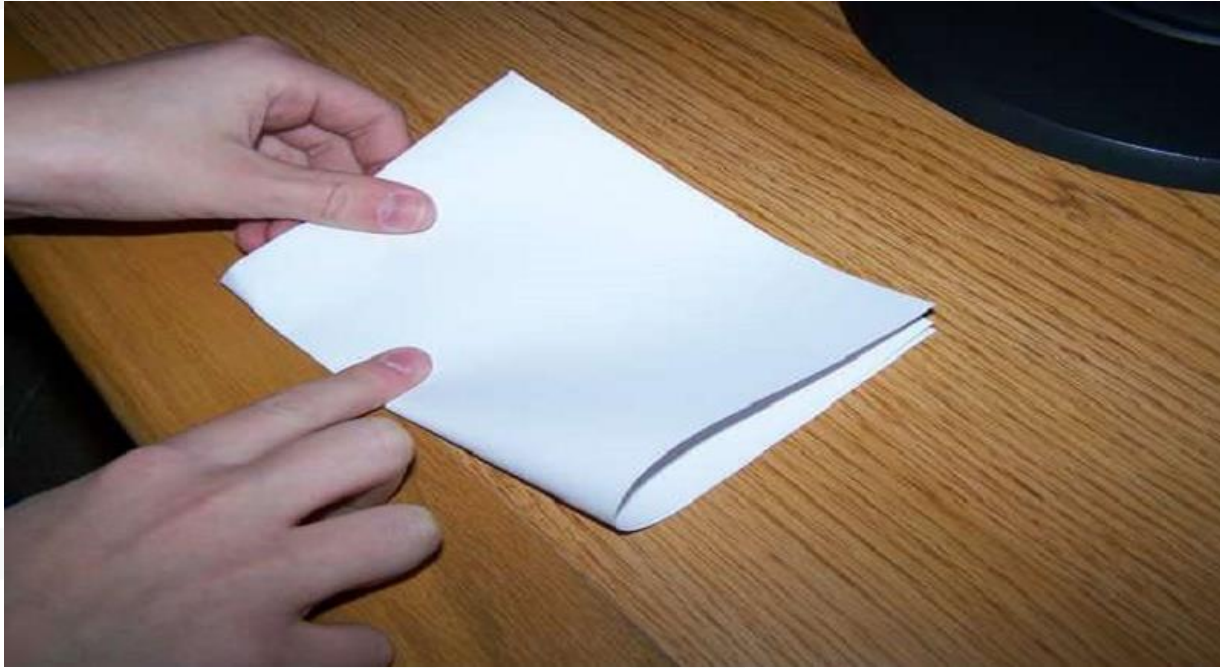


It is clear that there is a focus of knowledge in what might be described as 'academic' subjects, such as theory, research and case studies, as well as design and literature about products. There is less written about industry 'framework' subjects, such as policy, regulations, legislation and public procedures.

Most notably, whilst a lot has been written about Building Information Modelling (BIM), it is disconnected from other construction industry subjects. This may reflect the fact that BIM emerged as an area dominated by specialists, and has struggled to embed itself into the daily work of the rest of the industry.



Many Still Doubt That Innovation Can Change Our Industry In The Future. Change is Coming Though - 'Incremental Transformation'



What Does Exponential Growth Look Like?

- Fold a paper in half you double its thickness
- Fold it once again it will be thickness of credit card ← **CONSTRUCTION**
- Fold it 10 more times after that it will be the height of a Coke can
- Fold it 32 more times after that it will reach the moon, 240,000 miles away
- Fold it just another 8 times after that it will reach the Sun, 93 million miles away

The Future Will Not Be Dictated By The Past!

