



The Innovation Factory

Delivering the Scottish Construction Industry's First Dedicated Digital Manufacturing, Prototyping & Future Skills Centre of Excellence

Stephen Good, CEO / 31.01.18



Innovation Centres

Supported by The Scottish Funding Council,
Highlands and Islands Enterprise and
Scottish Enterprise.



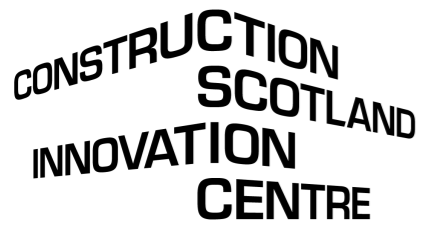
Scottish Funding Council
Promoting further and higher education



Highlands and Islands Enterprise
Iomairt na Gàidhealtachd 's nan Eilean



Scottish Enterprise



CONSTRUCTION
SCOTLAND



INNOVATION
CENTRE



Universities
Scotland



Edinburgh Napier
UNIVERSITY



UWS UNIVERSITY OF THE
WEST of SCOTLAND

THE GLASGOW
SCHOOL OF ART



University
of Glasgow

A silhouette of a suspension bridge spanning a deep chasm. The bridge has two main cables and a series of wooden planks forming the deck. On the right side of the chasm, there is a signpost with an arrow pointing left. The background is a clear blue sky.

**bridging the gap
between
academia and
industry**

vision...

**CONSTRUCTION
SCOTLAND
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CENTRE**

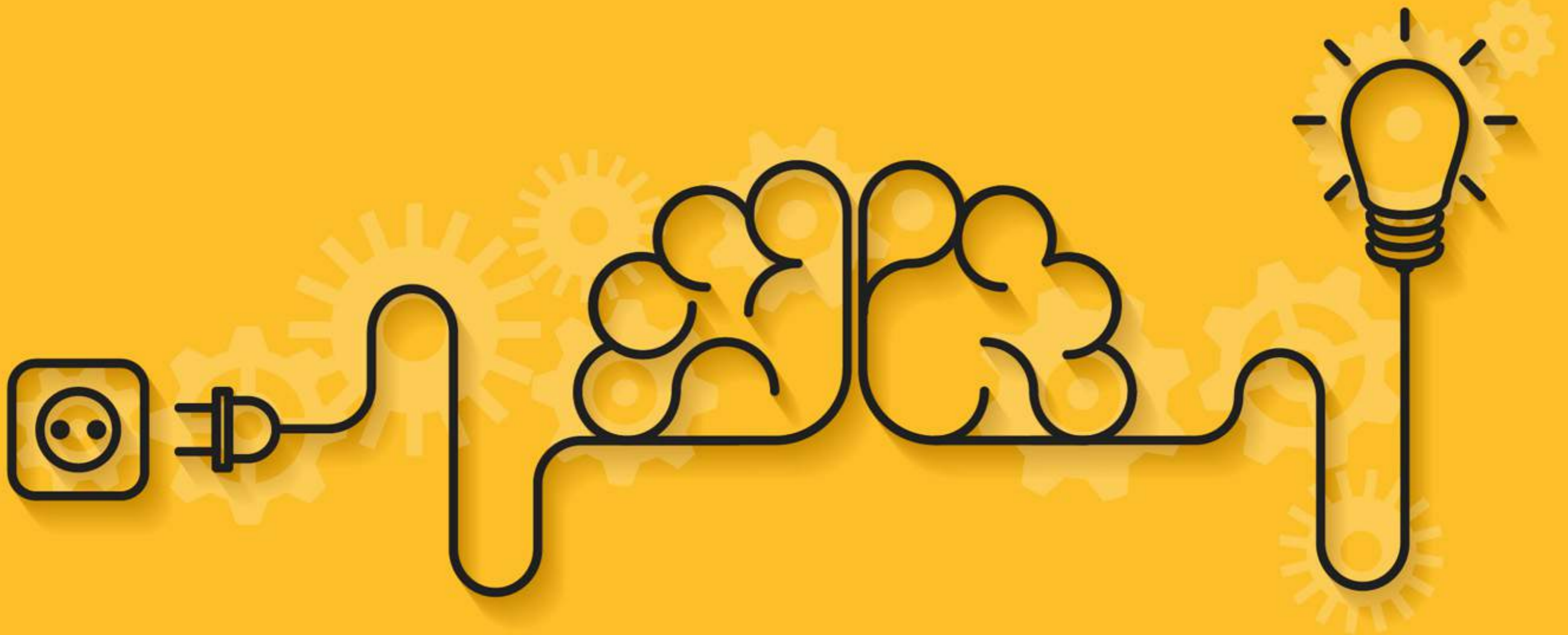
**champion
innovation &
connect Scotland's
construction
industry to deliver
transformational
change**

purpose...

**enable
industry
to exploit global
opportunities by
mainstreaming
an innovation
culture**

an innovation culture...

Don't think about innovation as an initiative,
look at it as being a unique and inherent feature
of your business.



CSIC access to...

expertise + funding:

networks of leading experts / coordination of partners
investment funding / collaborators + networks

projects + awareness:

exploratory workshops + events / live build projects / BIM
programme / calls + initiatives / focus hubs / local + international

facilities + training:

prototyping + testing / future workforce / training / CPD workshops
membership / pay-as-you-go access / commercial access

industry statistics...

178,000
PEOPLE ACROSS
(7% OF TOTAL)

31,000
BUSINESSES

88%
MICRO BUSINESSES

GVA
£10
BILLION

GDP
£25
BILLION



96%



OF THE INDIGINOUS SCOTTISH
CONSTRUCTION INDUSTRY DOES
NOT EXPORT OUTSIDE OF THE UK

48,000
PEOPLE SELF-EMPLOYED




120+
TRADE ORGANISATIONS



FOR EVERY **£1.00** SPENT ON
CONSTRUCTION A FURTHER **£3.00**
IS GENERATED IN THE ECONOMY

CSIC statistics...



£7.8M

CORE FUNDING

LAUNCHED OCT 2014



3 YEARS INTO
A 5 YEAR
SET UP PLAN

£1.5
MILLION




**CAPITAL
EQUIPMENT**

200+ 

INDUSTRY PARTNERS

14 **CORE TEAM**



13


**UNIVERSITY
PARTNERS**

progress...

industry predicted outcomes

NO. OF
PROJECTS
SUPPORTED

112 

 271
INDUSTRY ENGAGEMENTS

NEW PRODUCTS AND
PROCESSES
DEVELOPED
FOR
MARKET

47 

INDUSTRY
INVESTMENT
IN PROJECTS

£5.5M 

2
3
8 NEW
JOBS



ADDITIONAL
REVENUE
GENERATED

£81M

53



MSc STUDENTS



146 NEW
COLLABORATIONS

wider impact...

industry predicted outcomes

PROJECTS
WITH MULTIPLE
COLLABORATION
PARTNERS

70%



75%

PROJECTS WITH HEI'S



NO. OF NEW
INTERNATIONAL
MARKETS
ENTERED

14

ANTICIPATED
COST SAVINGS
TO BUSINESSES

£4.5M



768

JOBS
SAFEGUARDED



PREDICTED
CO2
SAVINGS

237
TONNES

48%

STRATEGIC PROJECTS



£6.5M

ADDITIONAL
REVENUE
FROM
EXPORTS

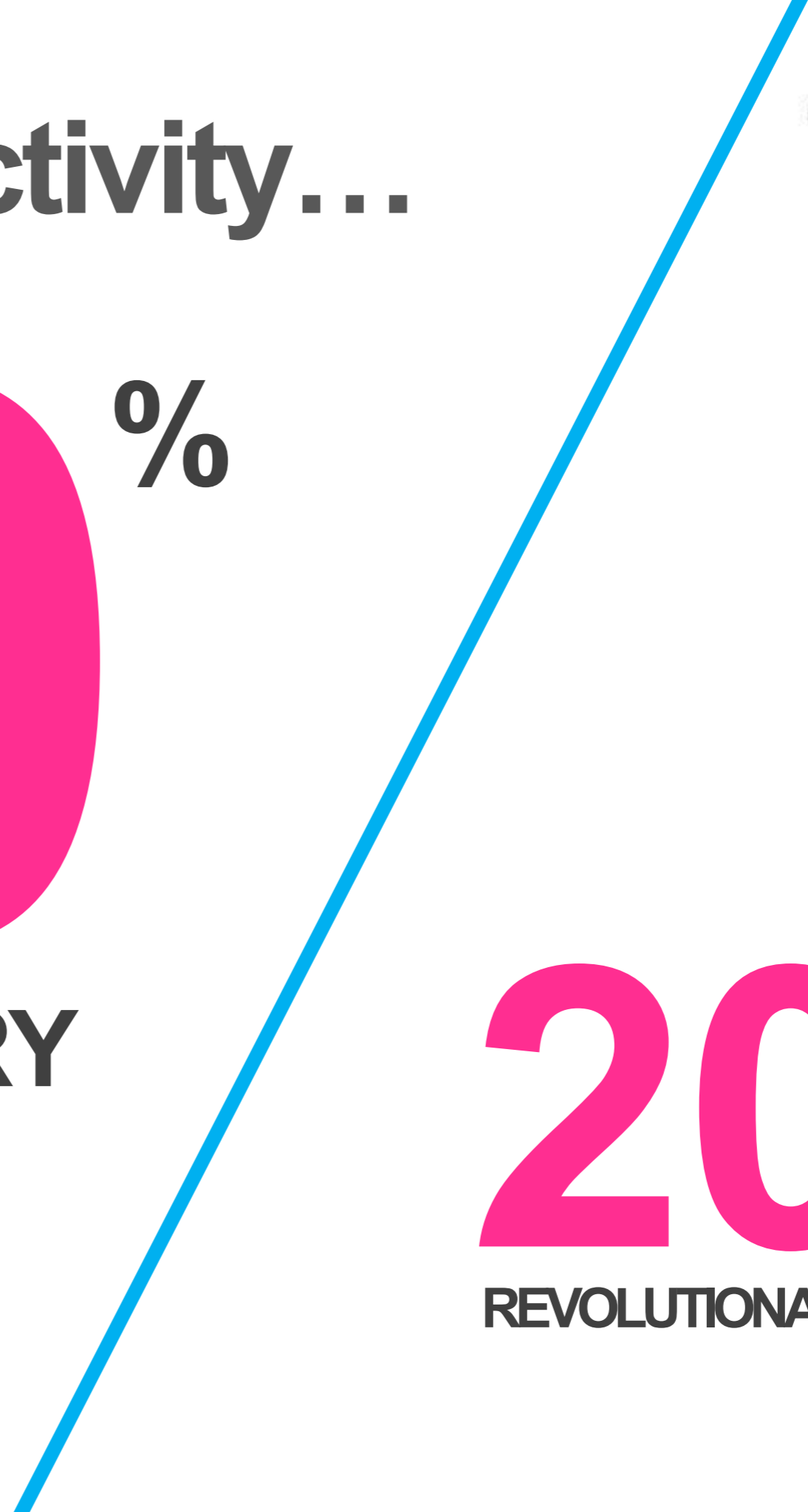
innovation activity...

800 %

EVOLUTIONARY

20 %

REVOLUTIONARY





PROCESS INNOVATION



BUSINESS INNOVATION



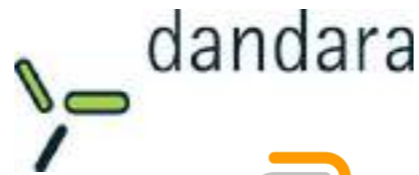
SERVICENOVOATION



PRODUCT INNOVATION

current project partners...

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CENTRE



"cost effective waste solutions with first class service"



anderson bell + christie



current project partners...

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SCOTLAND
INNOVATION
CENTRE



SCOTTISH
FUTURES
TRUST



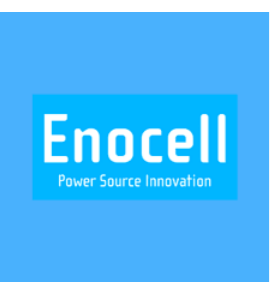
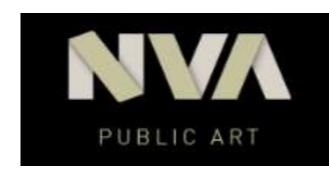
HEBHOMES

ARUP

Austin-Smith:Lord



current project partners...



industry priorities...

culture + behaviour:

Innovative / Collaborative / Opportunity Focused / International
Diverse Talent Pool / People Focused / Improved Image

productivity + efficiency:

Offsite Manufacturing / More for Less / DfMA / Resource Efficient
Speed & Quality / Mass Customisation / Lean / Skills / BIM

technology + data:

Automation / AR+VR+MR / Advanced Analytics / Digital Processes
Robotics / Transferable Technologies / Early Adoption



**is construction ripe
for a digital revolution...?**

how would you assess the capacity of the construction industry...?

1. Cutting edge
2. Fit for purpose
3. Ripe for change
4. Woefully inadequate

how would you assess the capacity of the construction industry...?

1. Cutting edge
2. Fit for purpose
- 3. Ripe for change**
4. Woefully inadequate

**innovation
is change
that unlocks
new value**

innovation

is change

that unlocks

new value







In the fourth industrial revolution, digital analytics enables a new level of operational productivity.



1st
Mechanization,
water power,
steam power

2nd
Mass production,
assembly line,
electricity

3rd
Computer and
automation

4th
Cyber physical
system



Maturation of new
cyber physical
technologies
(artificial
intelligence, 3-D
printing, robotics)



Data analytics
driving efficacy
and effectiveness
and new business
models



Pervasive
sensing
and
actuation



Ubiquitous
connectivity
throughout
the supply
chain



Unprecedented
levels of data
and increased
computing
powers



**time for
change?**

**“change has never happened
this fast before, and it will
never be this slow again”.**

Gordon Moore, Intel

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**5 Billion GB
worth of data
generated in
human history**



**5 Billion GB
worth of data
generated in
human history**



**5 Billion GB
worth of data
generated every
10 hours**



**5 Billion GB
worth of data
generated in
human history**



**5 Billion GB
worth of data
generated every
10 hours**



**5 Billion GB
worth of data
generated every
2 minutes**

**industry led
change?**

“drive culture change in the construction industry through procurement reform, a more collaborative approach with earlier contractor involvement and better training”.

“drive culture change in the construction industry through procurement reform, a more collaborative approach with earlier contractor involvement and better training”.

The Simon Report, 1944

RETHINKING



CONSTRUCTION

1994

THE REPORT OF THE CONSTRUCTION TASK FORCE

CONSTRUCTING THE TEAM

BY SIR MICHAEL LATHAM

FINAL REPORT OF THE
GOVERNMENT/INDUSTRY REVIEW OF
PROCUREMENT AND CONTRACTUAL
ARRANGEMENTS IN THE UK
CONSTRUCTION INDUSTRY

1998

HMISO



Never Waste a Good Crisis

A Review of Progress since *Rethinking Construction*
and Thoughts for Our Future



HM Government

Industrial Strategy: government and industry in partnership



Construction 2025

July 2013

Building for The Future

The Scottish
Construction
Industry's
Strategy

2013-2016

THE FARMER REVIEW OF THE UK CONSTRUCTION LABOUR MODEL

MODERNISE OR DIE

Time to decide the industry's future



Sector

- ICT²
- Media
- Professional services
- Finance and insurance
- Wholesale trade
- Advanced manufacturing
- Oil and gas
- Utilities
- Chemicals and pharmaceuticals
- Basic goods manufacturing
- Mining
- Real estate
- Transportation and warehousing
- Education
- Retail trade
- Entertainment and recreation
- Personal and local services
- Government
- Healthcare
- Hospitality
- Construction
- Agriculture and hunting

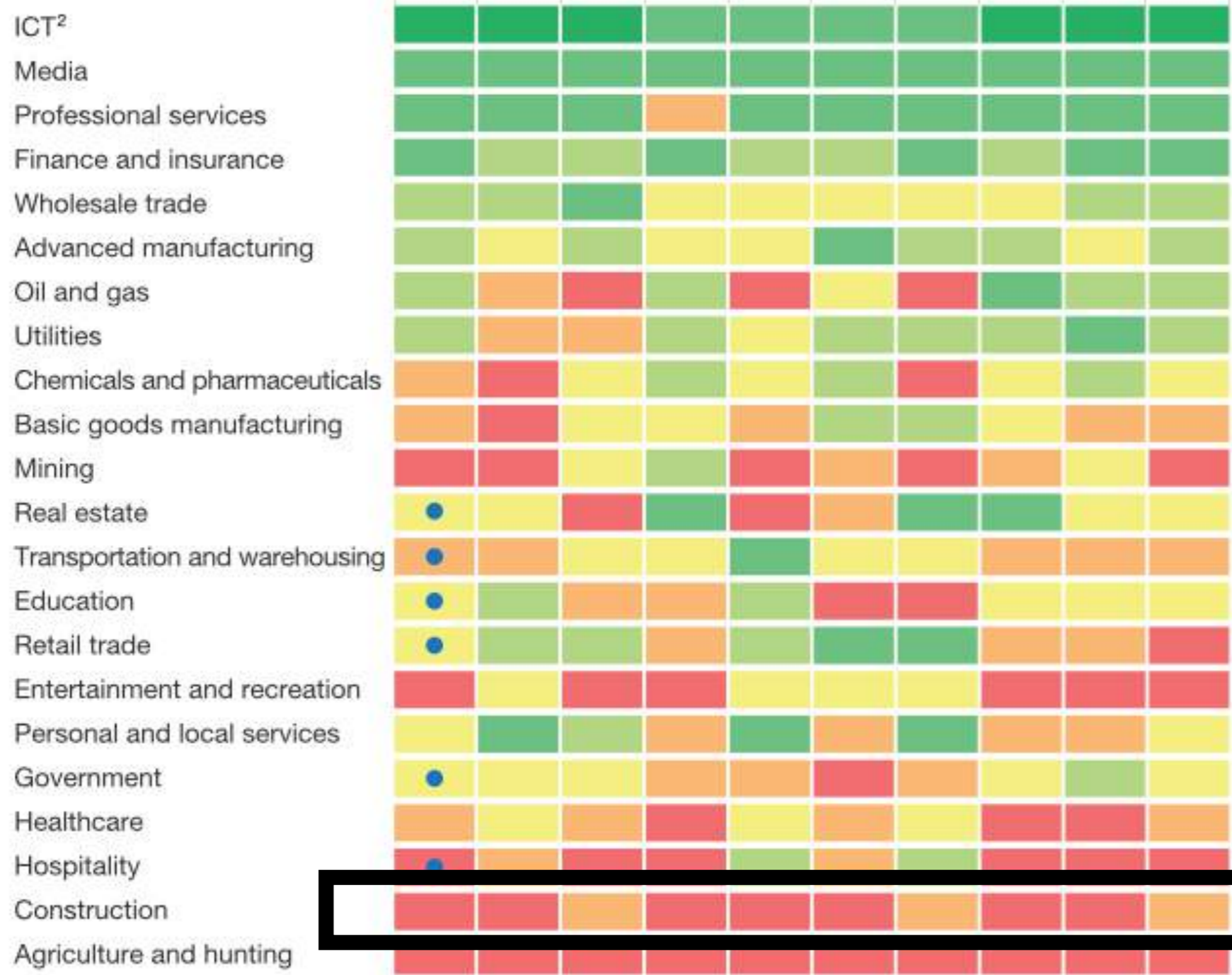


Relatively low digitization (Red) to Relatively high digitization (Green). Blue dot indicates Digital leaders within relatively undigitized sectors.

McKinsey Global Institute industry digitization index; 2015 or latest available data

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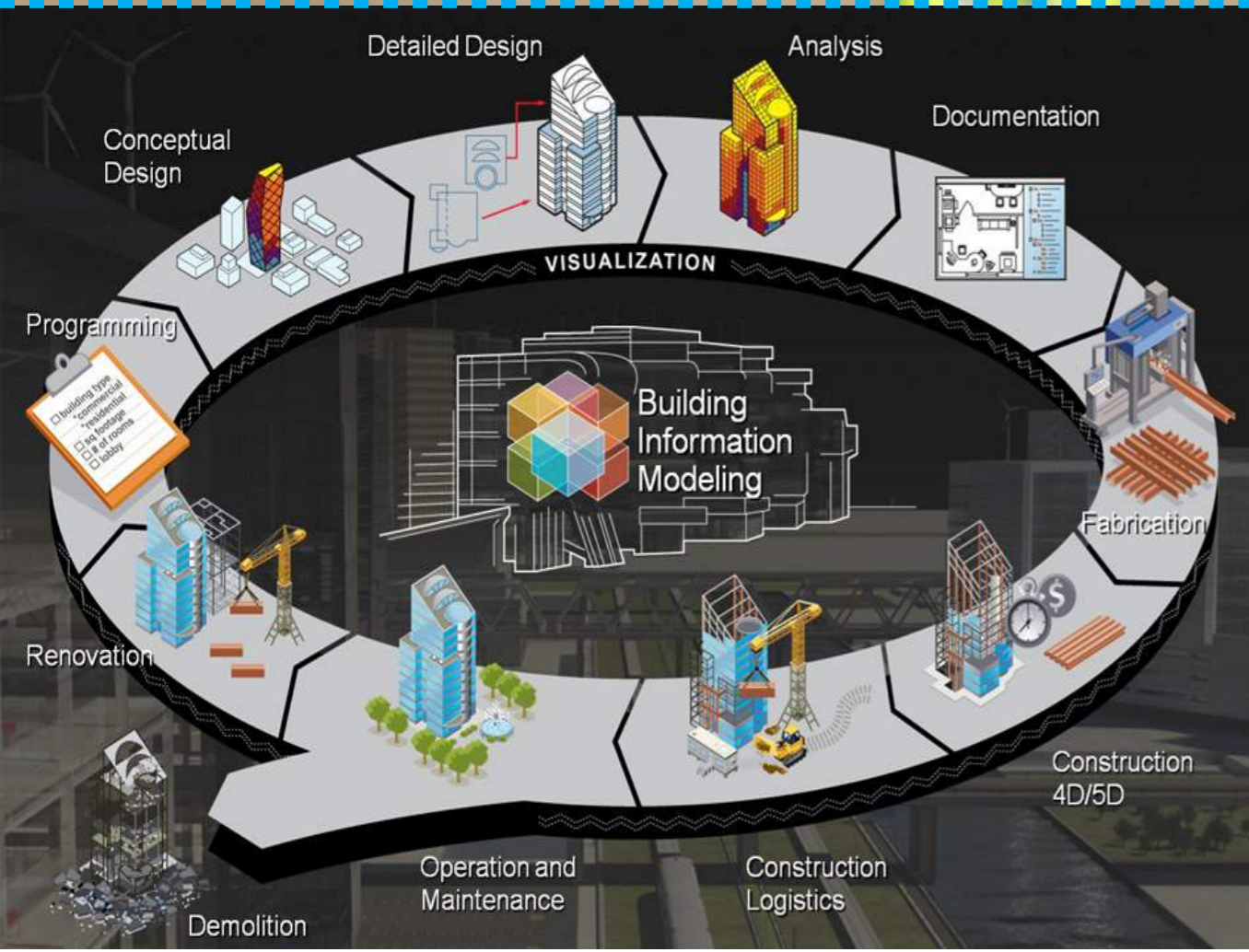
Sector



Construction



Relatively low digitization Relatively high digitization
 • Digital leaders within relatively undigitized sectors



TECH/IOT/BIM/MOBILITY

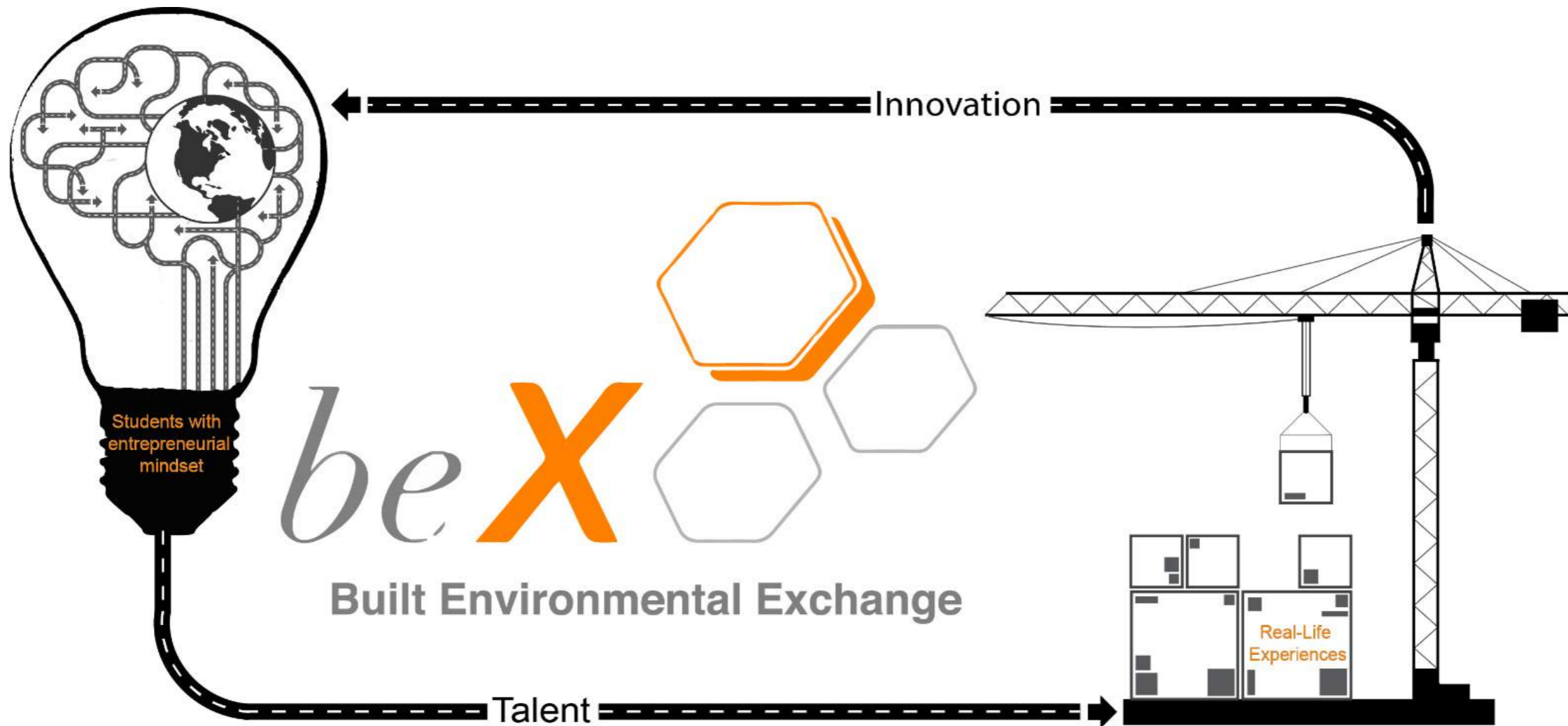


AR / WEARABILITY / ROBOTS

**The jobs of
the future
will not be
the jobs of
today.**

MSc Programme...

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 Scottish Funding Council
Promoting further and higher education

Edinburgh Napier
UNIVERSITY 

CIWG Pilot Project...



future skills programme...

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CITB construction skills

skills investment plan...

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Work-based
learning including
Apprenticeships



Find an apprenticeship at
apprenticeships.scot



digitalworld.net
promoting careers in
digital technologies



Career Long Professional
Learning modules



Career Information, Advice and Guidance

Advisers in every secondary school
developing Career Management Skills
- aligned to the Career Education
Standard, Curriculum for Excellence
and the outcomes of Developing
Scotland's Young Workforce



myworldofwork.co.uk
including expert
advice on use



My World of Work
School Ambassadors



Teacher lesson resources



Digital tools and
resources for younger
years' pupils (P5-P7)



Support for parents



Improving Gender
Balance Scotland



Employer links



The Scottish
Government

DYW

Developing the
Young Workforce

Skills
Development
Scotland

preparing for BIM...

BIM Awareness:

Oct 16-Dec 17 / Free to attend / Step by Step awareness events / monthly programme / events across Scotland / BIM Level 2

BIM Implementation:

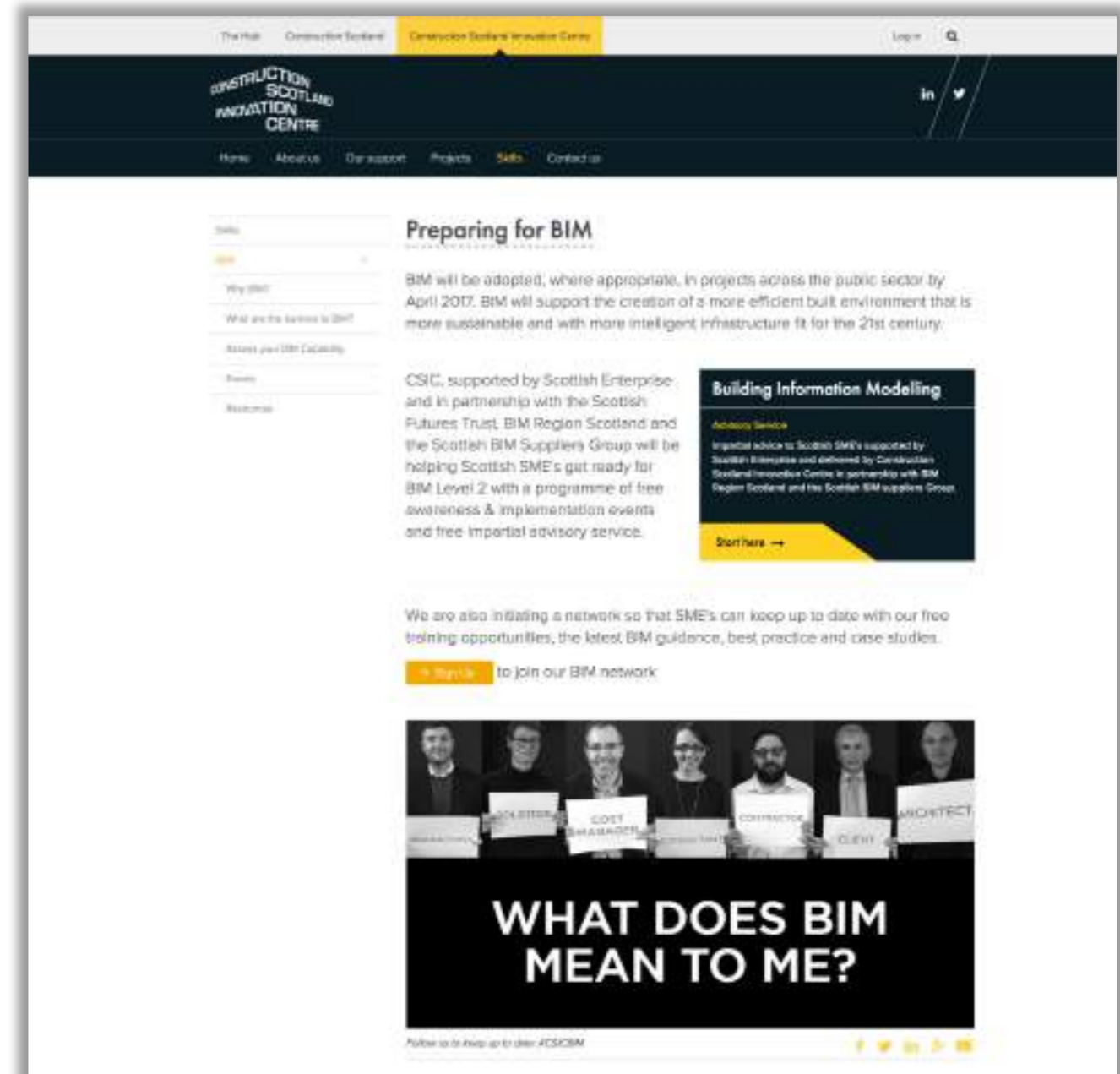
Jan 18-Dec 18 / free to attend / knowledge to mobilisation stage / monthly programme / events across Scotland / BIM level 2

preparing for BIM...

Online Hub

The CSIC BIM pages include:

- Background to BIM Level 2 Adoption
- Self Assessment of your BIM Capacity
- Signup to Preparing for BIM Network
- Preparing for BIM Advisory Service
- Preparing for BIM 'Step by Step' Events
- BIM Guidance, Standards & other resources



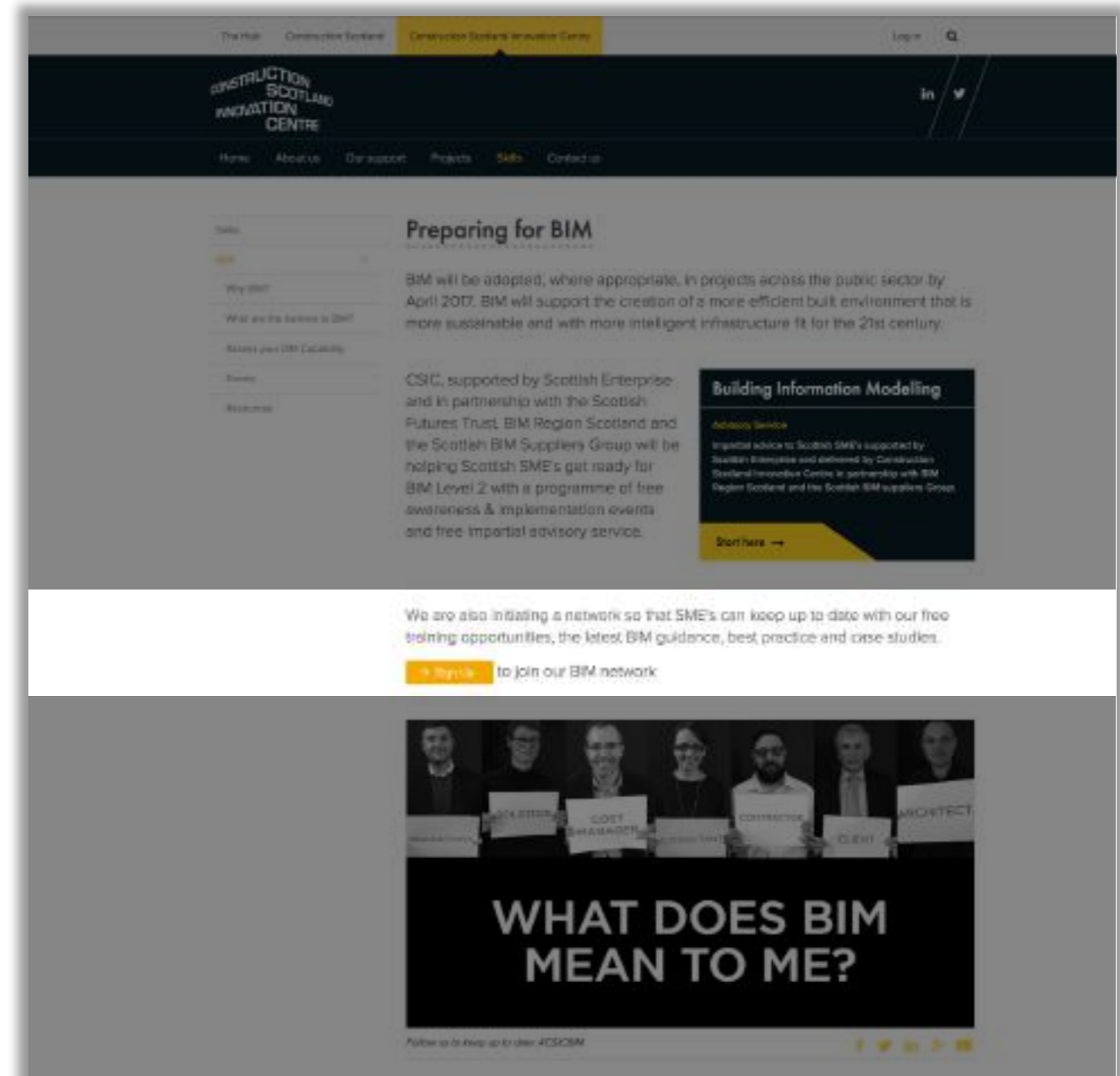
Join the network today, register at www.cs-ic.org/BIM

preparing for BIM...

Online Hub

BIM Network:

The CSIC BIM pages includes an 'one click' signup to the BIM Network which will keep subscribers updated on the event programme, updates on standards, guidance, resources and others relevant news.



Join the network today, register at www.cs-ic.org/BIM

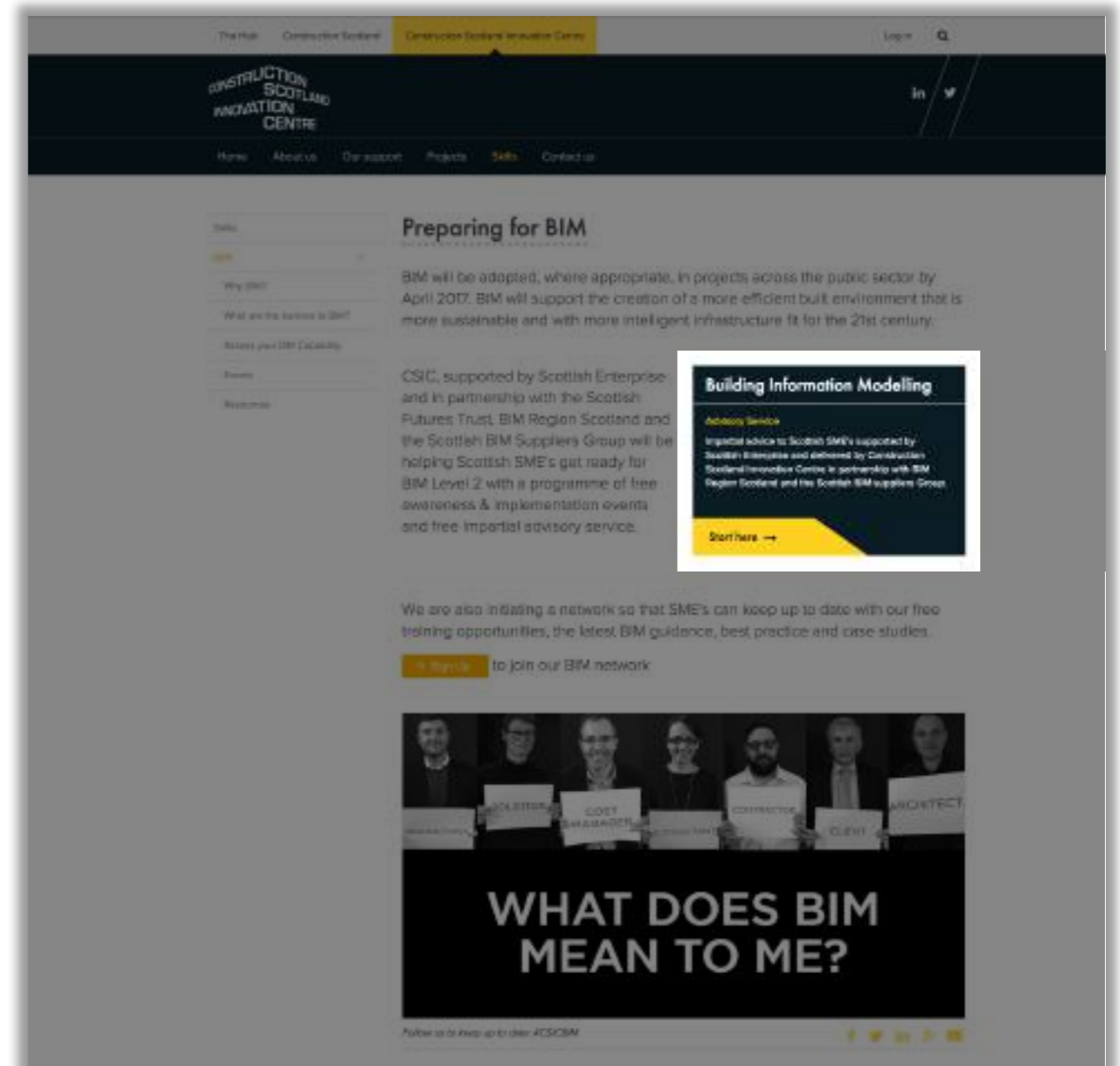
preparing for BIM...

Online Hub

BIM Advisory Service:

The CSIC BIM pages includes an 'one click' Advisory Service allowing SME's to access impartial advice & support around BIM topics.

The service is delivered by the Construction Scotland innovation Centre in partnership with BIM Region Scotland and the Scottish BIM Suppliers Group and is supported by Scottish Enterprise and Scottish Futures Trust.



Join the network today, register at www.cs-ic.org/BIM

preparing for BIM...

Online Hub

BIM Self Assessment Tool:

The Scottish Futures Trust, Constructing Excellence & CIOB have published a 'BIM Compass' which is a simple, unambiguous and confidential way to self assess **your** current BIM capability and compare against open industry benchmarks.

This is to support both suppliers and procurers to inform their current capability and identify areas for future training and up skilling.

The tool is accessible at www.cs-ic.org/BIM

The screenshot displays the 'How it works' section of the BIM Self Assessment Tool. It features a blue sidebar on the left with the text 'How it works'. The main content area is divided into three columns, each representing a step in the process:

- Step 1: The Capability Assessment**
 - A series of evidence based 'this is the experience we have' statements aligned to 8 core BIM competencies (as defined by the BIM Task Group).
 - Select which statement aligns with your experience for each competency.
 - The assessment is not timed or recorded so you can cancel it at any stage or take again at a later date.
 - If your experience is zero, simply click on the first box.
- Step 2: The Results**
 - Your answers generate your own capability charts so you can compare yourself against your peers.
 - The table and charts show your results and how you compare with the industry average.
 - The first 3-pointed spider chart highlights your Level 1 BIM capability. Combined with the 2nd spider, you see your Level 2 BIM capability.
 - The pie charts represent the average score of all the answers given for each particular core competency.
- Step 3: The Upskilling Action Plan**
 - Your results populate your Upskilling Action Plan.
 - The colour coded table shows you what you need to do to improve.
 - Core competencies that need 'most attention' are in red, 'some attention' in amber and 'good progress' in green.
 - Your results are not saved so print screen if you want to keep them.

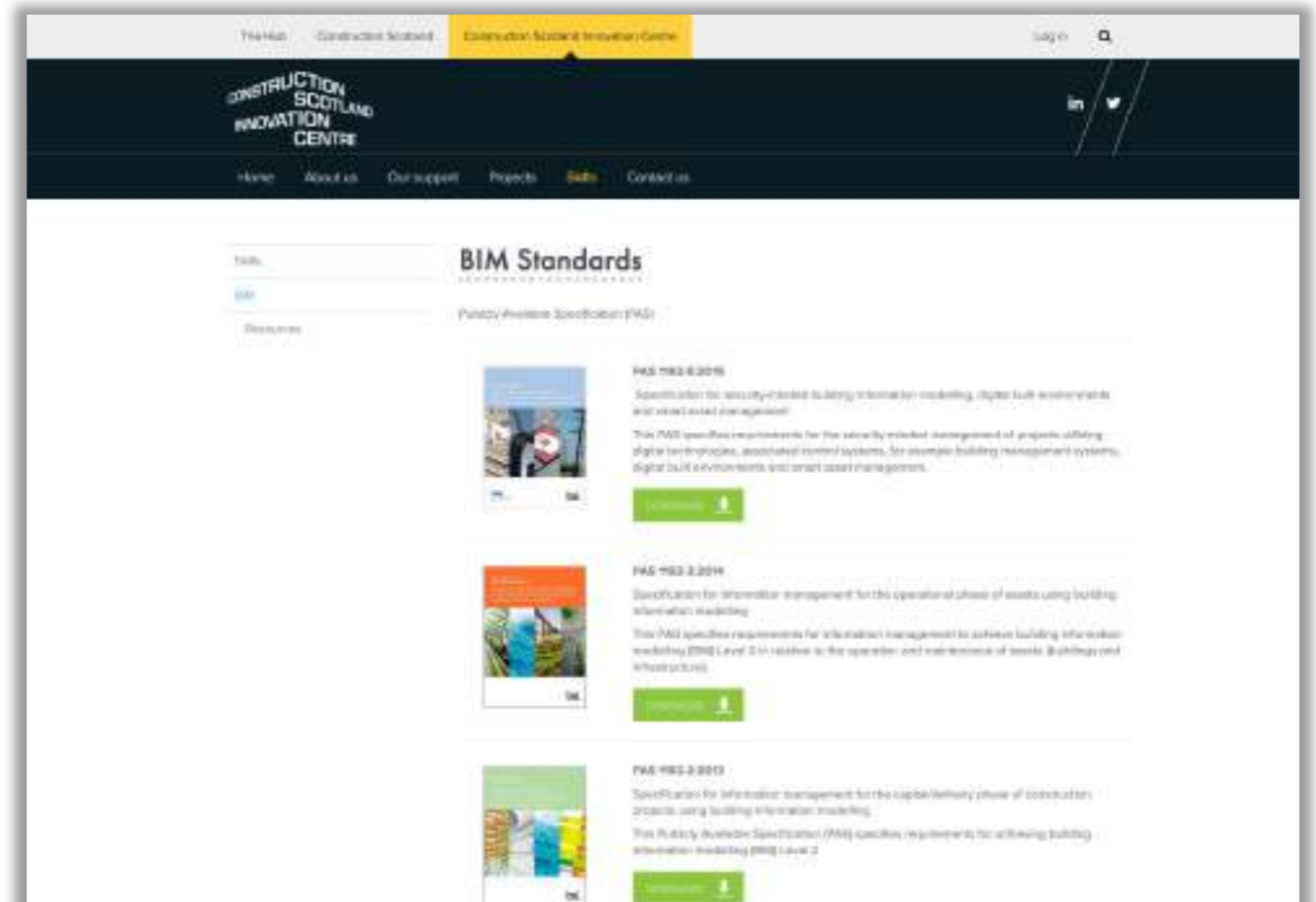
preparing for BIM...

Online Hub

BIM Resources:

This section provides useful links to the existing BIM Level 2 standards and best supporting advice.

- ✓ Frequently Asked Questions
- ✓ Free BIM Standards
- ✓ Free BIM Guidance
- ✓ Free Wiki & Dictionary
- ✓ Free to use BIM Toolkits
- ✓ Open BIM Protocols
- ✓ Accredited Courses
- ✓ Free Knowledge Base



BIM portal...

When?
To Adopt BIM



Why?
To Adopt BIM

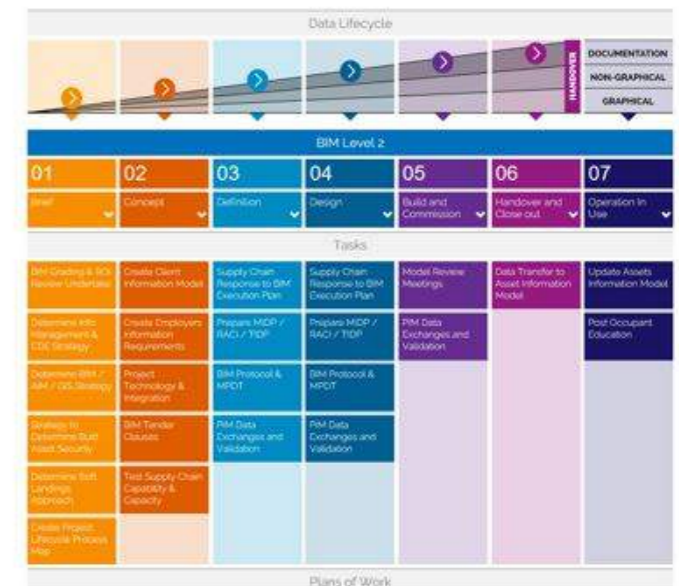
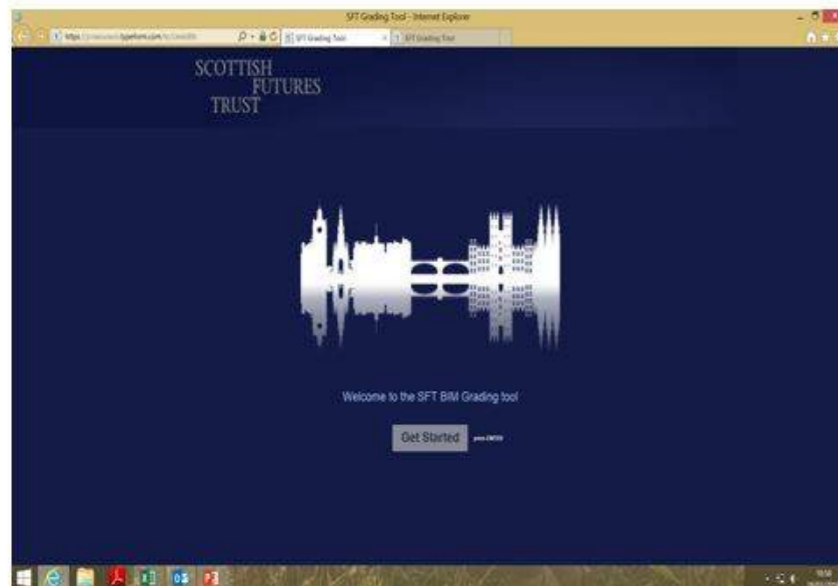


How?
To Adopt BIM

BIM Grading Tool

BIM Level 2 Benefits Tool

Scottish BIM Guidance



access the BIM portal at www.bimportal.scottishfuturestrust.org.uk

**How do you
drive industry
innovation.?**

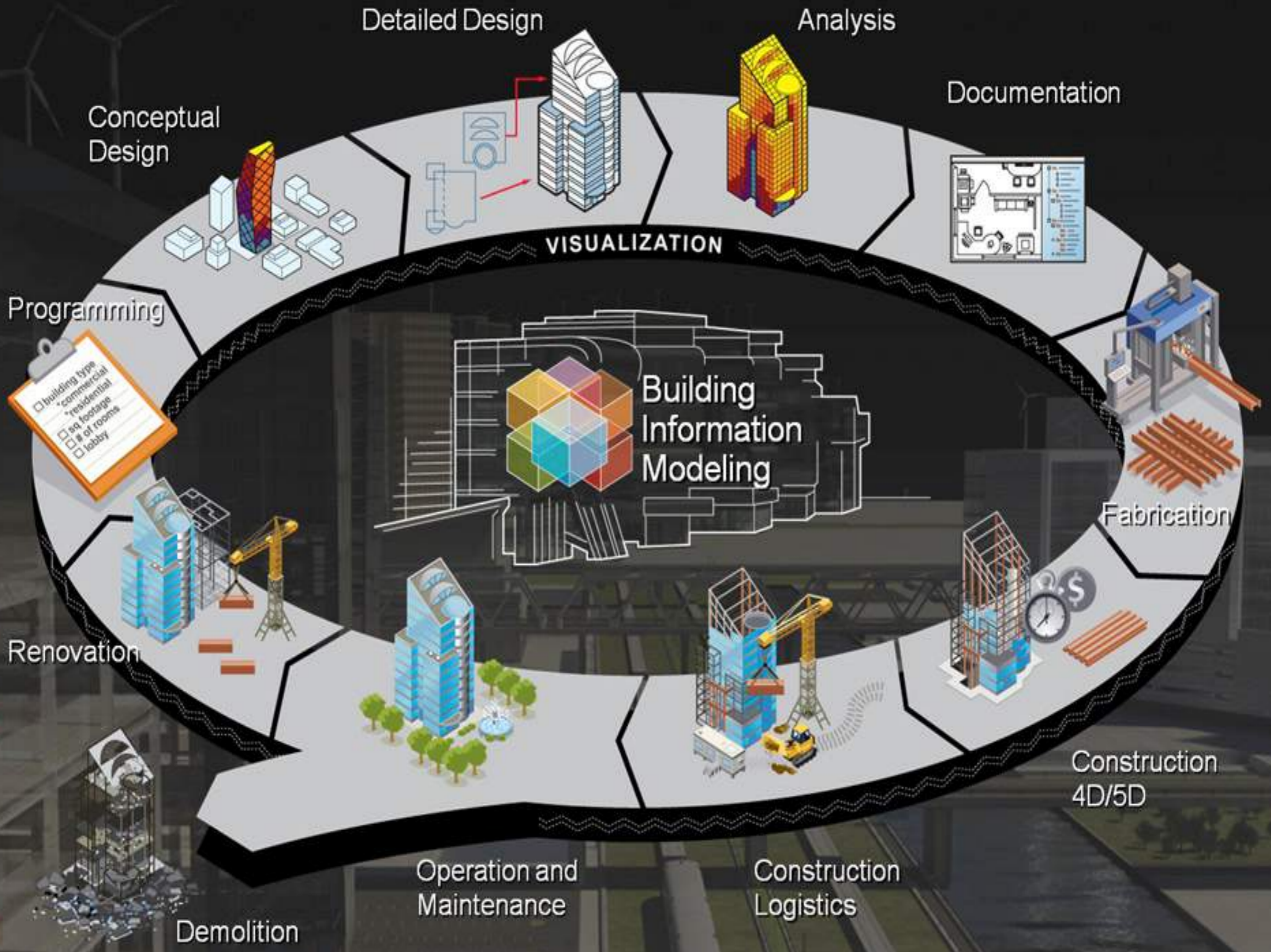


The Innovation Factory





**34,000 SQ FT
HAMILTON INTERNATIONAL
TECHNOLOGY PARK**





 VIVE

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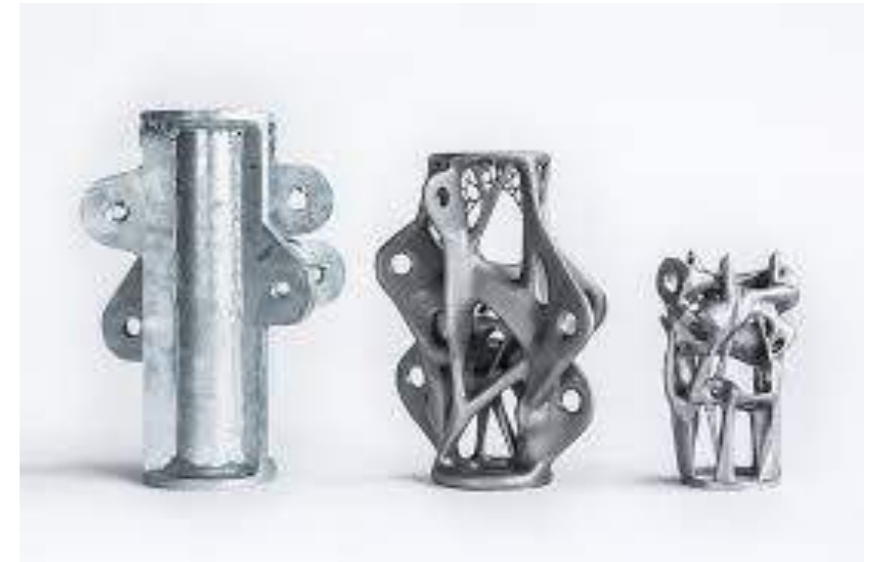


Microsoft
HoloLens

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GoPro
Be a *HERO*. 



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TM



BDSYSTEMS™

meet our cobot...

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rethink  robotics.

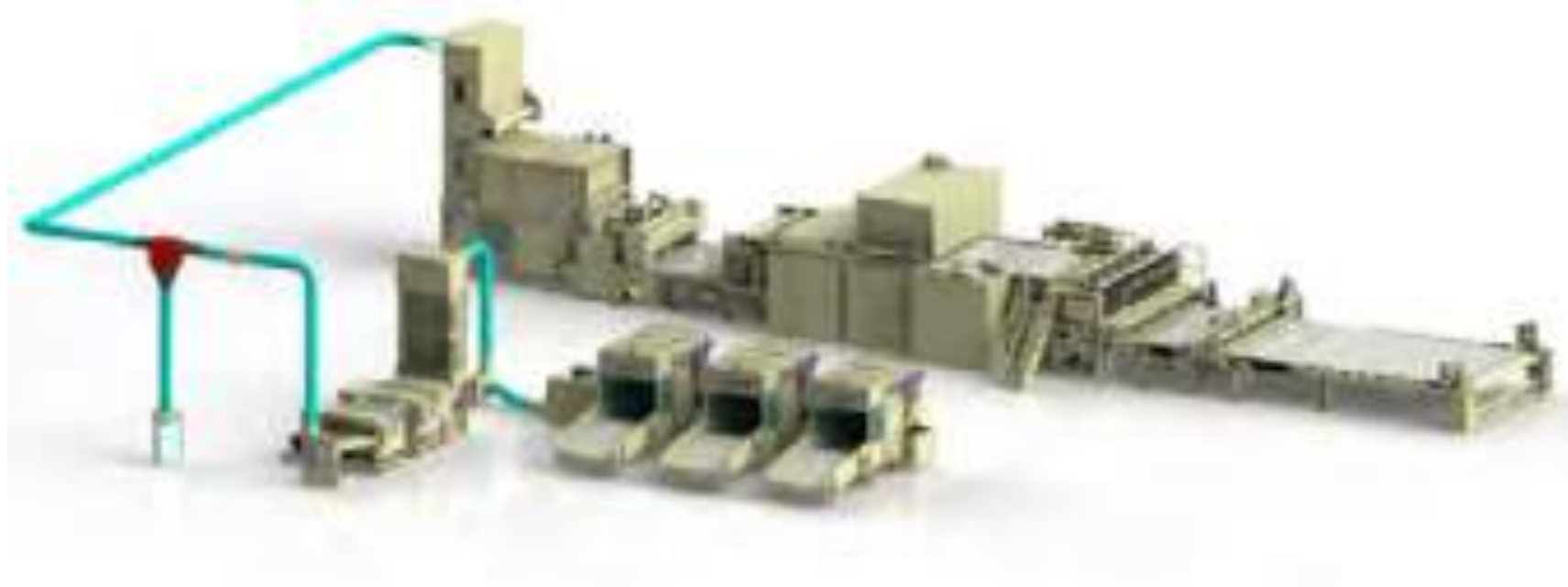


KUKA

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AXYZ
AUTOMATION INC.



FORMFIBER DENMARK APS
VERSATILITY & FLEXIBILITY

Stonemaker DM100





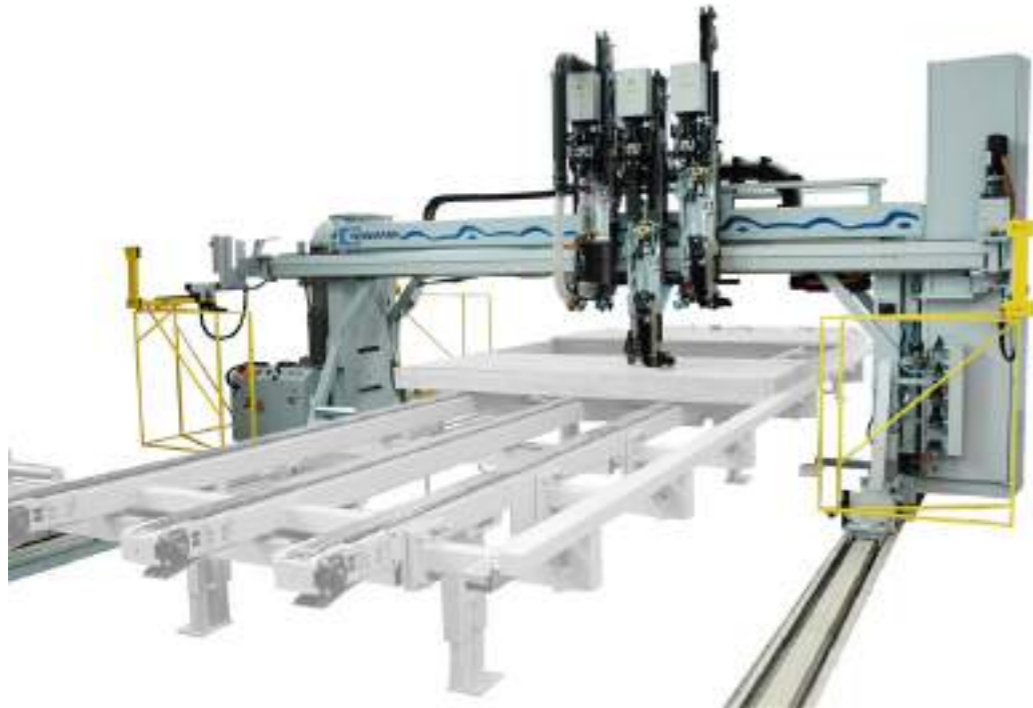
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Fankhauser GmbH



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**the UK construction
industry's first dedicated
digital manufacturing,
prototyping &
future skills
“centre of excellence”**

**Andrew Wolstenholme
CEO, Crossrail
Chair, UK Construction Leadership Council**

thank you...

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