

Digital Construction

Building the present – Creating the Future

Changing the way we create our built environment



Menno de Jonge
Director Digital Construction

3D Construction Printing Conference – Copenhagen, Denmark – 30 November 2017

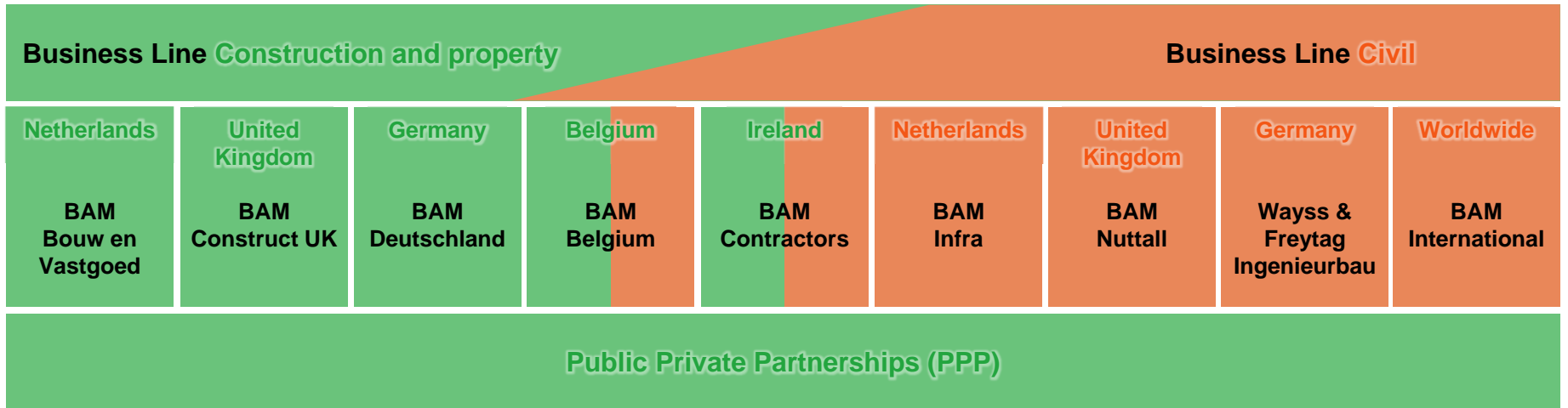
 menno.de.jonge@bam.com
 [@mfdejonge](https://twitter.com/mfdejonge)

Content

-  Introduction Royal BAM Group  
Koninklijke BAM Groep nv
-  Royal BAM Group's Digital Transformation
-  3D Printing @ Royal BAM Group
-  Follow us on bam.com

Introduction to Royal BAM Group

BAM Leader in Digital Construction



Revenue
(2016)
€6,976 Million

Result
(2016)
€102.7 Million
(1,5%)

Order book
(2016)
€10,193 Million

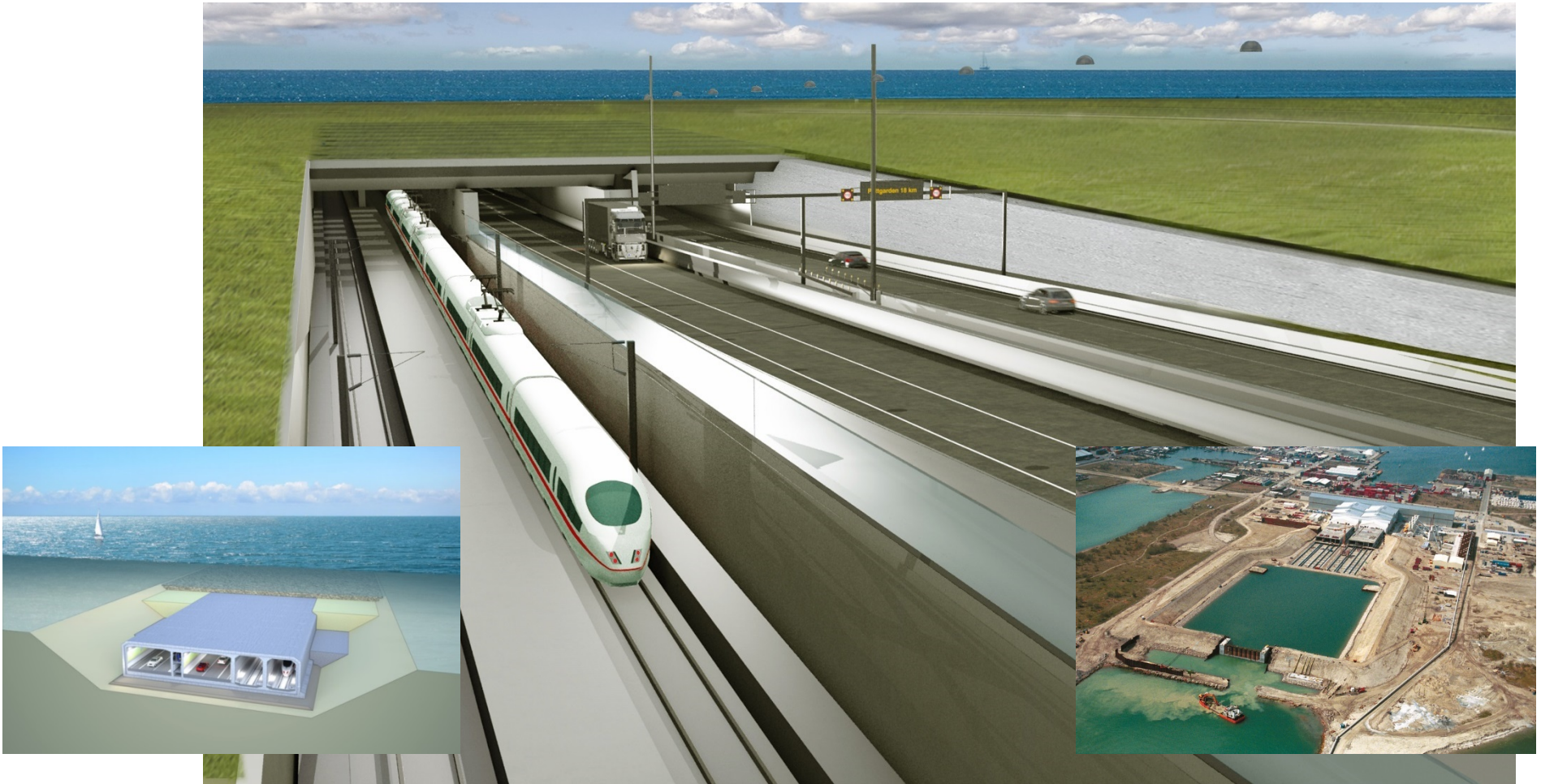
Employees
(2016)
20,370 (fte)



Art Depot Museum Boijmans van Beuningen – Rotterdam – The Netherlands

Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017



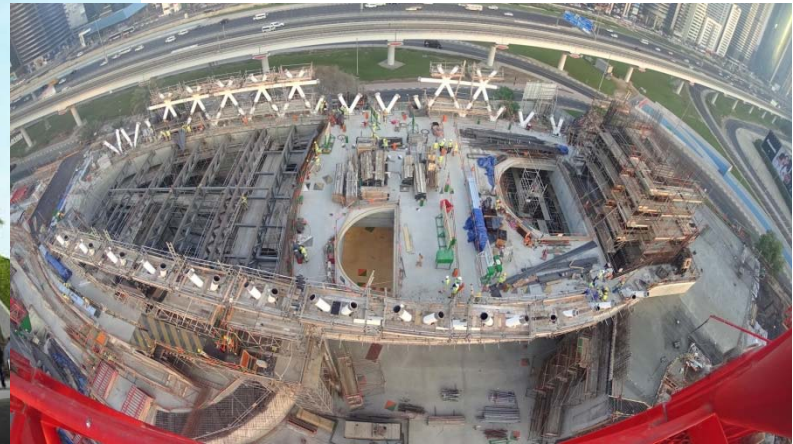
Fehmarnbelt tunnel – Linking Germany and Denmark

Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017



Museum of the Future
Dubai, UAE



Museum of the Future – Dubai – United Arab Emirates

Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017



Sea lock North Sea Canal – IJmuiden – The Netherlands

Image courtesy of Royal BAM Group

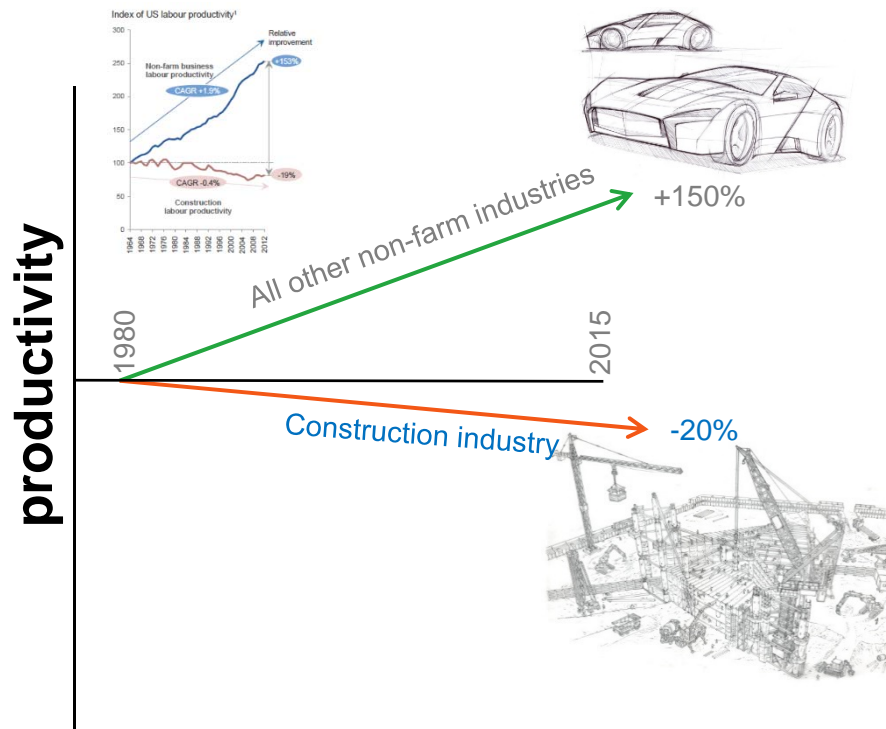
3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

Royal BAM Group's Digital Transformation

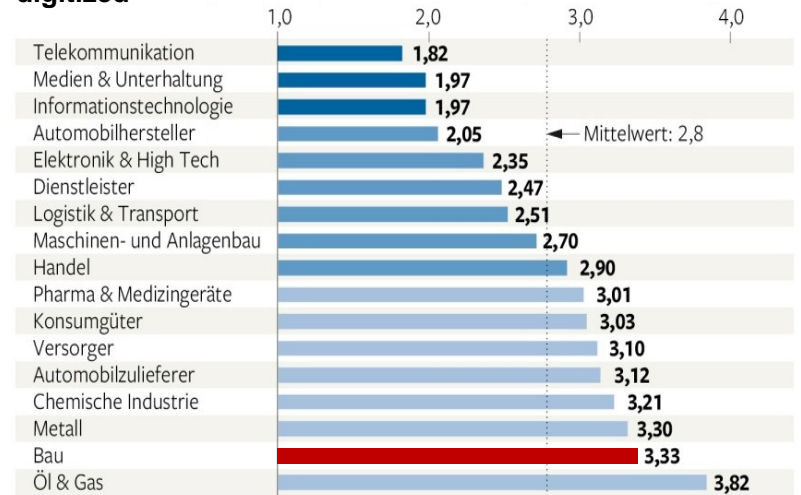
BAM Leader in Digital Construction

The construction sector

Declining productivity and low degree of digitalisation



Scale: 1 = mostly, 2 = partly, 3 = very little, 4 = rudimentary digitized



Construction Sector

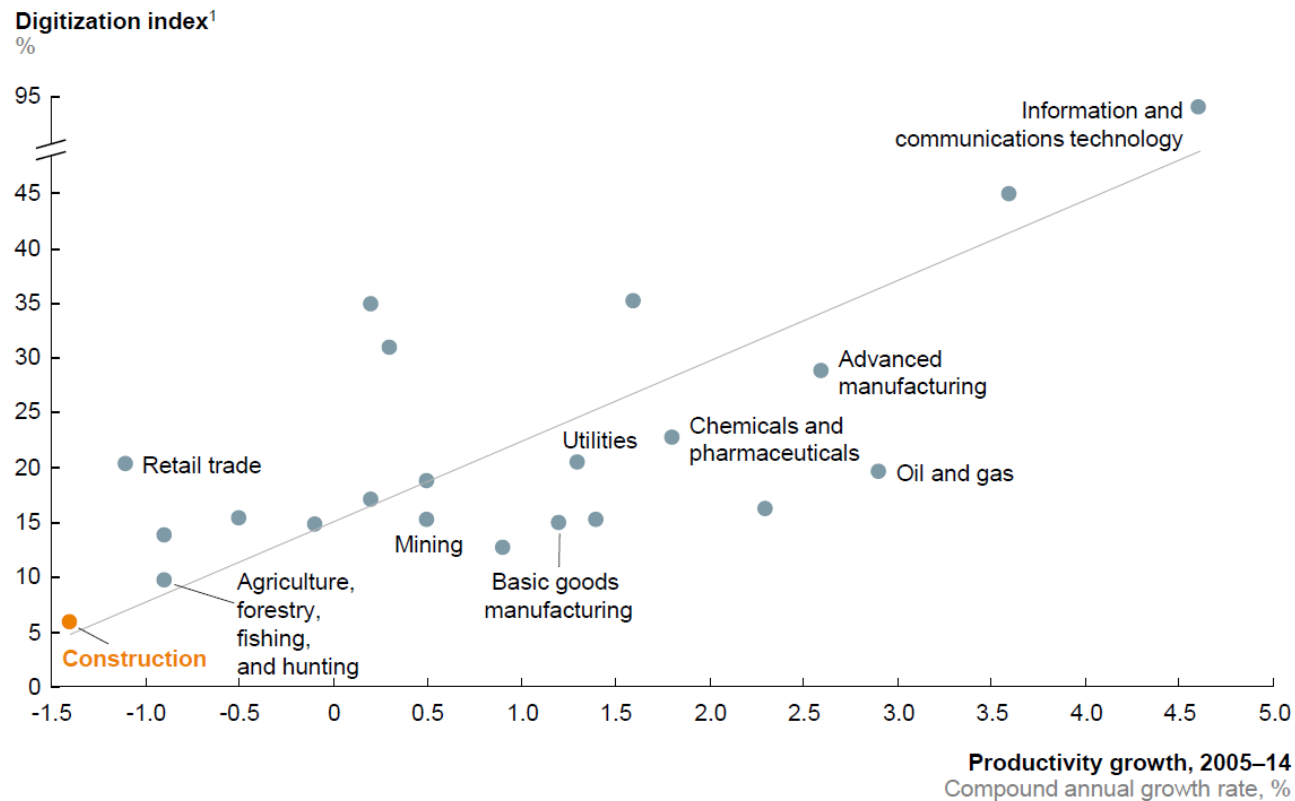
QUELLE: TOP 500 STUDIE 2014/ accenture

Source Accenture – Based on Stanford CIFE study on global productivity

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

Lower digitalization leads to Lower productivity

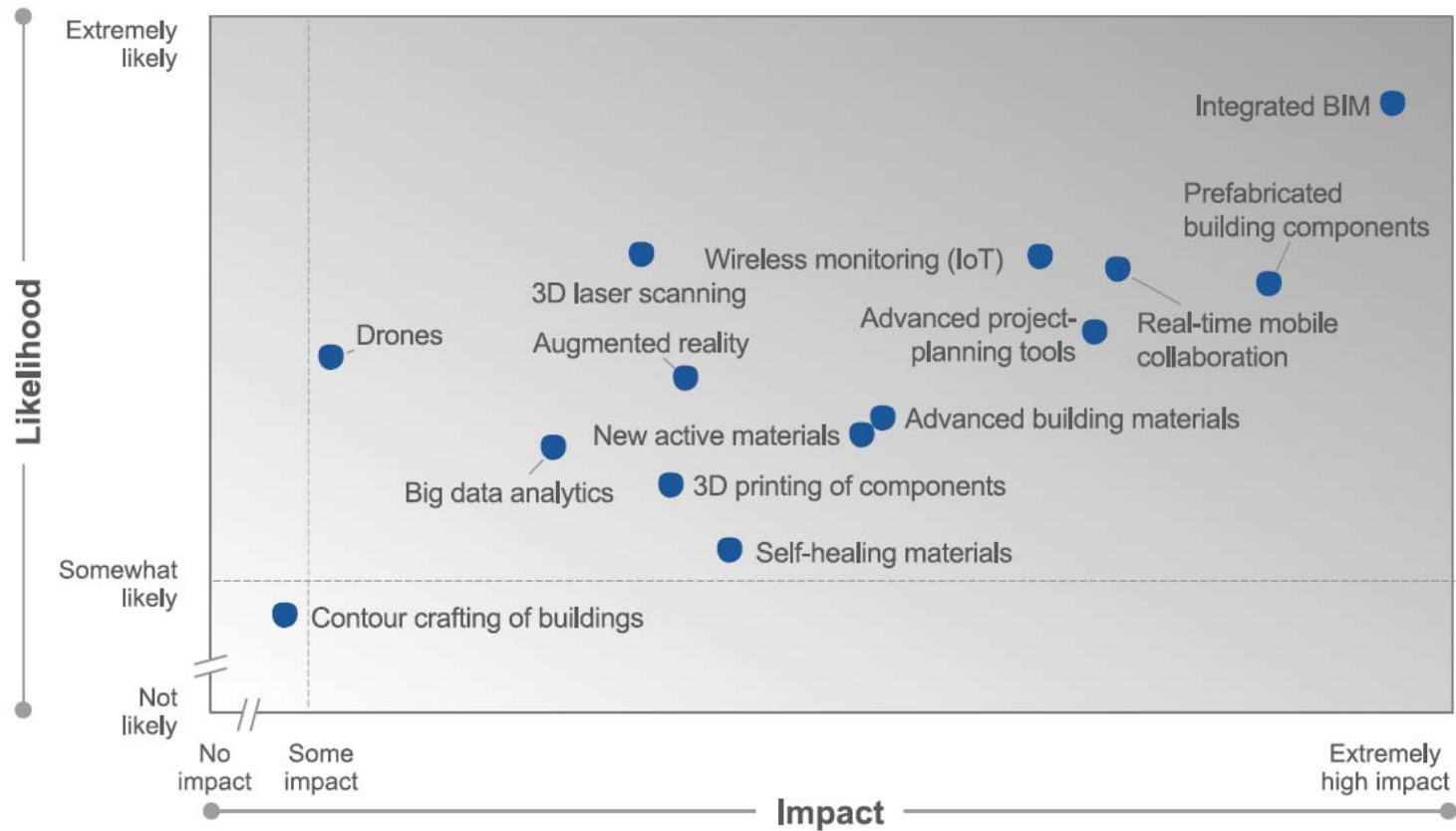
Lower digitization in construction relative to other industries has contributed to the productivity decline



Source McKinsey Global Institute – Reinventing Construction (feb 2017)

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

Impact likelihood matrix of new technologies



Source WEF – Shaping the future of Construction (May 2016)

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

“The best way to predict
the future is to create it”

Abraham Lincoln

“We create the future
using digital ...”

Royal BAM Group

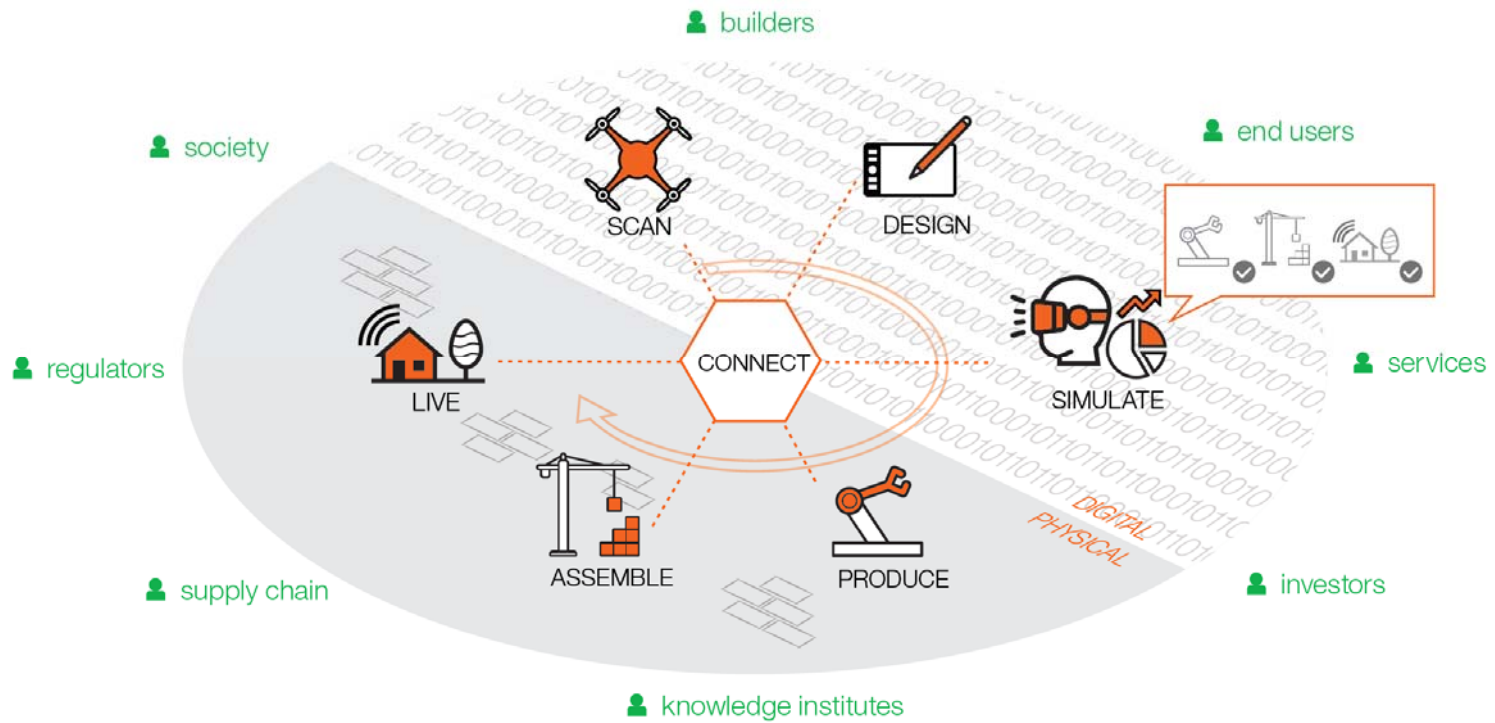
“we make it before we make it”
(digital first, physical next)

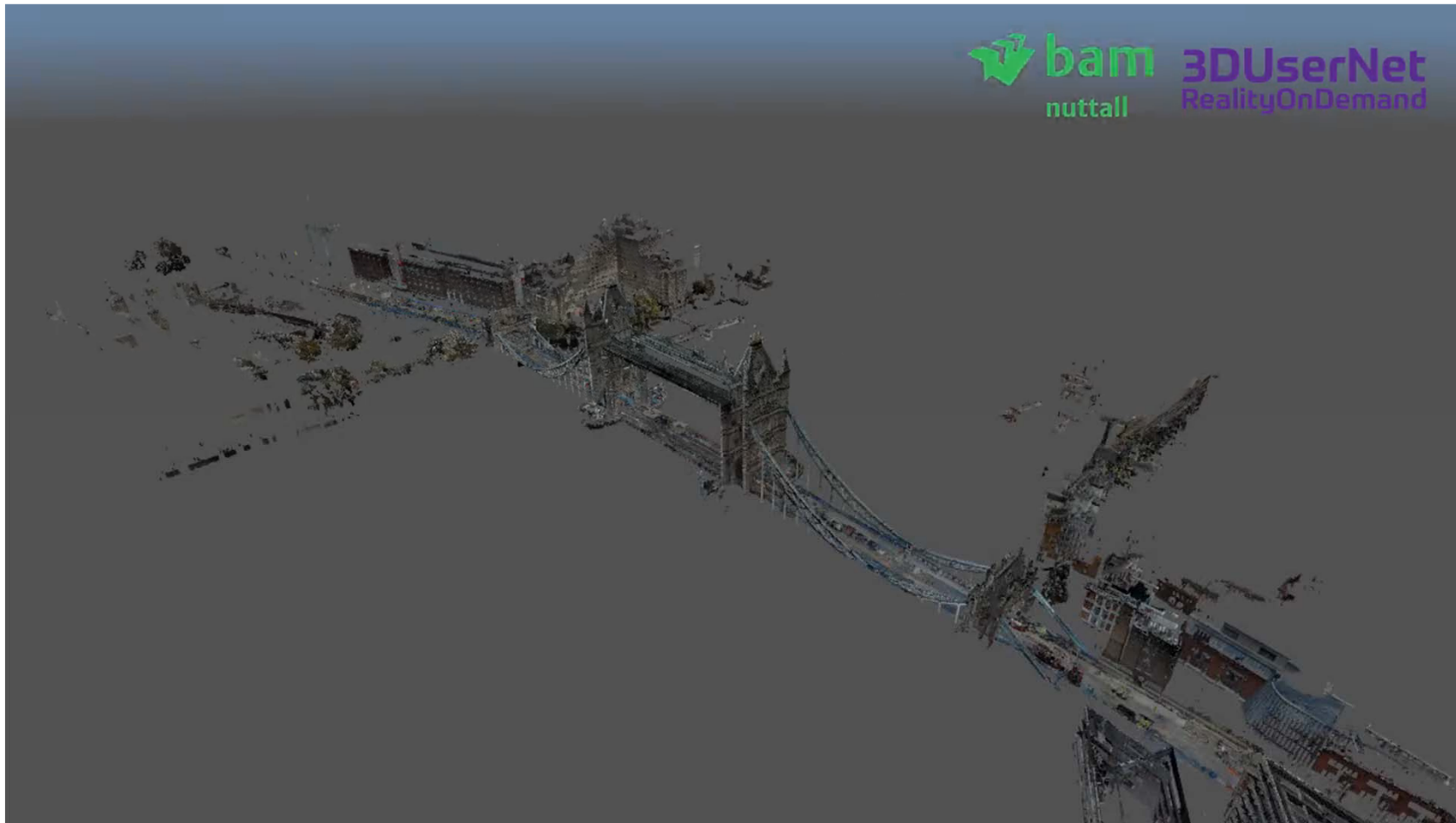
Royal BAM Group nv



Royal BAM Group's Digital Transformation

an integrated multi-stakeholder approach





 **bam**
nuttall

3DUserNet
RealityOnDemand



Image courtesy of Royal BAM Group





Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

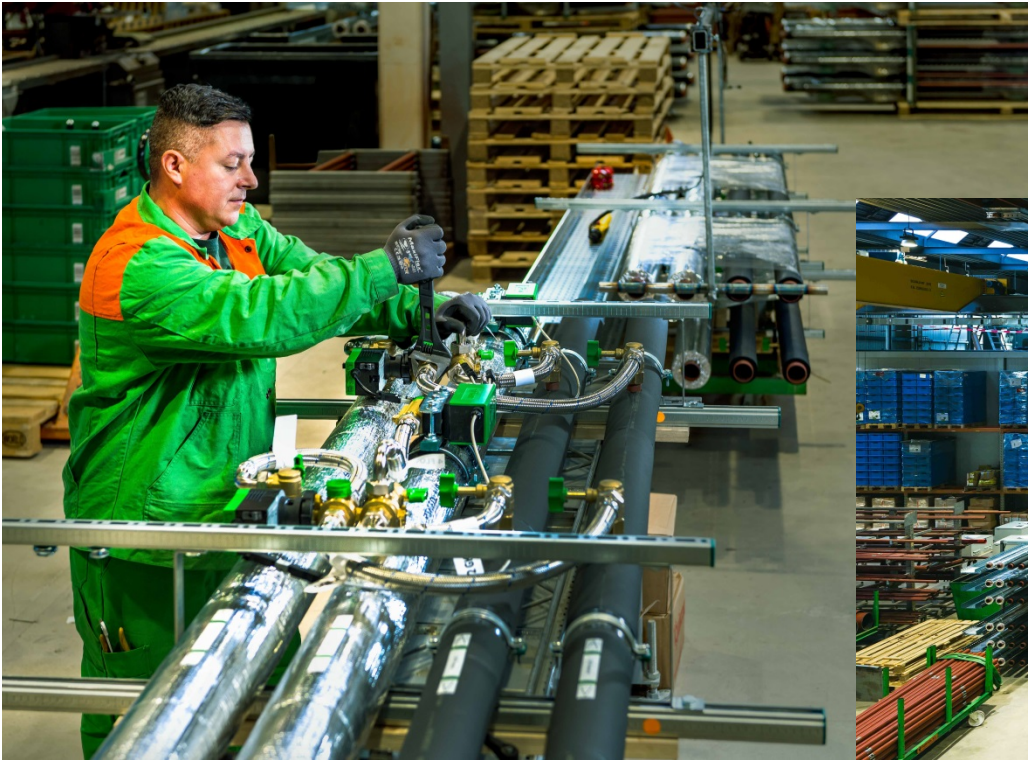


Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

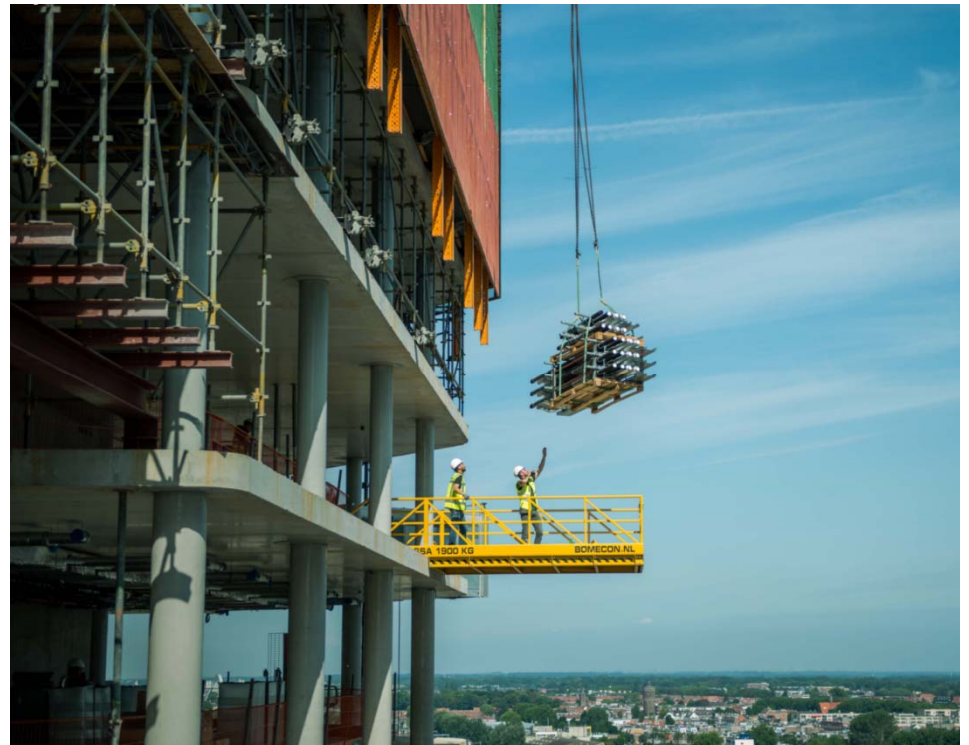


Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

3D Printing @ Royal BAM Group

BAM Leader in Digital Construction

The Landscape House

BAM Leader in Digital Construction



Universe **A**rchitecture



Location	Amsterdam, The Netherlands
Product type	Concrete housing (landscape house)
Printing Location	Amsterdam, FabCity, Java Island
Construction	D-Shape
Architect	Universe Architecture, Jan Jaap Ruijsenaars
Contractor	Royal BAM Group

Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

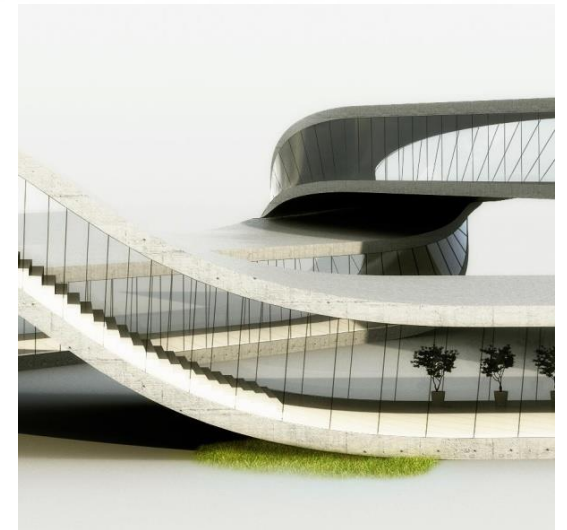


Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017



3D printed Landscape House scale 1:15 as city bench, presented by and in Amsterdam



Image courtesy of Royal BAM Group



3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017



3d BUILDER

World's first 3D printed Concrete Bridge

BAM Leader in Digital Construction

Client	
3D Printing	
Engineering	
Contractor	
Materials	



Location	Gemert, The Netherlands
Product type	Bicycle bridge
Project time	3 months (July – September 2017)
Construction	Additive manufacturing, ~800 concrete layers, post-prestressing
Dimensions	Span 8 meters x width 3,5 meters

Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

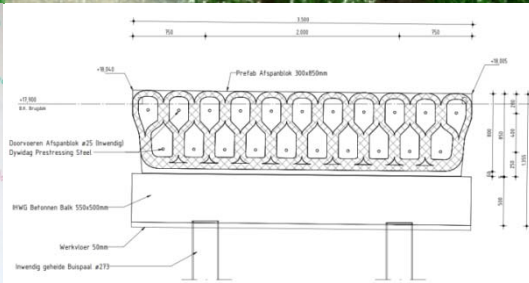
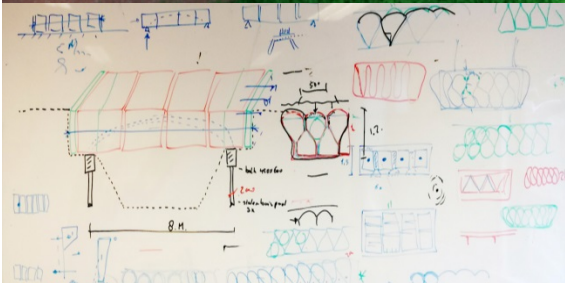


Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017



Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017



Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017



Image courtesy of Royal BAM Group

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

NOS Nieuws Sport Uitzendingen TELEERST AEX

Wereldprimeur voor Gemert: fietsen over een 3D-geprinte brug

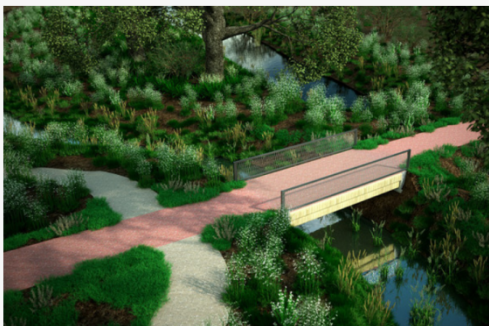
© DINSDAG, 12:19 BINNENLAND

Wie vandaag de fiets pakt rond het Brabantse Gemert, staat mogelijk een bijzondere ervaring te wachten. Vanochtend is daar de eerste 3D-geprinte fietsbrug ter wereld in gebruik genomen.



AD Nieuws Regio Sport Show Video beta

Binnenland Buitenland Politiek Economie Gezond Bizar Wetenschap Auto



▲ Voor de 9 meter lange betonnen fietsbrug was geen hulptuig materiaal zoals bekisting nodig, wat aanzienlijk oplevert en het gebruik van schaarse grondstoffen overbodig maakt. © BAM

Image courtesy of Royal BAM Group

become a supporter subscribe search

jobs dating more International edition

theguardian

world sport football opinion culture business lifestyle fashion environment tech travel

browse all sections

World's first 3D-printed bridge opens to cyclists in Netherlands

Crossing printed from 800 layers of concrete could take weight designers say

ance-Press

October 2017 02:52 BST

Йохан Больхус
Разработчик компании BAM Infra /Нидерланды/



De Telegraaf • 17 Oktober 2017

Dit is de eerste 3D-geprinte brug

In Gemert is de eerste 3D-geprinte fietsbrug ter wereld geopend.

3D Construction Printing Summit, Copenhagen, Denmark – 30 November 2017

Benefits

- Reduced environmental impact (improve sustainability)
 - 50% reduction of concrete material → lower CO2 emissions & carbon footprint
 - Offsite 3D Concrete Printing → reduced logistics
 - No formwork needed → reduced secondary material usage
 - Additive manufacturing proces → Material waste reduced to near zero
- Improved productivity in a controlled environment (Offsite)
 - 3D Concrete printing using gantry robot → reduced labour
 - Improved safety conditions
 - 24-7 robot operation → reduced schedule time
- Other benefits
 - Increase constructible geometrical freedom
 - Enables the use of advanced computational optimization techniques

Follow us on
bam.com

BAM Leader in Digital Construction



Home › Digital construction at BAM

Digital

[What is digital construction at BAM?](#)

[Our offer](#)

[Projects](#)

[News](#)

[Work with us](#)

[Contact](#)

Digital construction at BAM

BAM is fully embracing digital ways of working.

We are using technological innovations such as BIM, robotics, 3D printing, virtual and augmented reality and modular/offsite construction, to enable us to build digitally before building on site.





BAM leader in Digital Construction