ARE YOU PART OF THE PROBLEM OR PART OF THE SOLUTION?

21ST SEPTEMBER 2021

CLAIRE PENNY

WHY AM I ASKING THIS QUESTION…?

"You're either part of the solution or you're part of the problem."

- Eldridge Cleaver

WHY AM I ASKING THIS QUESTION…?

"Everyone has a part to play. We have the power. You can do it."

- Maxine Waters

MY ANSWER TO THIS QUESTION...

شكرًا

СПАСИБО

ありがとう

GRAZIE

GO RAIBH MAITH AGAT

DANKE

शुक्रिया

谢谢

THANK YOU

MAHALO

감사합니다

GRACIAS

DZIĘKUJĘ

MERCI

KIITOS

TAKK

OBRIGADO

WHY DO WE NEED TO COME TOGETHER?

WHY DO WE NEED TO COME TOGETHER?

Summary

Investment and Output

1. Total investment in Building and Construction in Ireland is projected to increase to €30 billion in 2019 or 14 percent as a share of GNI*.
2. The share of investment accounted for by housing is forecast to increase from 26 percent in 2019 to 45 percent in 2023.
3. In 2018 there were 18,072 new dwelling completions. This was a 25 percent increase on 2017. Of the new dwelling completions in 2018, 13 percent were in an Apartment Scheme.
4. The overall public capital allocation for 2019 is €7.3 billion. This is a €1.4 billion (24 percent) increase on 2018.
5. The Government's latest Investment Projects and Programmes Tracker includes 271 major projects and programmes with 25 major infrastructure projects commencing in 2019.

Costs

1. The construction tender price index, which covers non-residential construction, is estimated to have increased by 7.4 percent in 2018.
2. Construction costs for new residential buildings have remained relatively constant between Q3 2010 and Q3 2018, with annual average growth of less than 1.5 percent over that period.
3. In the year to December 2018 there was a 0.3 percent increase in the wholesale price index for building and construction materials.
4. The average hourly earnings for all construction employees increased by 6.2 percent on an annual basis in Q4 2018 to stand at €21.43.

Employment and Enterprise

1. Employment in the construction sector stood at 145,500 in Q4 2018, representing an annual increase of 8 percent.
2. This represents 6.4 percent of total employment in the Irish economy.
3. In 2016, there were 50,673 construction enterprises, with over 95 percent of these classified as Micro (0-9 persons engaged).
4. The average gross value added per person engaged in the large construction enterprises (250+ persons engaged) is €98,000, almost double the average gross value added per person engaged in the small and micro enterprises (0-49 persons engaged).

Skills and Knowledge

1. There was a total of 3,398 new construction apprentice registrations in 2018, representing an annual increase of 15 percent. However, in 2018 new apprentice registrations in bricklaying and plastering were at 12 percent and 9 percent of their peak in 2004.
2. There were 4,746 undergraduate new entrants in engineering, manufacturing and construction in 2017/18, representing a decrease of 4 percent compared to the previous year.
3. The number of new entrants in building and civil engineering in 2017/18 was 57 percent of the 2009 level.

Productivity

1. There has been little to no productivity growth in the Irish construction sector between the years 2000 and 2016.
2. Had the construction industry kept pace with productivity growth in the other domestically dominated sectors, gross value added would be some €3.1 billion higher.
3. Ireland's construction sector is ranked fourteenth in the Euro Area for labour productivity.

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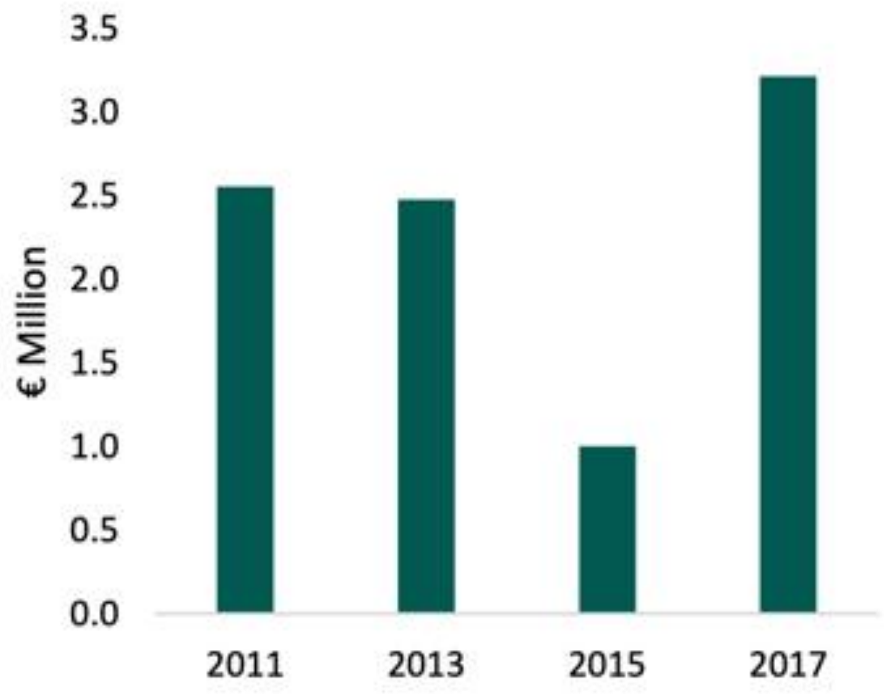
WHY DO WE NEED TO COME TOGETHER?

Figures 7.7 and 7.8 look at Irish construction sector research and development spending over time and compared internationally. After a large decrease of nearly €1.5 million from 2013 to 2015, expenditure on construction sector R&D has recovered in 2017 to €3.2 million, an increase of around 33 percent on 2011.

Figure 7.7: Construction Sector R&D Spending



Source: Eurostat

WHY DO WE NEED TO COME TOGETHER?

New Civil Engineer

Construction industry spent record £351M on research last year

26 NOV, 2019 | BY SAM SHOLI

The UK construction industry increased its research & development spending to a record high of £351M in 2018, according to the Office for National Statistics (ONS).

The figure is a 9.7% increase on spending in 2017.

WHY DO WE NEED TO COME TOGETHER?


DUBLIN

Technological University Dublin

ARROW@TU Dublin

Conference papers

School of Multidisciplinary Technologies

2020-08-27

The Irish Construction Industry's State of Readiness for a BIM mandate in 2020

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McAuley, B., West, R. and Hore, A. (2020) The Irish Construction industry's state of readiness for a BIM mandate in 2020, Proceedings of the Civil Engineering Research in Ireland 2020 Conference, Cork, 27th - 28th August 2020, pp 740-745.

5 CONCLUSIONS

This paper has highlighted that the Irish construction industry is adequately positioned to respond to a mandate, as there are already in existence training solutions from HEIs and software providers, industry roadmaps, CPD events, internationally recognised conferences, certification routes, as well as templates and guidance documents. These are all complemented through a broad selection of government

publications all endorsing BIM. Industry and academic publications, research outputs, seminars and workshop presentations have been promoted through professional institutions. With the current Covid-19 crisis, organisations are accelerating their digital agendas and beginning to realise the relevant benefits that digital tools can offer them. This, by default, has further positioned the industry to respond positively to a potential mandate. With these resources and frameworks readily in place, the next step is the delivery of a clear and concise vision from the government that will need to be backed by a roadmap, standards, guidelines and legal protocols. These, it could be argued, are largely in place through existing ISO standards, institutional templates, and the NBC Roadmap and any shortfalls in this respect could be developed in the interim until a mandate is invoked. These resources could also provide the initial starting point for the proposed Build Digital initiative. The most critical factor for the mandate to be successful is adequate funding, with a focus on providing guidance and training resources for clients and SMEs.

WHAT IS EVERYONE STRIVING FOR?

Rialtas na hÉireann
Government of Ireland

Projects delivered **on time** and **on budget**

Net zero **carbon**

WHAT IS EVERYONE **STRIVING FOR?**

Projects delivered **on time** and **on budget**

Buildings with a strong **ESG** rating

Increased **yield**

Net zero **carbon**

WHAT IS EVERYONE STRIVING FOR?

Projects delivered **on time** and **on budget**

Existing client **'stickiness'**

New business models to generate **increased revenue**

QUESTIONS?

What **outcomes** are desired?

What **information** is required?

Where does the data reside?

How will you access the data?

Once you have answered the...

WHY

WHAT

WHERE

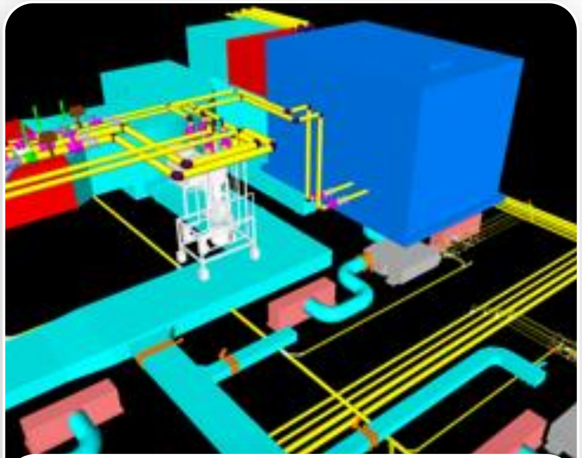
HOW

...it's not the end of the story.

In order to ensure the data is **usable** and **useful** both now and in the future, you need to…

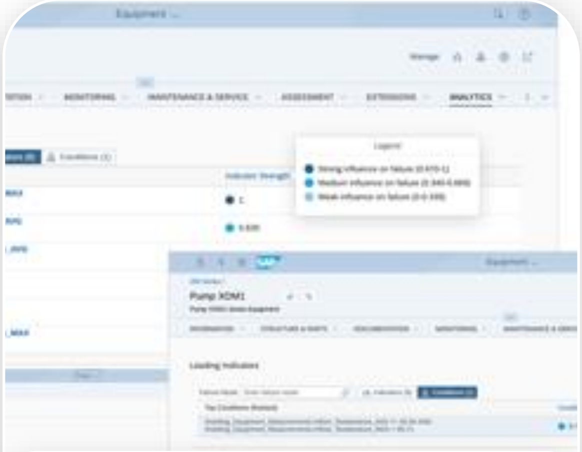
CLASSIFY THE DATA

MAKE IT MACHINE READABLE



Object Model Classification

Goose vs Duck



Downstream Uses

STANDARDISE THE DATA

APPLY DATA DICTIONARIES

Source: https://www.bsigroup.com/globalassets/localfiles/en-gb/built-environment/bsi-bim-iso-19650-brochure-final022019.pdf

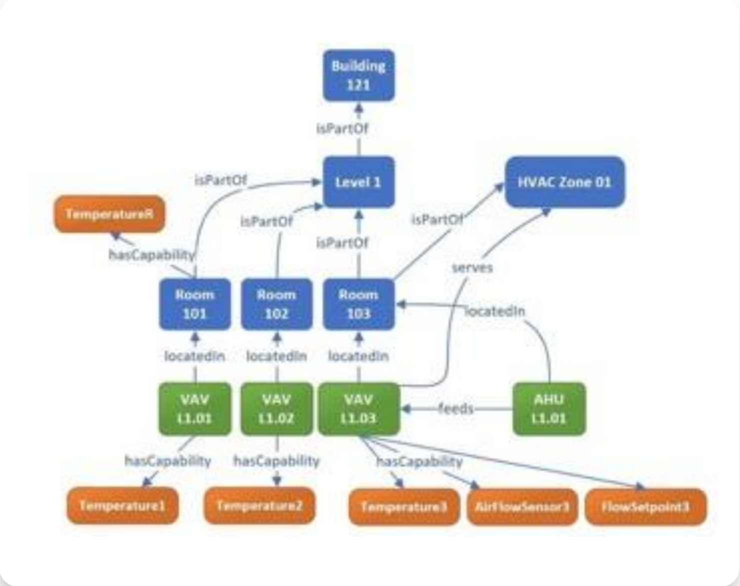
The actual information that is required to deliver specific use cases are **not necessarily** defined by standards…

Classification systems & Data dictionaries are essential to data standardisation

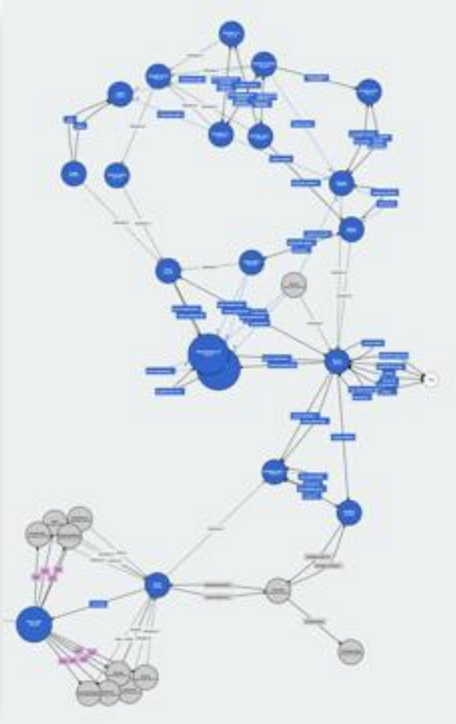
CREATE A DATA MODEL

MAKE IT MACHINE READABLE

ONTOLOGIES & KNOWLEDGE GRAPHS



Knowledge graphs represent entities and their relationships defined by an ontology.



WHEN YOU TAKE THESE STEPS

Classification + data dictionary+ ontology = **machine readable**

Knowledge graphs can provide well abstracted representations

Machine readable = **data driven workflows**

Data driven workflows = **value services**

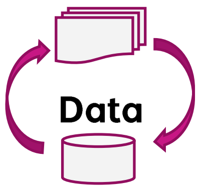
EXAMPLE – BIM PROCESS

Data

Without Classification

Unknown	X area^2	X ST Grade
Unknown	X Material	X Linear m^2
Unknown	X Material	X Rated kPa

Time consuming process or referencing drawings, BOQ's & BOM's to identify components.



Updates to the design require repeat of manual identification process.

Often **not** used downstream

Classification

Data

With Classification

Concrete Slab	X area^2	X ST Grade
Hydronic Pipe	X Material	X Linear m^2
Ball Valve	X Material	X Rated kPa

Classified & well-structured data

Standardised data structures

Machine readable

Many downstream uses, including Digital Twin

WHOLE BUILDING PERFORMANCE TWIN

Challenges	Benefits		Savings & Gains
Data: Incomplete, untrustworthy, unusable			
Information: disconnected, incomplete, absent	Operations	Data driven automated business and operational workflows. Reprioritise deferred maintenance. Reduce labour costs by avoiding unnecessary inspections	33% reduced labour cost
Time: Manual processes	Occupants	Wellness & comfort, real-time analysis of indoor air quality, space management	8%* Increase in productivity
Software integrations: Siloed systems, difficult to achieve one version of the truth	Equipment	Unified, complete and accurate information. Reduced defects and liabilities. CAPEX reduction with improved equipment reliability and extension of equipment life	10% Increase in productivity
Performance: Equipment, performance, reliability cost of failure & mixed priorities	Sustainability	Evidence based reporting. Real time analysis of building and equipment performance	20% Reduction in energy costs
Wellness: IAQ, occupancy, comfort			
Regulatory & internal requirements: Transparent and evidence-based reporting	3rd Parties	Integration to 3rd party solutions. Day one operational readiness. CAPEX reduction with improved equipment reliability and extension of equipment life	30%** Improvement in project value
Risk: Defects and liabilities			

70% of the TCO for a facility is during it's operational phase***

NEW OPPORTUNITIES

Digital **Handover**
Day one operational readiness

Asset Twin
Digital O&M

Performance Twin
Whole building performance

How will you generate more revenue?

THANK YOU

www.invicara.com
www.twinit.io