

BIM in Ireland: Maturity and Diffusion

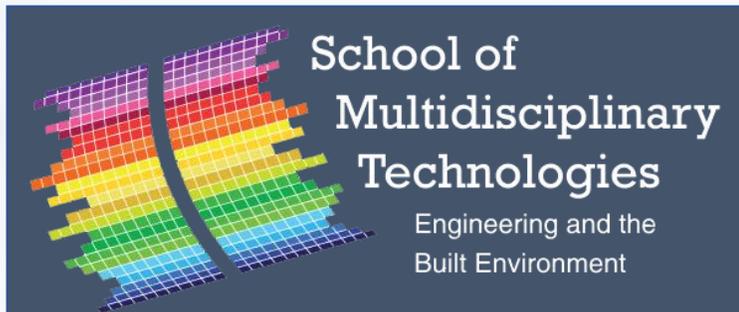


Dr. Barry McAuley



CitA: Connecting you to Innovation

Building
Information
Modelling
in Ireland
2019



MSc in applied Building Information Modelling and Management

- CitA was founded as a not-for-profit organization in 2005 and soon added education and training activities to its offering.
- CitA ran a series of workshops in 2019 under their successful Digital Transition Series programme to explore innovative and transformative approaches to the delivery of housing, health, education infrastructure and utility projects which are all envisaged under the Ireland 2040 plan.
- These workshops will be complemented with the 4th CitA BIM Gathering to take place in Galway on the 26th September
- In both 2018 and 2019, CitA commissioned its Tech Trend Series which is designed to explore how technology is disrupting both the property and the construction industry.
- CitA also launched the CitA Academy Portal, a central learning solution to meet industry, academic, and government skills development needs⁵⁵.
- To further expand its reach to the sector, CitA has formed strategic partnerships with both NBS and the BRE Academy.



CitA
Construction **IT** Alliance

Building
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Open BIM Standards & Mandate
Mandates in place
Future Mandates fixed
BIM Programmes planned
No BIM requirement

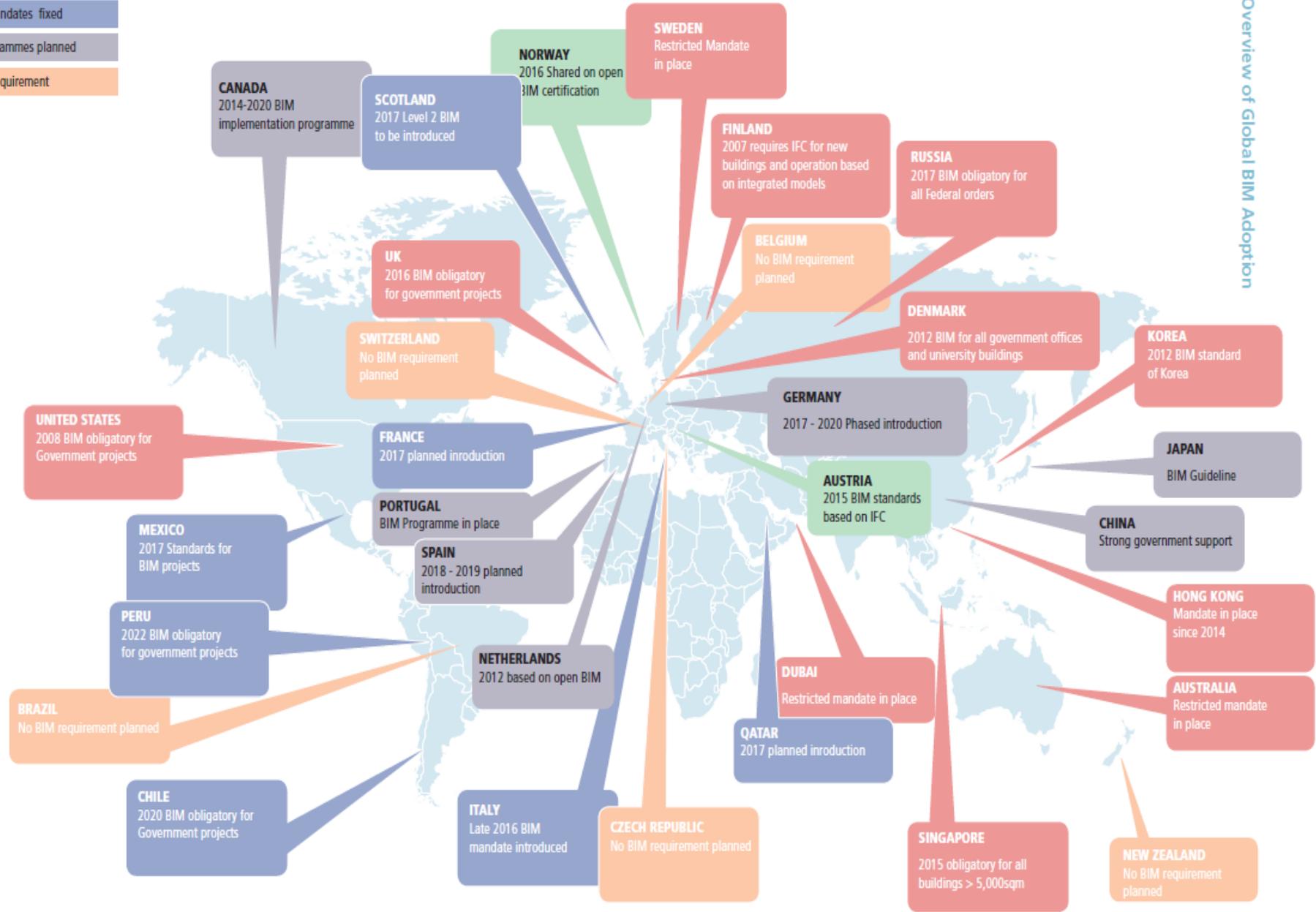


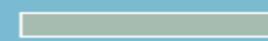
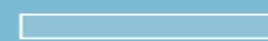
Figure 1: Overview of Global BIM Adoption

Dept./Body	Sub Sector	Band 5	Band 4	Band 3	Band 2	Band 1
Ag. & Marine		–	–	–	+36	+18
Defence		–	+18	+24	+36	+48
Education	Primary	–	+18	+24	+36	+48
	Secondary	–	+18	+24	+36	+48
	Third Level	–	+18	+24	+36	+48
Health	HSE	+12	+18	+24	+36	+48
	Vol. Hospitals	+12	+18	+24	+36	+48
Housing	Housing	–	+18	+24	+36	+48
	Non-Housing	+12	+18	+24	+36	+48
OPW	Heritage	+24	+30	+36	+48	–
	Flood Risk Management	–	–	–	+36	+18
	New Build	+12	+18	+24	+36	+48
Transport	Rail	+12	+18	+24	+36	+18
	Road	+12	+18	+24	+36	+18

BIM Level 1



BIM Level 2

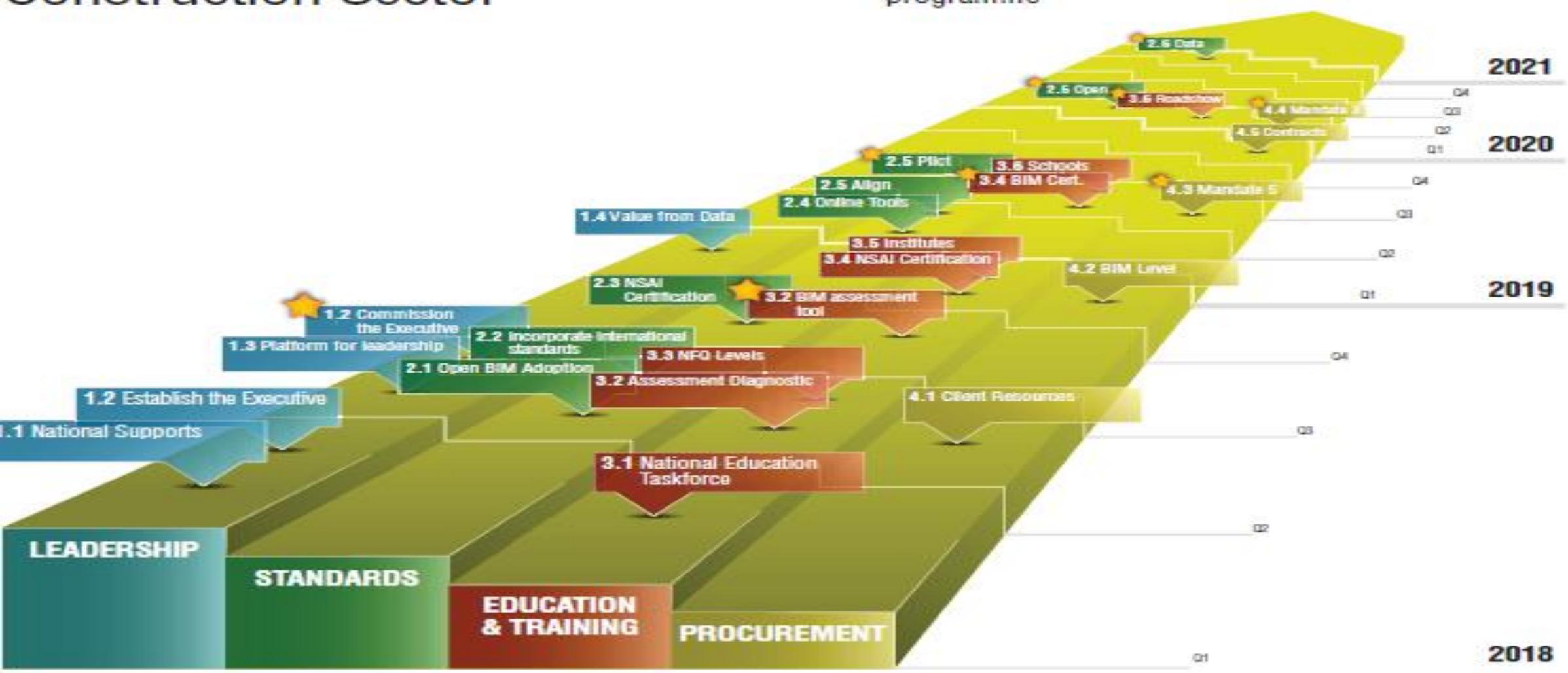


Digital Roadmap 2021

Construction Sector

2021

- 20% reduction in project delivery programme
- 20% increase in construction exports
- 20% reduction in capital costs



Building Information Modelling in Ireland 2017

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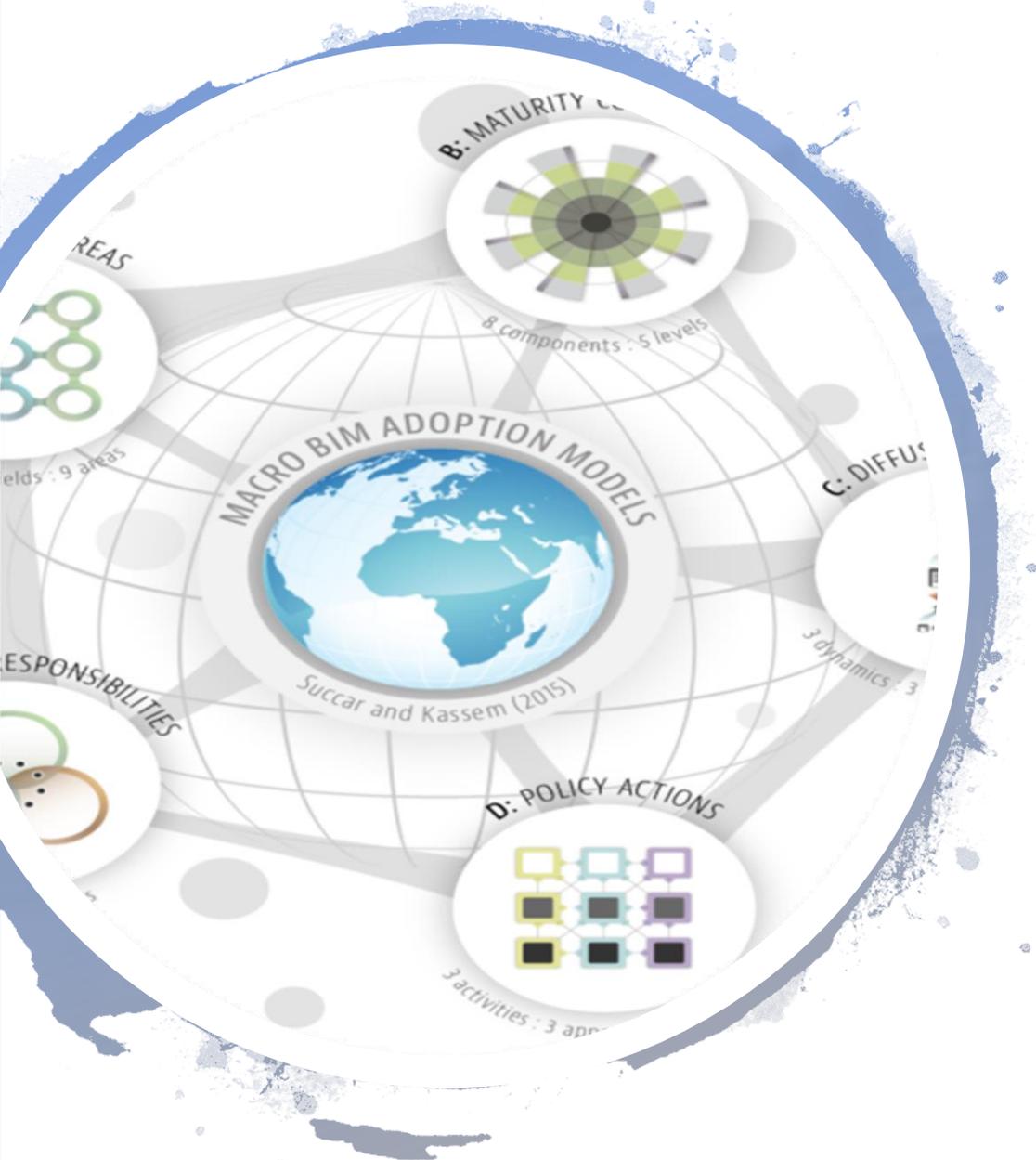
Recent Publications

Recent Publications

- **The Expert Group on Future Skills Needs:** Prefabrication and the use of BIM systems will have a substantial impact on the sector over time.
- **The Engineers Ireland State of Ireland 2019 Report :** Vital contribution that Modern Methods of Construction including BIM, can play in expediting the delivery of housing provision in Ireland.
- **The Construction Sector Performance and Prospects 2019 Report:** Ireland's construction industry must embrace digital technologies more proactively.
- **Action Plan for Jobs 2018 :** Digital technologies are becoming increasingly disruptive and pervasive / new pathways for reskilling into ICT/Technology roles at apprenticeship level.

Pre 2018

*National BIM Council Roadmap to Digital Transition for Ireland's Construction Industry, Irish government strategy to increase the use of digital technology in particular categories of public works projects, **GCCC positional paper**, Construction 2020 A Strategy for a Renewed Construction Sector, **Action Plan for Jobs 2017**, Forfás Ireland's Construction Sector: Outlook and Strategic Plan to 2015,*



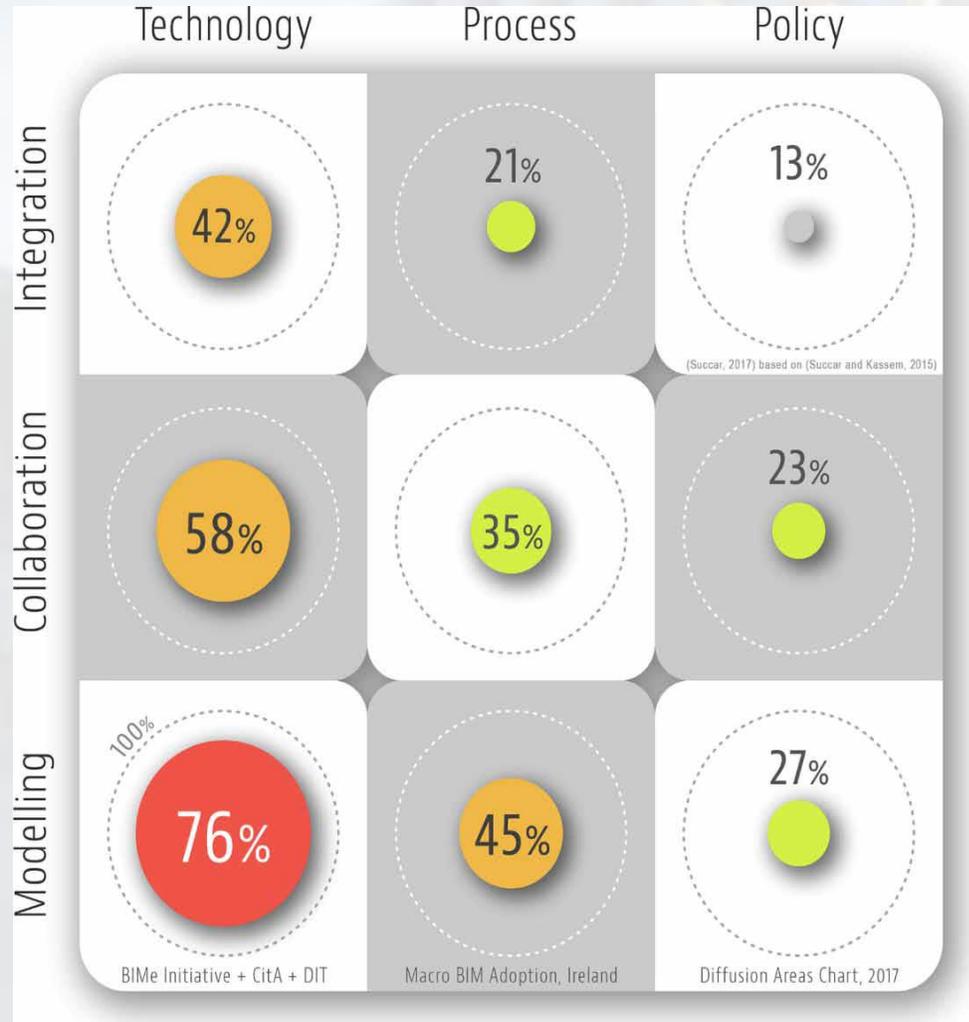
Macro BIM Maturity Models

Roadmap and government's strategy to increase digital technology had been in effect for two years, along with a continued surge in construction sector output, it was decided by the authors to reapply the macro BIM maturity conceptual models to investigate if Ireland's BIM diffusion dynamic and levels have been impacted.

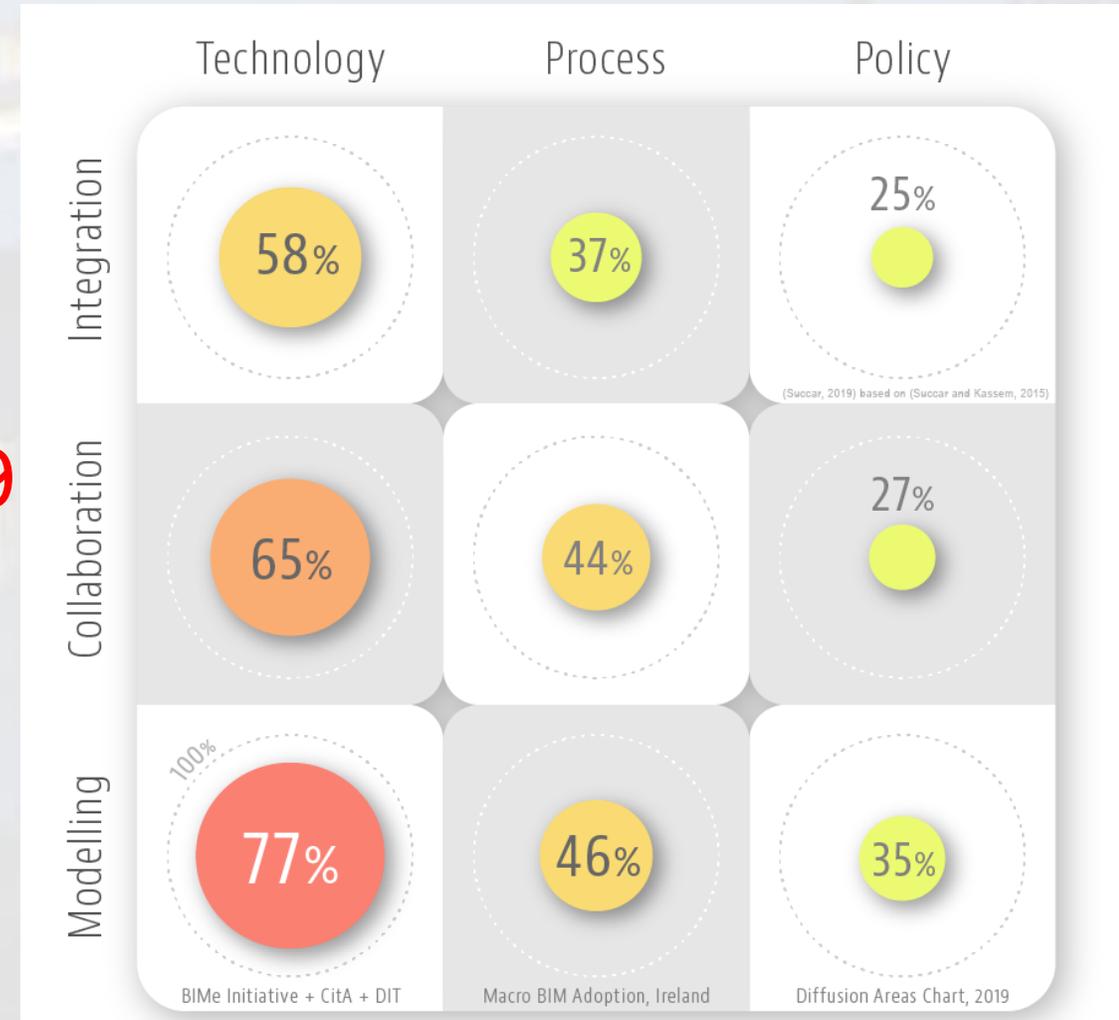
Macro BIM maturity model would assist in understanding any limitations that a lack of funding has had on the adoption of BIM.

Model A: BIM diffusion areas model for Ireland

2017



2019



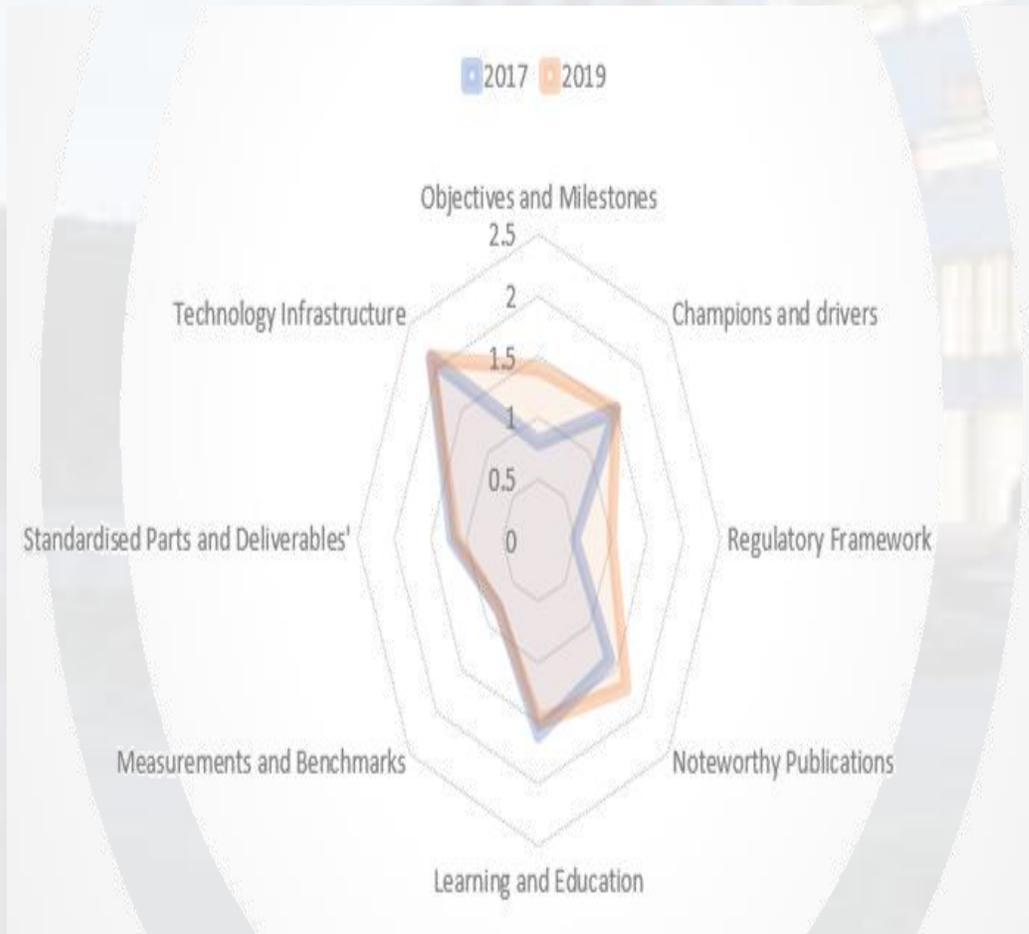
This model seeks to establish the extent of BIM diffusion across markets

Model A: BIM diffusion areas model for Ireland

Ireland has experienced a steady increase in both collaboration and integration for process and policies.

- The improvement in policy and processes in regards to the BIM collaboration fields can be partially attributed to the roadmap and government's digital strategy.
- A more significant initiative which has helped in this context is the introduction of ISO 19650.
- This maturity model should exhibit further growth in the coming years as the National Standards Authority of Ireland now offers third-party certification to IS EN ISO 19650 part 2.

Model B: Macro maturity components model for Ireland



	2017	2019
Objectives and Milestones	0.8	1.4
Champions and drivers	1.5	1.5
Regulatory Framework	0.5	1
Noteworthy Publications	1.4	1.7
Learning and Education	1.6	1.5
Measurements and Benchmarks	0.8	0.8
Standardised Parts and Deliverables'	1.2	1.15
Technology Infrastructure	2.1	2.1

This model assesses the BIM maturity of countries using a comparative matrix or granularity using component-specific metrics

Model B: Macro maturity components model for Ireland

Compared to 2017, Ireland has seen moderate growth in the majority of components.

- The largest growth has come within the objectives and milestones, regulatory framework and noteworthy publications. The roadmap, government's digital strategy and ISO publications have all played a part in elevating these figures.
- While other figures have not significantly grown, they remain stable.
- Ireland's technology and infrastructure continues to attract foreign investment with Project Ireland 2040 firmly placed to support businesses and communities across all of Ireland in realising their potential.
- Learning and education remain strong with ongoing commitments to digital construction evident within leading third level educational bodies. This commitment is fundamental as the Irish construction industry now faces an unprecedented skills shortage

Education

Athlone Institute of Technology (IT)	BIM modules incorporated into all four years of the Quantity Surveying (QS) course and some of the Civil Engineering programme.	Full Time	Limerick IT	<ul style="list-style-type: none"> CM and BIM module in year 2 on the BSc (Hons) CM and BSc (Hons) CE Management Degrees. BIM with Revit Architecture 	Full Time
Cork IT	<ul style="list-style-type: none"> BSc (Hons) in BIM & Management (BIM+M) Cert in BIM Technologies / Cert in MEP BIM Applications BIM enabled interdisciplinary project module/ Various BIM modules exist on the Architectural Technology (AT) Civil Eng (CE), Structural Eng, Construction Management (CM) and QS courses 	Full Time	Ulster University	<ul style="list-style-type: none"> Common 1st year module delivered to QS, AT, Construction Eng, Energy, Building Surveying, Architectural Eng CE and Safety Eng Collaborative BIM learning takes place in year 2 of the QS and AT Postgraduate modules within the MSc in Construction Business and Leadership include salient BIM implications. 	Full Time
Dundalk IT	<ul style="list-style-type: none"> 8 Week PT Industry-Related BIM / Revit Course BIM Modules embedded into the AT, CM & Building Surveying Courses. 	Part-Time & Full Time	University College Cork	<ul style="list-style-type: none"> MEngSc in Information Technology in Architecture, Engineering, and Construction 	Full Time
Galway Mayo IT	<ul style="list-style-type: none"> Higher Diploma in Engineering in BIM BIM Modules incorporated into the AT, CM, QS and Economics, and CE courses. 	Part-Time & Full Time	University City Dublin	<ul style="list-style-type: none"> BIM based design module for undergraduate Civil Engineers and Architects 	Full Time
IT Carlow	<ul style="list-style-type: none"> Level 9 Certificate in BIM and Construction Project Management BIM Management module on the MSc in Management in the Built Environment 	Part-Time & Full Time	Technological University Dublin	<ul style="list-style-type: none"> MSc in applied BIM & Management / Postgraduate Diploma in Collaborative BIM / Postgraduate Certificate in BIM Technologies BIM Modules on the AT, QS, M&E, and CE courses. BSc (Hons) in BIM (Digital Construction) 	Part-Time & Full Time
IT Sligo	<ul style="list-style-type: none"> PG Cert in BIM and Lean Construction Management BIM modules on the PGD/ MSc in Project Management (PM), BSc Hons Construction Project Management (CPM), BSc CM, BSc / BSc Hons QS (All PT) BIM modules on the BEng/ BEng (Hons) CE, BSc Hons CPM, BSc / BSc Hons QS, BSc Hons CPM and Applied Technology, BSc Advanced Wood and Sustainable Building Technology (All FT) 	Part-Time & Full Time	Trinity College Dublin	<ul style="list-style-type: none"> BIM modules on the MSc in façade Eng. and third year on the Bachelor Programme in CE. 	Full Time
IT Tralee	<ul style="list-style-type: none"> Certificate in BIM with Revit 	Part-Time	Waterford IT	<ul style="list-style-type: none"> Higher Diploma in Science in BIM BSc in Architectural Technology / BSc [Honours] in Architectural and BIM Technology The WIT School of Engineering has developed a suite of modules at various levels 	Part-Time & Full Time
Letterkenny IT	<ul style="list-style-type: none"> Certificate in BIM (Revit) / Certificate in 4D BIM (Navisworks) BIM Graphic Communications module Integrated BIM Project module 	Part-Time & Full Time			

Research

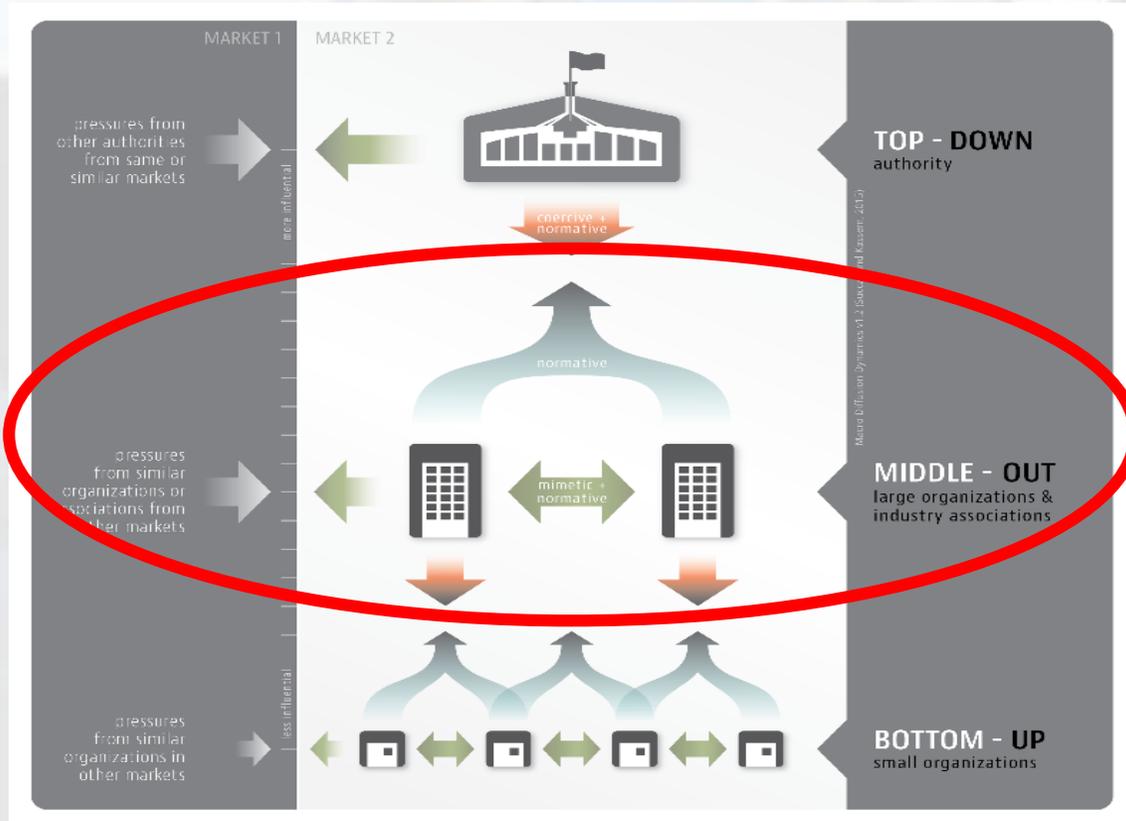
There has been a surge in research within the domain of BIM since 2017 with a number of Horizon2020 projects commissioned.

- The Horizon 2020 BIMcert project aims to develop more efficient and relevant training programme materials
- Limerick IT is involved in the Horizon 2020 BIMZeED project
- GMIT leads the National Forum for the Enhancement of Teaching and Learning for the BIM Futures Project
- UCC is developing a BIM-based toolkit for efficient renovation of buildings under the BIM4EEB project
- DCU has made funding available for a Postdoctoral Scholar to investigate how IFC can be used for digital planning.
- UCD have ongoing BIM based research initiatives in Model View Developments (MVDs).
- The original BICP team from TU Dublin, Trinity College Dublin and CitA continue to carry out important research.
- TU Dublin continue to investigate a number of BIM focused research themes i.e. Blockchain, Geomatics, frameworks, etc.

Model C: Diffusion Dynamics Model

2017

2019



**Results show
no change in
this model**

This model assesses and compares the directional pressures and mechanisms affecting how diffusion unfolds within a population

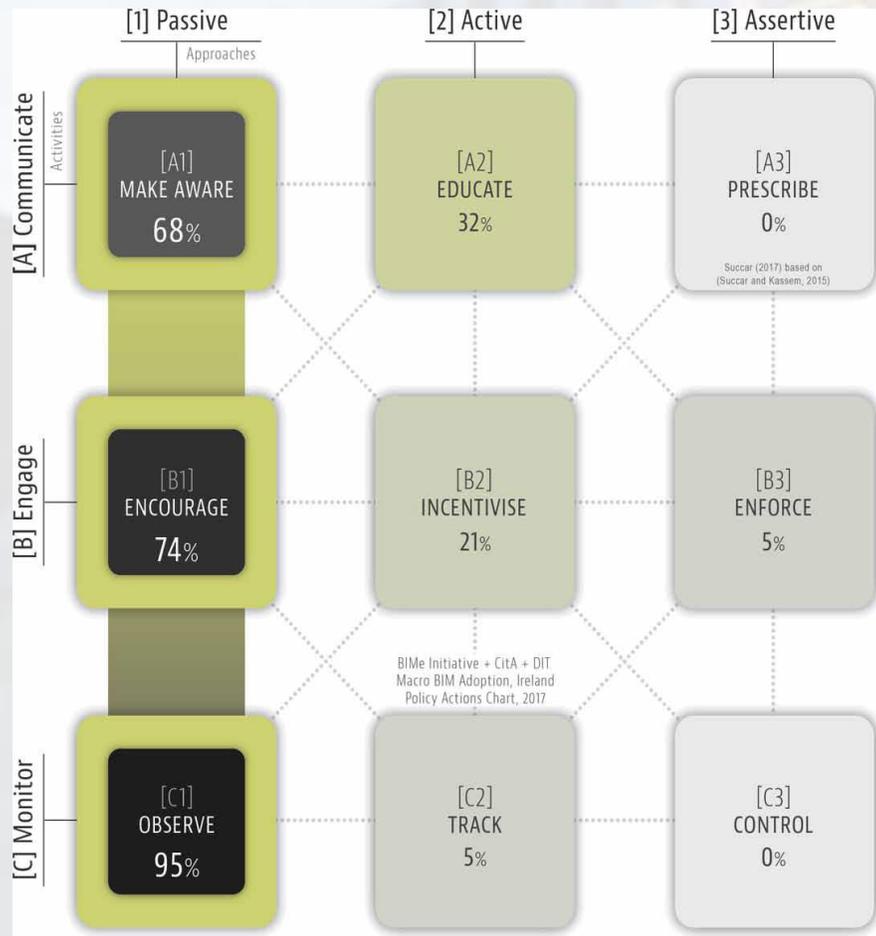
Model C: Diffusion Dynamics Model

Results are similar to those of 2017, which suggest again that that Ireland's diffusion dynamic is still middle-out

- Larger organisations or industry associations are pushing the BIM agenda within the industry and not the government.
- As the government has not provided strategic funding to-date or guidance documents to assist with BIM implementation, this has resulted in this model remaining static.
- Unless adequate funding is provided to support the government's digital strategy, it may risk further alienating SMEs within an already demanding and extremely competitive sector

Model D: Macro-Diffusion Responsibilities

2017



2019



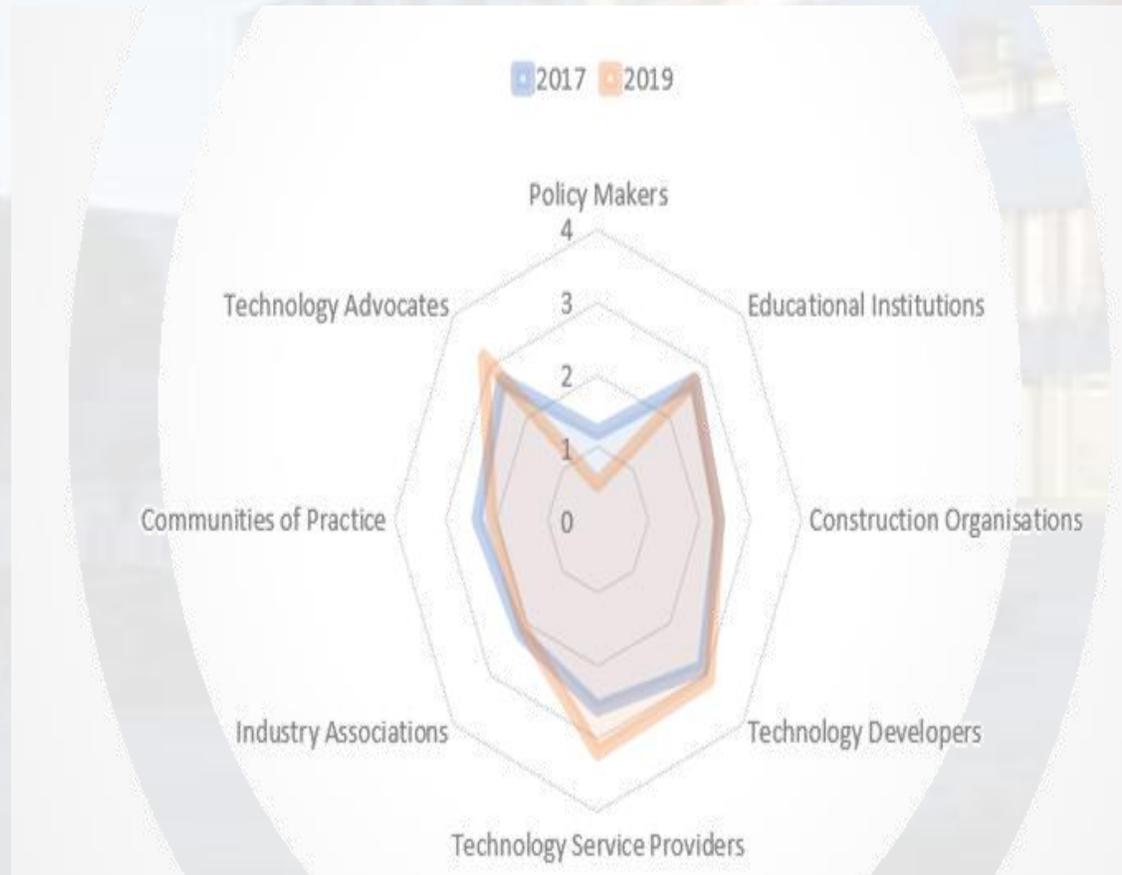
This model identifies, assesses and compare the actions policy makers take (or can take) to facilitate market-wide adoption

BIM IN IRELAND 2019

While results are similar in 2019, it is encouraging to observe that the Irish government is now seen as taking a more active approach when it comes to communication.

- Construction Sector Group (CSG), which ensures that regular and open dialogue between government and industry.
- While results have improved in comparison to 2017, there is a slight reduction in incentivisation despite an increase in training.
- These figures would be predicted to decrease or stagnate if the government fails to provide the industry with more encouragement and support to adopt BIM.

Model E: Macro Diffusion Responsibilities Model



	2017	2019
Policy Makers	1.2	0.5
Educational Institutions	2.7	2.7
Construction Organisations	2.4	2.4
Technology Developers	2.9	3.1
Technology Service Providers	2.6	3.2
Industry Associations	2.2	2.1
Communities of Practice	2.4	2.1
Technology Advocates	2.7	3.2

This model assesses and compares the roles played by different stakeholder groups in facilitating diffusion within and across markets.

Model E: Macro Diffusion Responsibilities Model

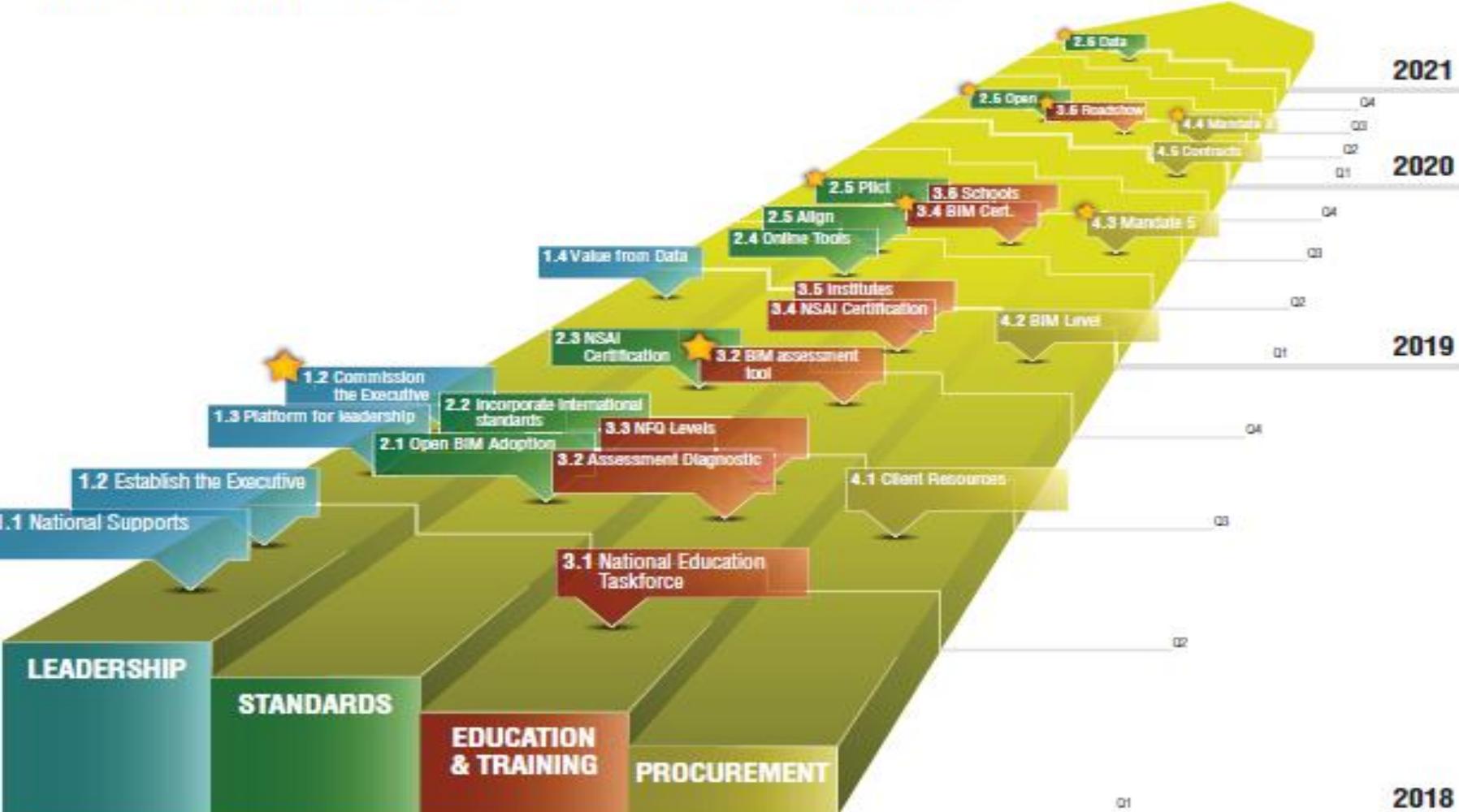
- In 2017 the technology developers were seen as the most influential technology players. However, the developers, service providers and advocates are now seen as co-leaders in this space.
- For the policymakers, the educational institutes continue to have much higher BIM diffusion compared to policy makers.
- The survey shows a significant drop for policy makers within this area.
- The construction organisations are seen as the key process players. However, industry associations and communities of practice are also ranked highly.

BIM in Ireland Umbrella Forum



Digital Roadmap 2021

Construction Sector



What does tell us about the Roadmap?

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NBC Roadmap: Leadership Pillar



Leadership

While government has not provided the leadership required, as of yet, there is still evidence that the industry continues to mature.

- In the recent NBS CitA survey it was reported that 76% of respondents had adopted BIM.
- According to the macro maturity models, leadership is presented by construction organisations, professional institutes, and the 3rd level educational sector.
- Despite no strategic funding being provided to-date from the government, some public sector organisations, continue to push BIM.
- A collective consortium of industry bodies has presented their findings to the CSG on a roadmap for what services the Centre of Excellence should offer and how it should be funded.

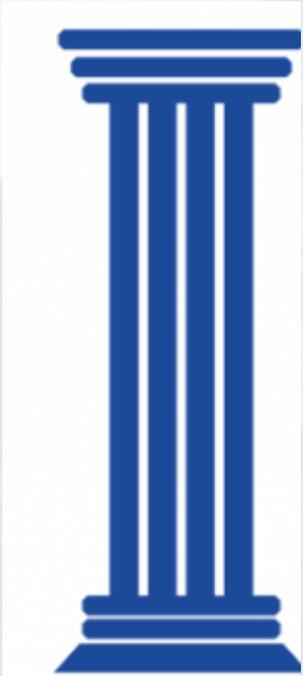
NBC Roadmap: Standards Pillar



Standards

- NSAI has now developed a BIM certification program.
- Development of the National Annex.
- Ongoing release of templates and guidance documents, such as the RIAI BIM Pack, continued progress is expected in this area.
- Three Irish BIM experts attending CEN meetings.
- Funding being made available for a Postdoctoral Scholar at DCU to investigate how IFC can be used for digital planning and building regulation control submissions.
- The development of online tools and supports to help implement “National Tools” has yet to be progressed.

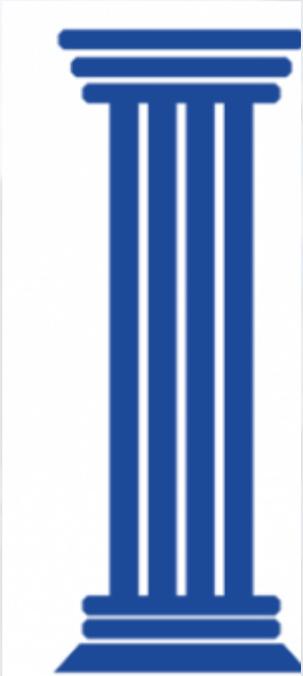
NBC Roadmap: Education and Training Pillar



Education and Training

- The third level education sector continues to be seen as the primary entity for upskilling.
- Professional institutes also continue to upskill internally
- Organisations, such as CitA, continue to provide guidance to both large enterprises and SMEs within the sector through workshops, discounted training, conferences, etc.
- To target the skills shortage at its core, it is recommended to explore exemplary international initiatives, such as Class of Your Own and BeIMCraft.
- At present, the National BIM Education Taskforce has not been established.
- Development of an online BIM self-assessment tool for companies and a base level of learning outcomes targeted at alternative National Framework of Qualifications levels have not been progressed.

NBC Roadmap: Procurement Pillar



- The procurement process of a phased BIM mandate for public works projects is on schedule to commence in Q2 2019.
- As of yet, there are no online supports or reviews of the suitability or provisions made for developing government construction contracts.
- Concerning the maturity, despite rising in this area, benchmarks and processes may stagnate unless clear direction is provided.

Procurement

Conclusion

- Ireland has shown a steady increase in some aspects of its BIM maturity since 2017.
- The Irish AEC Sector has, by default, led in the execution of parts of the roadmap and, in doing so, achieved a number of significant targets.
- There are still many vital objectives outstanding that will need funding if the key aims of the roadmap are to be achieved.
- The AEC sector now finds itself at a crossroads with a push from government required to advance the BIM maturity within the industry
- The industry cannot afford to stay static and must advance in line with other global jurisdictions to maintain its competitiveness.





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BIM in Ireland
2019 Report
now available

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