BIM adoption policies
insights from across the world.

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February 2, 2018 | at ÉTS, Montreal
In this presentation, I will briefly:

- Explain what is meant by *country-scale* BIM adoption.
- Explain five ways for *measuring* BIM adoption.
- Compare the approaches taken by policy makers to encourage BIM diffusion.
- Discuss the *BIM adoption data* collected from 21 countries and the interesting stories they tell.
- Answer a few key questions that are typically asked when developing a *BIM adoption strategy or roadmap*. 
Some of the questions that are typically asked:

What is the *best way* to encourage BIM adoption across a country?

How long does it take for BIM policies to take effect?

Does every country need a BIM mandate?

Can policy makers copy BIM adoption policies from other countries?

Should each country develop their own set of standards?

Who is responsible for leading BIM adoption efforts?
What is Macro BIM Adoption?
‘Macro’ refers to all adoption activities intended to affect a whole market, country or large region
BIM

‘BIM’ refers to the current expression of digital innovation within the construction industry

(no its not Revit)
‘Adoption’ refers to the whole mix of implementation and diffusion activities: adoption within organisations, adoption on projects, and adoption by individuals.
Macro Adoption

= Diffusion

+ Performance
  + Compliance
  + Compatibility

Implementation
  + Capability
  + Maturity
  + Competence

macro

meso (middle)

micro

1. Market
2. Defined Market
3. Sub-Market
4. Industry
5. Sector
6. Discipline
7. Specialty
8. Team
9. Organization
10. Organizational Unit
11. Organizational Group
12. Organizational Member
Background Research
BIM adoption policies insights from across the world

- **1st paper published**: BIM policy development Brazil
- **policy report delivered**:  
- **2nd & 3rd paper published**: BIM policy development Brazil
- **data collection started**:  
- **4th paper validation data published**:  
- **BIMe Initiative - Ireland study completed**:  
- **Macro BIM Adoption consultancy Mexico**:  
- **minimum 8 in-depth BIme Initiative country studies in 2018**:  
- **2010-2011**: macro BIM team formed
- **2013**: BIM policy issues identified
- **2014**: 1st paper published
- **2015**: consultancy report published
- **2016**: 2nd & 3rd paper published
- **2017**: data collection started
- **2018**: validation data published

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+ a large Community of Volunteers

Knowledge Network

Including five Knowledge Sets

Knowledge Structure
BIM adoption policies insights from across the world

BIM Leadership Forum, 2015 | Brazil
Future BIM Implementation, 2015 | Qatar
EU BIM Summit, 2015 | Spain
Geospatial World Forum, 2015 | Portugal
GEOBIM, 2014 | Netherlands

2015, 2016, 2017...
Barcelona, Milan, Rome, Sao Paolo, Hannover, Cairo, Dublin ...
A Proposed Approach To Comparing the BIM Maturity of Countries

Analyzing Noteworthy Publications of Eight Countries Using a Knowledge Content Taxonomy

Macro BIM Adoption: Conceptual Structures

Macro BIM adoption: Comparative Market Analysis

2013

2015

2015

2017
Data Collection
BIM adoption policies
insights from across the world

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Initial Benchmarking Data – collected in 2015 from

20 countries and 95 experts
What data was collected?
Macro Adoption Models
The **Diffusion Areas Model** clarifies how to measure the **Extent of BIM Diffusion** across markets.

The model overlays **BIM Fields** (technology, process, and policy) and **BIM Stages** (modelling, collaboration, and integration).

*[Applicable at OScales 1-10]*
BIM Fields refer to all topics, activities, and actors across the BIM domain.

BIM Stages refer to the performance milestones to be crossed across the BIM domain.
Diffusion Areas
Rating in 21 countries
Diffusion Areas

Trends
Diffusion Areas Chart clarifying BIM diffusion within a market

Ireland 2017
Macro BIM Adoption Snapshot conducted in collaboration with CIT and DIT

Dr. Bilal Succar at ÉTS, Montreal | Feb 2, 2018
Macro Maturity Components Model

Measures BIM Maturity across markets using 8 maturity components and 5 maturity levels
Macro Maturity Components Model

the eight Maturity Components
Macro Maturity Components Model

the five Maturity Levels
Macro Maturity Components Model

- the eight Maturity Components
- the five Maturity Levels
Component I

Objectives, stages and milestones

<table>
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<th><strong>a</strong> (low maturity)</th>
<th><strong>b</strong> (medium-low)</th>
<th><strong>c</strong> (medium maturity)</th>
<th><strong>d</strong> (medium-high)</th>
<th><strong>e</strong> (high maturity)</th>
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<tr>
<td></td>
<td>There are no market-scale BIM objectives or well-defined BIM implementation stages or milestones</td>
<td>There are well-defined macro BIM objectives, implementation milestones and capability stages</td>
<td>BIM objectives, stages and milestones are centrally managed and formally monitored</td>
<td>BIM objectives and stages are integrated into policies, processes and technologies and manifest themselves within all other macro maturity components</td>
<td>BIM objectives and stages are continuously refined to reflect advancements in technology, facilitate process innovation, and benefit from international best practices</td>
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</table>

Other component-specific metrics include: The Availability of Long-term Objectives to Guide Market Adoption; Availability of Capability Stages to Guide Market Adoption; The Availability of Maturity Milestones to Guide Market Adoption; ...
### Component V

**Learning and education**

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<td>a</td>
<td>BIM learning topics are neither identified nor included within legacy education/training programs; learning providers lack the ability to deliver BIM-infused education</td>
<td>BIM learning topics are identified and introduced into education/training programs; BIM learning providers are available across a number of disciplines and specialties</td>
<td>BIM learning topics are mapped to current and emergent roles; BIM learning providers deliver accredited programs across disciplines and specialties</td>
<td>BIM learning topics are integrated across educational tiers (tertiary, and vocational) and address the learning requirements of all industry stakeholders</td>
<td>BIM learning topics are infused (not separately identifiable) into education, training and professional development programs</td>
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**Other component-specific metrics include:** BIM Infusion into Tertiary Curricula; Multi-disciplinary Integration of Curricula; Use of Simulated Design, Construction and Operation Environments; Expertise of Learning Providers; ...
### Component VII

**Standardised parts and deliverables**

*latest version or additional information*

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<td>There is no market-specific <strong>object libraries</strong> (e.g. doors and windows); service delivery <strong>model uses</strong> (e.g. clash detection) and <strong>operational data</strong> requirements (e.g. COBie)</td>
<td><strong>Object libraries</strong> are available yet follow varied modelling and classification norms; service delivery <strong>model uses</strong> and <strong>operational data</strong> requirements are informally defined and partially used</td>
<td><strong>Standardised object libraries</strong> are available and used; service delivery <strong>model uses</strong> and <strong>operational data</strong> requirements are formally defined and used across all project lifecycle phases</td>
<td><strong>Standardised object libraries</strong>, service delivery <strong>model uses</strong>, and <strong>operational data</strong> requirements are integrated into, procurement mechanisms, project workflows and lifecycle facility operations</td>
<td><strong>Standardised object libraries</strong>, service delivery <strong>model uses</strong> and <strong>operational data</strong> requirements are continuously optimised and realigned to improve usage, accessibility, interoperability and connectivity</td>
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**Other component-specific metrics include:** Availability of an Elemental Classification System; Availability of National Object Libraries; Availability of Standardised Model Uses; ...
Comparative rating of macro maturity across the 2015 sample
Macro Maturity Components Charts

Compares BIM Maturity across sample markets using the 8 maturity components and 5 maturity levels

Diffusion Dynamics Model
Diffusion Dynamics Model

clarifies the how BIM diffuses within and across markets

The model includes:

3 Diffusion Dynamics:
Top-Down, Middle-Out & Bottom-Up.

3 Pressure Mechanisms:
Downwards, Upwards & Horizontal; and

3 Pressure Types:
Coercive, Normative, & Mimetic
Diffusion Dynamics Model
clarifies the *how* BIM diffuses within and across markets

- TOP-down
- MIDDLE-out
- BOTTOM-up

Government
Large Organizations
Small Organizations
Diffusion Dynamics Model clarifies the *how* BIM diffuses within and across markets.
Diffusion Dynamics Model clarifies the *how* BIM diffuses within and across markets.
Diffusion Dynamics Model clarifies the *how* BIM diffuses within and across markets.
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Diffusion dynamics across the 2015 sample
Policy Actions Model

clarifies how different Policy Makers have different Policy Approaches to influencing BIM Adoption

The model includes
3 Policy Approaches:
Passive, Active, & Assertive; and
3 Policy Activities:
Make Aware, Encourage & Observe
BIM adoption policies
insights from across the world

Make Aware
policy player informs stakeholders of the importance of a new system/process

Encourage
policy player conducts networking events to encourage stakeholders to adopt the system/process

Observe
policy player observes if stakeholders adopt the system/process

Policy Approaches

Make Aware
- Passive
  - Communicate
  - Make Aware

Encourage
- Active
  - Engage
  - Encourage

Observe
- Assertive
  - Monitor
  - Observe
Policy Approaches

**Educate**
- Policy player generates informative guides to educate stakeholders of the system/process.

**Incentivise**
- Policy player provides incentives and to stakeholders adopting the system/process.

**Track**
- Policy player tracks how the system/process is adopted by stakeholders.

**Prescribe**
- Policy player details the exact system/process to be adopted by stakeholders.

**Enforce**
- Policy player favours or penalises stakeholders based on their adoption of the system/process.

**Control**
- Policy player establishes compliance gates and mandatory standards for the prescribed system/process.
Policy
Actions
Charts
comparative sample charts

Make Aware
Incentivise
Control

Make Aware
Incentivise
Observe

Educate
Incentivise
Control

Educate
Enforce
Control
Policy Actions Charts
comparative sample charts
## Policy Action types across the 2015 sample

<table>
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<th>Policy Action types</th>
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<th>Prescribe</th>
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| Frequency | 14 | 7 | 0 | 20 | 1 | 1 | 20 | 1 | 0 |
BIM adoption policies insights from across the world

Policy Actions Chart

Ireland 2017
Macro BIM Adoption Snapshot conducted in collaboration with C&I and DIT
Diffusion Responsibilities Model

clarifies the different BIM Diffusion Roles played by industry stakeholders – clustered into 9 Groups
Diffusion Responsibilities Model clarifies the different BIM Diffusion Roles played by industry stakeholders – clustered into 9 Groups.
Diffusion Responsibilities Model

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Diffusion Responsibilities Model
clarifies the different BIM Diffusion Roles played by industry stakeholders – clustered into 9 Groups
Governmental players playing an active role in mandating or encouraging the adoption of BIM tools and workflows. For example, the Task Group in the UK and BCA in Singapore.
2 Educational Institutions
The universities and not-for-profit technical institutions developing and delivering learning programs and materials.
3 Construction Organizations

Designers, contractors, owners, operators and other organizational players involved in deploying BIM tools and workflows, training their staff and delivering BIM-enabled outcomes
4 Individuals
The individual practitioner, researcher, lecturer and student involved in learning, or actively implementing BIM tools and workflows.
BIM adoption policies across the world

The large software houses responsible for developing and maintaining BIM software tools, network solutions and middleware e.g. Autodesk, Nemetschek and Trimble

5 Software Developers
The large software houses responsible for developing and maintaining BIM software tools, network solutions and middleware e.g. Autodesk, Nemetschek and Trimble
Value-adding Resellers
The companies bridging and maintaining the relationship between software/network solution developers and end users.
Industry Associations
Associations dedicated to represent the interests of their individual and organizational members
*e.g. AMCA in Australia*
8 Communities of Practice
The informal grouping of individuals with a shared interest in improving their own BIM performance
*e.g.* Revit user groups
BIM adoption policies insights from across the world

The associations involved in developing and promoting technology-centric solutions for industry problems e.g. buildingSMART

9 Technology Advocates
The associations involved in developing and promoting technology-centric solutions for industry problems e.g. buildingSMART
Diffusion Responsibilities
Comparing contribution of player groups within the same country
**Diffusion Responsibilities**

*Comparing contribution of player groups* across countries

<table>
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<tr>
<th></th>
<th>Policy Makers</th>
<th>Educational Institutions</th>
<th>Construction Organisations</th>
<th>Technology Developers</th>
<th>Technology Service Providers</th>
<th>Industry Associations</th>
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**Index Legend**

- 75 - 100% High
- 50 - 74% Medium-high
- 25 - 49% Low-medium
- 1 - 24% Low
- 0 inexistent
## Macro Maturity Components

<table>
<thead>
<tr>
<th>Policy Makers</th>
<th>Educational Institutions</th>
<th>Construction Organizations</th>
<th>Individual Practitioners</th>
<th>Technology Developers</th>
<th>Technology Service Providers</th>
<th>Industry Associations</th>
<th>Communities of Practice</th>
<th>Technology Advocates</th>
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<tbody>
<tr>
<td><strong>Objectives, Stages and...</strong></td>
<td><strong>Champions &amp; Drivers</strong></td>
<td><strong>Regulatory Framework</strong></td>
<td><strong>Noteworthy Publications</strong></td>
<td><strong>Learning &amp; Education</strong></td>
<td><strong>Measurements &amp; Benchmarks</strong></td>
<td><strong>Standardised Parts and...</strong></td>
<td><strong>Technology Infrastructure</strong></td>
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</table>

[A] Leading, [B] Supporting, & [C] Participating roles
Developing a roadmap (sample)
<table>
<thead>
<tr>
<th>Objectives, Stages &amp; Milestones</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>20xx</th>
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<tbody>
<tr>
<td>Establish basic strategic objectives</td>
<td>Define minimum capability requirements for projects of Type X</td>
<td>Define minimum capability requirements and project deliverables for all other types and sizes of projects</td>
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<tr>
<td>Champions &amp; Drivers</td>
<td>Establish a high-level task group to develop a national strategy</td>
<td>Establish mid-level, regional or specialised satellite task groups to implement the national strategy and develop detailed protocols</td>
<td>Conduct pilot projects using the new regulatory framework. Refine the framework and establish a strategy for its market-wide adoption</td>
<td>Mandate the use of the new regulatory framework</td>
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<tr>
<td>Regulatory Framework</td>
<td>Develop or a new regulatory framework that encourages process innovation, early involvement of contractors and integrated project delivery</td>
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<tr>
<td>Noteworthy Publications</td>
<td>Establish a list of noteworthy publications to be developed</td>
<td>Develop or coordinate the development of the first set of guides, protocols and mandates that facilitate BIM adoption across the market</td>
<td>Develop or coordinate the development of a set of standards that regulate the quality of project deliverables across the supply chain</td>
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<tr>
<td>Learning &amp; Education</td>
<td>Develop a competency inventory, an educational framework and sample learning modules. Conduct awareness sessions across the supply chain</td>
<td>Develop learning modules for tertiary, vocational, and professional settings. Encourage the development of e-learning material covering all disciplines and roles. Educate the educators.</td>
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<tr>
<td>Measurements &amp; Benchmarks</td>
<td>Develop metrics for assessing and prequalifying the capability of organizations and the competency of individuals</td>
<td>Develop a market-wide benchmark for project performance. Develop a performance pre-qualification framework</td>
<td>Establish a market-wide pre-qualification register</td>
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<td>Standardised Parts &amp; Deliverables</td>
<td>Develop a protocol for standardized components</td>
<td>Generate standardized components for most-used architectural, structural and mechanical elements.</td>
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<tr>
<td>Technology Infrastructure</td>
<td>Develop a protocol for min hardware specifications</td>
<td>Develop a protocol for common information environment</td>
<td>Develop a protocol of a shared modelling environment</td>
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</table>
In Summary
Some of the questions that are typically asked:

What is the best way to encourage BIM adoption across a country?

How long does it take for BIM policies to take effect?

Does every country need a BIM mandate?

Can policy makers copy BIM adoption policies from other countries?

Should each country develop their own set of standards?

Who is responsible for leading BIM adoption efforts?
THANK YOU
bsuccar@changeagents.com.au