European BIM Summit, Barcelona 2015 – February 13th, 2015

BIM, trends from all around the world

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About the Presenter

Emmanuel Di Giacomo
- EMEA BIM Ecosystem Business Development
- Architect
- 12 years at Autodesk
- In the CAD / BIM Industry and 3D World for more than 25 years
- Formerly BIM & Revit Implementation Manager and AEC Marketing Manager
- Teaching BIM at Key Architecture Universities and Schools in France
- Formerly Product Manager for 3D software
- Facebook Revit Utopic City Creator (96K Likers WW)
- Village BIM Creator
- ABCD Blog Creator
BIM Event | Agenda

- BIM - where are we now?
  - Global trends worldwide
  - Adoption rates in Europe
  - BIM standards & Mandates
  - PR Coverage in Europe
  - Open Standards commitments
  - Lighthouse projects & Customers switching to BIM

- BIM – Benefits for the Building Industry & Projects
  - Architects, Engineers, Construction Companies, Owners
  - Healthcare, Entertainment, Commercial, Concert halls…
BIM means a big chance for GCC

Phillip G Bernstein is an architect, vice president of Autodesk, a lecturer at Yale University and an author

BIM will soon be the central platform for design, construction and building operation, largely supplanting the use of 2D drawings.

Augmented by cloud computation, big data analytics and widespread interconnectivity, BIM will be a tool that enables us to ask the important questions and get the answers at every point of the process.

Computations optimisation will become the norm for design and construction practice, and that optimisation will occur in the context of detailed data models that augment insight and decision-making.

Process modelling, the procedural overlay of physical modeling will accelerate this insight.

A designer placing an exterior wall in her design will have instant access not just to information about "what" that wall is made of, but "how" it will be fabricated and installed. Mechanical equipment models will simulate location, materiality and performance.

The definition of a "model" will become more robust, subtle and provocative and the design and construction processes it supports evolve accordingly. The construction sector in the Middle East is booming and the recent developments give a significant boost to the industry as large, important and expensive projects will need to be delivered responsibly.

Further, industry reports show that the GCC building construction market has recovered significantly from the downturn 2013 has been positive with residential, education and hospitality segments in particular showing signs of growth and a strong recovery. The GCC should take this once-in-a-generation opportunity to create standards, platforms and processes that are based on the most modern and sophisticated tools available. This will ensure that construction projects are a success and the GCC can establish and maintain a world-class industry for years to come.

Construction is fundamental to economic development and well-being, as buildings and infrastructure create the world we live in. The GCC should strive to do so by ensuring the use of the best possible tools and methods, and BIM is one critical strategy in such an approach.
BIM – Where are we now?
Building Business Environment

Macro Industry Trends

- Urbanisation
- Natural resources
- Competition and consolidation
- Complexity
- Technology
BIM I Adoption rates in the world

**US**
- 45% growth / last 3 years
- > 400% growth / last 5 years
- Contractors (74%) have surpassed architects (70%), and engineers are at 64%

**UK**
39% adoption vs 13% in 2010

**BIM Mandates in Norway and Finland**
- Government mandate requires full BIM by 2016

**Nordics**

**South & Central Europe**
- 14% creating and analyzing models
- 60% not using BIM

**South & Central Europe**

**Australia**
Strong BIM adoption

**China**
- 5% adoption and growing
- Strong awareness

**Japan**
<5% adoption 80% awareness

**HK Housing Authority**
Has standards & requirements in place

**Singapore**
50% BIM adoption

**Singapore**

**Australia**

**Nordics**
P-BIM software exchange protocols in China

**BIM I Adoption rates in the world**

**France 2017?**

**US**

**McGraw Hill Smart Market Report 2012**
**National BIM Report 2013 from NBIS**

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BIM – Mandates & Policies
European Parliament votes to modernize EU public works projects and to encourage the use of BIM

EU Public Procurement Directive

Article, 19.3 *Rules applicable to communications* provides that:

“For works contracts and design contests, Member States may require the use of specific electronic tools, such as of building information electronic modelling tools or similar.”
**European Trends**

European Parliament Recommends BIM Mandate for Publicly Funded Building Projects

- 28 EU member states can recommend, specify or mandate the use of BIM for publicly funded construction and building projects in the European Union by 2016.

- The UK, Netherlands, Denmark, Finland and Norway already require the use of BIM for publicly funded building projects.
BIM Standards & Mandates

Directives
- EU BIM directive for Public Procurement, January 16th
- UK BIM mandate in 2016
- France to mandate BIM in 2017 for public building
- Qatar, Kuwait mandating BIM

Norway
In Norway, the civil state client Statsbygg decided to use BIM for the whole lifecycle of their buildings. In 2007, 5 projects had used BIM. By 2010, all of Statsbygg projects were using IFC/IFD based BIM. In addition The Norwegian Homebuilders Association has encouraged the industry to adopt BIM and IFC.

Denmark
Danish state clients such as the Palaces & Properties Agency, the Danish University Property Agency and the Defence Construction Service require BIM to be used for their projects.

Finland
The state property services agency, Senate Properties, requires the use of BIM for its projects since 2007.

Netherlands
In 2012 the Dutch Ministry of the Interior (RGD) requires BIM for large building maintenance projects.

Hong Kong
The Hong Kong Housing Authority will require BIM for all new projects from 2014.

South Korea
The Public Procurement Service made BIM compulsory for all projects over S$50 million and for all public sector projects by 2016.
<table>
<thead>
<tr>
<th>Country</th>
<th>Organization</th>
<th>Guideline/Handbook</th>
<th>Background/Purpose</th>
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<tr>
<td>Australia</td>
<td>Australasian Procurement and Construction Council</td>
<td>National BIM Guide</td>
<td>• BIM Fluency for the construction industry believed to be crucial to maintain competitive advantage</td>
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| China        | Ministry of Science and Technology                                 | National BIM Standard (by 2016)                        | • National adoption may be driven by infrastructure rather than buildings, thru smart city management and mass transit projects  
• Carbon reductions are a near-term priority                                                                                                                                          |
| France       | Ministry of Ecology, Sustainable Development & Energy and Ministry| BIM Road map in draft form by end of 2014               |                                                                                              |
| Germany      | Federal Office for Building and Regional Planning                 | BIM Guide for Germany                                   | • Guide intended to provide structure for future BIM National Mandate                                                                                                                                         |
| Hong Kong    | Hong Kong Housing Authority                                       | BIM Standards, user guides, and library components for contractors | • Use BIM for the Design Stage by 2015                                                                                                           |
| Japan        | Ministry of Land, Infrastructure, Transport and Tourism           | 2013 Guidelines for architecture BIM Models             | • In addition to the 2013 guidelines, The Japan Institute of Architects put forth BIM guidelines in 2012                                                                                                   |
| Malaysia     | Public Works Department                                           | BIM Guideline Standard (2016)                          | • Concern of readiness of industry to adopt BIM, industry groups have recommended government provide training & Tax breaks                                                                            |
• Establishes consistent approach, efficient process and common language for BIM                                                                                                                                 |

Singapore - BCA Academy
BIM Mandate

Results of BIM Mandate

- 86% improved visualization/presentation
- 85% identified and resolved design conflicts
- 84% improved productivity in CDs
- 82% reduced rework downstream
- 81% reduced errors and omissions in CDs
UK’s BIM Mandate
Ambitious and Forward Thinking Policy

- All centrally funded public projects – buildings and infrastructure deliver **BIM data** for the **entire project lifecycle** by 2016

- BIM Fluency is viewed as a **must-have skill set** for the future health of the industry.

- Mandate is to support the UK’s construction goals:
  - Cut lifecycle costs and carbon consumption by **20%**
  - Transform itself into an efficient, integrated and collaborative industry and services are in **demand** worldwide.

BIM Event | BIM Mandates in France

**Government led**
- « Objectives 500,000 » housing fixed by Government for 2017
- Modernization of the Building Industry initiative launched « Batiment 2.0 »
- Strong focus on BIM to help achieve Sustainable and cost reduction goals
- Government named Mr Delcambre as Mr Digital to lead this move of the Industry
- buildingSMART France leading key topics like BIM Management, LOD definition, QTO…
- PPBIM ISO Standard for Building Products Manufacturers

**Private led**
- First ever BIM Golden Awards led by largest Press Group, Sept. 24th
- Bouygues Construction launched successful BIM Generation site to influence ecosystem
- Crédit Agricole Bank’s New Headquarters in BIM (Owners: Mormons)
France – Objective 500,000 dwellings per year

- **Strategy – Digitalization of the whole Building Industry**
  - June 2014 - French Government nominated an Ambassador for the Digitalization of the Building Industry
  - Summer 2014 – National BIM Survey
  - December 2014 – Official roadmap to BIM
  - February 2015 – 1st BIM Task Group meeting led by CSTB

- **Tactics:**
  - 20M€ for the digitalization of the Building Industry (SMB)
  - BIM Mandate for the whole Industry in 2017 for public projects
  - BIM Task Group
  - Digital Portal - BIM National platform to train & educate
  - BIM Execution Plan writing
  - Education move to BIM
  - Reality capture mandate
  - BIM Objects platforms with Products Manufacturers
  - IFC as a Standard
  - Digital Construction permits
  - Digital Hand-over as-built for O&M
  - Health Card of the Building to store all its BLM
  - BIM best practices
**BIM Event | Education BIM Mandates in France**

**Public**
- Ministry of Education launched BIM Mandates at National Level (STi & Pro)
- Paris-Tech launching First BIM Master in France September 2014

**Private**
- Launch preparation of a BIM Master for 2015 in Engineering
- GEPA - Architects Official Training Organization launched BIM Manager courses
- UNSFA - Trade Union of Architects launching BIM School
BIM Event | BIM Mandates in Italy

Public / Private led

- Project Innovance – BIM Content online database open to AEC professionals
- UNI (National Standardization Association) working on BIM at EC Level
- French-Italian axis of collaboration
BIM Event | Education BIM Mandates in Italy

Public

- University of Brescia to launch first BIM Master in Brescia in September 2014
Germany BIM – Digital Building Platform

- Industrie 4.0

- Germany’s federal minister of transport and Digital Infrastructure Alexander Dobrindt last month used the BAU 2015 exhibition in Munich to announce the creation of the Digital Building Platform [Platform Digitales Bauen].

- Group established by a number of industry-led organisations. Aim of developing a government BIM strategy. Official government statement: “standardising of process and device descriptions, develop guidelines for digital planning methods and provide sample contracts.”

- New intervention set up by Dobrindt as an initiative of Germany’s ongoing Reform Commission for Major Projects, a committee of experts set up to examine the underlying reasons why a series of major public sector projects in Germany went badly over budget and/or late like:
  - Berlin’s Brandenburg Airport, Stuttgart 21 railway station, Hamburg’s Elbphilharmonie concert hall, the new building for Germany’s intelligence services, and Hochmosel road bridge.
Bauen Digital GmbH
BIM Standard Support – COBie Challenge January 2014

buildingSMART alliance January 2014 Challenge
by Bill East, PhD, PE, F.ASCE - Engineer Research and Development Center, U.S. Army, Corps of Ei

• BPie for Architectural Programming
• COBie for Architectural Design
• COBie for Architectural and MEP Design
• SPie for Architectural Design and Architectural and MEP Design
• HVACie at Coordinated Design
• WSie at Coordinated Design
• Sparkie at Coordinated Design

• HVACie for MEP Fabrication Design
• COBie at Construction Handover
• SPie at Construction Handover
The UK Government has mandated the use of BIM in all government construction projects by 2016.

The government recently announced that £1.7 billion has been saved on major projects over the past year!
European Parliament votes to modernize EU public works projects and to encourage the use of BIM

Media Awareness and Engagement


BIM – Standards
Autodesk commitment to buildingSMART & IFC

- Founding member of buildingSMART (formerly IAI)
- Liaison with buildingSMART(BS) Communities Worldwide
  - USA, Germany, U.K., Australia, International, Committee Participation (Technical/Business)
- Current Building Smart Test Beds
  - US Army Corps COBie Challenge, U.K COBie trial, certifications
- IFC Implementation in various products
  - Revit Architecture, Revit MEP, Revit Structure, Navisworks, AutoCAD Architecture, AutoCAD MEP, Civil 3D
- Part of the first vendor group with IFC Re-certification
  - Revit Architecture IFC2x3 ISO/PAS 16739
- IFC Open source support in Revit
- IFC4 basic export support released Summer 2013

Jim Lynch, vice president, building and collaboration products of Autodesk, said: “We have many customers worldwide that mandate a neutral IFC file format and rely on it to ease the design, construction and maintenance of new and existing buildings. BuildingSMART’s IFC certification will allow our customers to facilitate more efficient, collaborative workflows; increase project team collaboration; and encourage data exchange and interoperability within a BIM workflow.”
Autodesk Commitment to Open Standards

- Autodesk works with a number of organizations & Initiatives worldwide, including
  - U.S. National BIM Standard (NBIMS) and related efforts of Construction and Operations Building Information Exchange (COBie) and National CAD Standard (NCS)
  - BuildingSMART Chapters Worldwide
  - US Army Corps of Engineers
  - US General Services Administration
  - China BIM Union
  - Singapore BCA
  - UK Government / UK BIM Task Group
  - Austrian Standard Institute - CAD/ BIM Standards
  - Public Sector Clients DACH
  - Reformkommission Großprojekte
  - VDI Koordinierungskreis
Autodesk Commitment to Open Standards

- Autodesk supports open standards across three major sectors: manufacturing, infrastructure & civils and building construction.

- Autodesk technology provides support to over 100 exchange standards across these three industries.

- Downloads of our ground-breaking IFC open-source exporter exceeds 20,000 worldwide.

- Autodesk is the holds IFC certification across architecture, structures and building services disciplines.

- Autodesk is the first major technology provider to gain IFC4 certification.
More than 80,000 IFC Revit Open Source engine downloads

- In 2014, more than 35,000 downloads over the first months
- End of 2014, More than 70 000 in total
- October 2014, last Open Source release, more than 5,235 downloads in the month
Autodesk Commitment to Open Standards

- COBie Implementation

Revit R15 COBie Utility
Autodesk Commitment to Open Standards

Ö-Norm BIM Implementation

Autodesk Ö-Norm BIM Standard Tool
Verfügbar für AutoCAD Architecture, AutoCAD, Revit

Ö-Norm Workshop 6240-4 Austrian Standard Institute
Autodesk Commitment to Open Standards

Autodesk supports BIM interoperability

Autodesk’s work on our data exchange protocols underscores our ongoing commitment to support industry Building Information Modeling (BIM) interoperability standards and open source data exchange methodologies:

- Autodesk created the IFC Open Source project for Revit in 2011, which has been downloaded more than 30,000 times by users from more than 100 countries.
- Autodesk has contributed at least 24 updates to the IFC export capabilities, and has updated the IFC open source 23 times.
- The Green Building XML (gbXML) schema used in several Autodesk® products, including Autodesk Revit® software products, Autodesk AutoCAD® variants, Autodesk BIM 360 products, and Autodesk Project Vasari software, was developed in 1999 to facilitate the interoperability between information stored in building information models and a wide variety of engineering analysis tools to support green building design, analysis and operating workflows. For a list of tools on the market supporting gbXML, reference the gbXML.org site. With gbXML support in several major engineering analysis and BIM tools, gbXML is considered a de facto industry standard schema.

Revit software products conform to IFC standards

Revit software products were among the first in the market to receive the buildingSMART IFC Coordination View 2.0 export certification, and to create IFC files in the latest IFC4 standard.

- Since 2005, Revit products have offered IFC file export and import, which makes it possible to export replicas of project models into the standard IFC file format. Users can then import

Autodesk open standards resources

- IFC Exporter for Revit (SourceForge)
- IFC Exporter for Revit (Revit App Store)
- CORe Toolkit for Revit
- STL Exporter
- buildingSMART Alliance (USA) buildingSMART International

Autodesk BIM Interoperability

Resource Center: Downloads, Whitepaper

How Autodesk Supports Open
Data Exchange Standards to Improve Project Collaboration

Building Information Modeling (BIM) is changing the way project data is organized and the way teams work together. Cross-functional project teams use BIM software solutions to create intelligent 3D digital models that give all stakeholders a clearer vision of the project and increase their ability to make faster, more informed decisions.

These BIM models are supplementing—and may someday replace—construction documents as a new standard for sharing and delivering building design data. Data exchange standards help project teams move these models and information from one 3D modeling software application to another, facilitating more efficient, collaborative workflows.
Autodesk Trust Center
Single Resource for Information on Cloud

www.autodesk.com/trust
www.autodeskplm360.com/trust

Autodesk—a name you can trust for data security
With over 10 years of experience providing cloud-based solutions, Autodesk knows that data security is critical to your success.

Whether you’re already using one of the Autodesk® 360 Managed Services® or just visiting to learn more, the Autodesk Trust Center shows how we safeguard the availability, confidentiality, privacy, and security of your data in the cloud.

Operations
Autodesk defines stringent data security targets for Autodesk 360 Managed Services and measures performance against those targets.

Privacy
Autodesk respects your privacy rights. Get answers to common questions about privacy, and read our Privacy Statement to learn more.

Security
Autodesk incorporates advanced data security technology to deliver secure cloud technology to users of Autodesk 360 Managed Services.

Quality
We’re constantly improving our products and services to maintain cloud security and the quality of the Autodesk 360 Managed Services.

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*This Trust Center covers listed Autodesk 360 Managed Services only.
BIM Event | Lighthouse projects & Ecosystem

Hospitality construction
BIM speeds luxury hotel completion

Project summary
Balfour Beatty used Building Information Modeling (BIM) to construct the 22-story, 1,001-room Omni Dallas Hotel. The luxury hotel, constructed adjacent to the city’s convention center, was built to help the city reap the economic benefits of large conventions. Autodesk BIM solutions helped the company beat its construction schedule by 2 months.

Optimize design
Balfour Beatty used BIM to explore multiple design options [...]

Reduce RFIs
By incorporating subcontractors into its BIM process [...]

Use fabrication to finish faster
Subcontractors used coordinated, 3D models [...]

Balfour Beatty
Omni Dallas Hotel

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BIM – Benefits for the Building Industry sector
BIM Event I BIM Adoption level by Discipline

Percentage of professions using BIM on more than 60% of their projects

BIM Event I Short and long-term BIM benefits

- Fewer Claims/Litigation
- Reduced Construction Cost
- Increased Profits
- Reduced Project Duration
- Maintain Repeat Business

Short-term BIM Benefits (2009 & 2012)
- Staff Recruitment and Retention
- Reduced Cycle Time of Specific Workflows
- Offer New Services
- Reduced Rework
- Market New Business
- Reduced Documents Errors and Omissions

Architects

- Less risks of errors
- More time = More business
- New growth opportunities
- No more modifications
- Gaining time in workflows
- More creative power
- Regaining the control

BIM Event | Better Sustainable Design
**Contractors**

- Better multidisciplines coordinations
- Efficiently visualizing the design intent
- Evaluating the constructability in 3D
- Quantity determination from the BIM Model
- Scheduling - 4D
- Cost management – 5D
- Site planning

Quality, safety, cost, and schedules are the main Key benefits for Construction!
BIM Event | BIM, benefits for Engineers

Engineers

- Maintain repeat business
- Market new business
- Offer new services
- Reduced documents errors and omissions
- Understand constructibility
BIM | For the Engineers
Ventilation, air extraction, disinfection simulations...

Images Courtesy of Huntair
BIM Event | BIM, benefits for Owners

Owners

- Documentation accuracy
- Reduced rework
- Construction cost
- Project duration
- BIM Model reuse for FM purposes

Saving 2€/sq.m can greatly improve the Owner efficiency and dramatically reduce FM costs!
BIM | For the Owners

Asbestos status

Avoid Sanitary disasters and protect patients and users’ health with a better predictability and follow up
80% of buildings spendings occur once delivered!
BIM allows at least 20% of cost energy reduction and a better management of the consumption…
BIM | For the Owners
External & Internal communication | Site integration
Gracias / Thanks!