



BIM ARABIA  
**بیم آرابیا**

**BIMARABIA**

5th issue

July 2017

**B**IM DEVELOPMENT

**G**ENERAL COMPARISON  
BETWEEN BIM 4D  
SOFTWARE



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The 4D BIM modeling is the next generation of project management including project planning , scheduling and data analytic. The 4D literally adds vision to the construction team also .....

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# 07

## BIM MANAGER (ROLES AND RESPONSIBILITIES)

To implement successfully BIM a cooperating team is a must. And the team must have a leader whom they trust. BIM manager has many administrative and tactical roles which if he mastered,.....

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# 08

## BUILDING INFORMATION MODELING (A SOCIAL ASPECT)

There's many who quotes from Scott Simpson, the director of the American Institute of Architecture his saying:” BIM is a 10% technology and 90% sociology, this saying has spread like a wild fire and been used in many related and non-related occasions till it has been mannered and questioned, .....

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# 09

## INTERVIEW WITH DR.YASSER AL MUTAIRI

**In the name of God, we begin. Is it possible to put a profile about yourself, your testimonies and experiences?**

Dr. Yaser bin Rizkan Almutairi, graduate of the Faculty of Environmental.....

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# 10

## COORDINATION SECTION

One of the most important advantages of BIM technology is to solve the problem of conflicts between the different elements of the same specialization or different disciplines. Therefore, we must follow some important steps before starting the model and during the process of

...

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## Building Information Modeling and the client

API >> Accessible Programmable Interface

Or what is known as the open Code window which is dealing with different functions of the program through writing the code.

SDK>> Software Development Kit

....

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• Teamwork

- Omar Selim
- Eng. Mohammed Ba-Aqail
- Eng. Sonia Ahmed
- Eng. Motasem Albanna
- Eng. Amar ElTom
- Eng. Najwa Salama



Translated by: Mohammed Metwally Ghattas



Eng. Hamza  
Faisal Mushrif

## Introduction:

Capabilities between different components of AEC (architecture, engineering, and construction) differentiated, engineering platforms used in BIM (Building Information Modeling) have certain capabilities vary from a software to another. Some of them outperform their modeling abilities while others are known for their simulation and so on, Individuals also have different knowledge, management and technical abilities toward BIM application in projects, these abilities may be connate or acquired, therefore, some of them polish their cognitive abilities through theoretical

education while others prefer to develop their abilities through practice based on their innate ability to learn rapidly, these capabilities affect organization's ability to implement BIM during various project phases, for example design phase, integration between designer's abilities with software technical capabilities may contribute to produce a distinctive building aligned to time, cost and quality constraints, so successful implementation of BIM during different project phases requires a reasonable alignment between the diverse capabilities of the participating companies.

While talking about technological capabilities, many of the current BIM platforms override previous capabilities of computer-aided design software, one of BIM platforms capabilities can be realized through immediate change in views, sections and elevations without the need to be separately modified, information storage, speed of information recovery and ability to exchange through unique platforms, all are exceptional capabilities of modern BIM platforms unlike other traditional platforms, however, despite these distinctive capabilities, these platforms still suffer from some deficit, one aspect of this deficit is its inability to support human creativity in the initial design phase, so, the demand is increasing on companies to compensate the lack of BIM platforms capacity through being linked to other platforms that support parametric design and innovation.

Through projects, these capabilities are formed of different levels related to individuals, organizations and the market, at organizations level, these capabilities are formed by knowledge of its members as well as by knowledge of other individuals in the participating organizations, this cognitive maturity requires technical capabilities to exchange information between individuals within the organization or through integrative contracts with other organizations, therefore, technical capabilities in organizations requires a certain amount of software, hardware and networking capabilities to reach a certain level of maturity in implementation of BIM, Similarly, to reach an integrated level of operational, organizational and business capabilities in companies requires more than just a partial change in the organization's business methodology.

Increasing those capabilities is also linked to other causes outside the organization context such as change in education, regulations and market demands, these capabilities dynamically interact with BIM, successful implementation of BIM in a project actively contributes to determine the lack of these capabilities, which helps to recognize the imbalance and thus the successful implementation of another project, an organizations involved in the project may mainly focus on one of the capabilities neglecting other factors. Thus, success of the project depends on the balance between various capabilities in an integrated manner among the participating organizations.



Alaa Masoud Abd El-Rahman

Translated by: Amira EL-Shazli

## BIM RESEARCH TOPICS - TOPIC (10)

At the design phase and before the construction phase, the project delivered in the form of working drawings and documents. Any construction project consists of working drawings

from all the construction disciplines (Architecture, Construction, Electromechanical) in addition to the project's bill of quantities and specifications.

Projects' specifications concern about the safety requirements, building material quality, and that all the construction systems are designed and implemented in a way that doesn't risk the occupants and assets safety and insures that health, safety, and environmental protection requirements are applied.

Standards apply to most of the products that are involved in the building process like cement, concrete masonry, building bricks, glazing, wood, insulations, ceramic, adhesives, ceiling tiles, chimney, and sewage and sanitary ware.

With the technology development, Building Information Technology (BIM) applications invented. Applying BIM on the construction projects main goal is to make a model for the building life cycle from design to demolish and facilitate many tasks such

as building material quantities and specifications extraction, and classification.

Autodesk Revit as an example to the BIM applications divides the standard specifications to sixteen divisions (Table 1). These sections are part of the program's library as Revit Keynotes text file (C:\Program Data\Autodesk\RVT2015\Libraries).

Table 1: Revit's standard specifications divisions

Key Value	Keynote Text
01000	Division 01 – General Requirements
02000	Division 02 – Site work
03000	Division 03 – Concrete
04000	Division 04 – Masonry
05000	Division 05 – Metals
06000	Division 06 – Wood and Plastics
07000	Division 07 – Thermal and Moisture Protection
08000	Division 08 – Doors and Windows
09000	Division 09 – Finishes
10000	Division 10 – Specialties
11000	Division 11 – Equipment
12000	Division 12 – Furnishings
13000	Division 13 – Special Construction
14000	Division 14 – Conveying
15000	Division 15 – Mechanical
16000	Division 16 – Electrical

In identifying the elements, it is preferred to add the keynote for each element. The advantage of this step is the ability of extracting the uses, types, and characteristics of each element used in the BIM model.

According to the type and amount of the required information, some element's keynote can be eliminated and that is totally depends on the Level Of Details (LOD) to be reached in the BIM model.

The greater the amount of information entered the BIM model, the greater the amount of information that can be utilized in contracting, tender document preparation, contractor selection, and building and implementation phase.

The keynotes in the BIM model is not only used in producing the project's documents in tables, but it also can be used in developing the project's working drawings as will be clarified.

For an example, the utility of a keynote of one of a BIM model element (column) will be studied to figure out the amount of information that can be used from each element's keynote in the BIM model for all the project's disciplines (Architecture, Structure, Electromechanical) and the way of extracting these data from the program.

Key Value	Keynote Text
01000	Division 01 - General Requirements
02000	Division 02 - Stewcwk
03000	Division 03 - Concrete
04000	Division 04 - Masonry
05000	Division 05 - Metals
06000	Division 06 - Wood and Plastics
07000	Division 07 - Thermal and Moisture Protection
08000	Division 08 - Doors and Windows
09000	Division 09 - Finishes
10000	Division 10 - Specialties
11000	Division 11 - Equipment
12000	Division 12 - Furnishings
13000	Division 13 - Special Construction
14000	Division 14 - Conveying
15000	Division 15 - Mechanical
16000	Division 16 - Electrical

Key Value	Keynote Text
01000	Division 01 - General Requirements
02000	Division 02 - Stewcwk
03000	Division 03 - Concrete
03100	Concrete Form and Accessories
03200	Concrete Reinforcement
03300	Cast in Place Concrete
03310	Structural Concrete
03310.A1	300x500 Cast in Place Rectangular Column
03310.A1.01	Specialty Treated Concrete
03310.A1.02	Heavy Concrete
03310.A1.03	Continuous Deck and Underlayment
03310.A1.04	Cast-in-Place
03310.A1.05	Concrete Protection and Clearing
03310.A1.06	Division 03 - Concrete
03310.A1.07	Division 05 - Metals
03310.A1.08	Division 06 - Wood and Plastics
03310.A1.09	Division 07 - Thermal and Moisture Protection
03310.A1.10	Division 08 - Doors and Windows
03310.A1.11	Division 09 - Finishes
03310.A1.12	Division 10 - Specialties
03310.A1.13	Division 11 - Equipment
03310.A1.14	Division 12 - Furnishings

Family: Concrete Rectangular Column [Load...]

Type: 300 x 500 [Duplicate...]

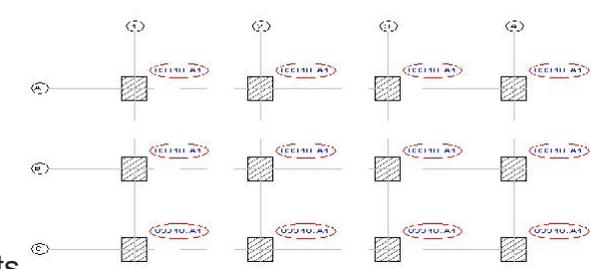
[Rename...]

Type Parameters

Parameter	Value
<b>Structural</b>	
Section Shape	Not Defined
<b>Dimensions</b>	
b	300.0
h	500.0
<b>Identity Data</b>	
Keynote	03310.A1
Model	
Manufacturer	
Type Comments	
Type Image	
URL	
Description	
Assembly Code	
Cost	
Assembly Description	
Type Mark	
OmniClass Number	
OmniClass Title	

[<< Preview] [OK] [Cancel] [Apply]

Type	Structural Material	Keynote	Comments
300 x 450mm	Concrete, Cast in Site	03310.A1	
300 x 450mm	Concrete, Cast in Site	03310.A1	
300 x 450mm	Concrete, Cast in Site	03310.A1	
300 x 450mm	Concrete, Cast in Site	03310.A1	
300 x 450mm	Concrete, Cast in Site	03310.A1	
300 x 450mm	Concrete, Cast in Site	03310.A1	
300 x 450mm	Concrete, Cast in Site	03310.A1	
300 x 450mm	Concrete, Cast in Site	03310.A1	
300 x 450mm	Concrete, Cast in Site	03310.A1	
300 x 450mm	Concrete, Cast in Site	03310.A1	
300 x 450mm	Concrete, Cast in Site	03310.A1	



### Consisting teamwork:

The core members of the team work in the usual projects consists of:

- BIM Manager
- Coordinators
- Modelers

In case of large projects, or those that contain more than one building or implemented in more than one company (specialized branches) may increase Job Title according to the needs of the project:

For example, if more than one company working on the same project, but in different disciplines (architectural, electrical, mechanical, structural ... etc.) We will need for each group (Chief BIM) works in conjunction with (BIM Manager)

Family: Concrete Rectangular Column [Load...]

Type: 300 x 450mm [Duplicate...]

[Rename...]

Type Parameters

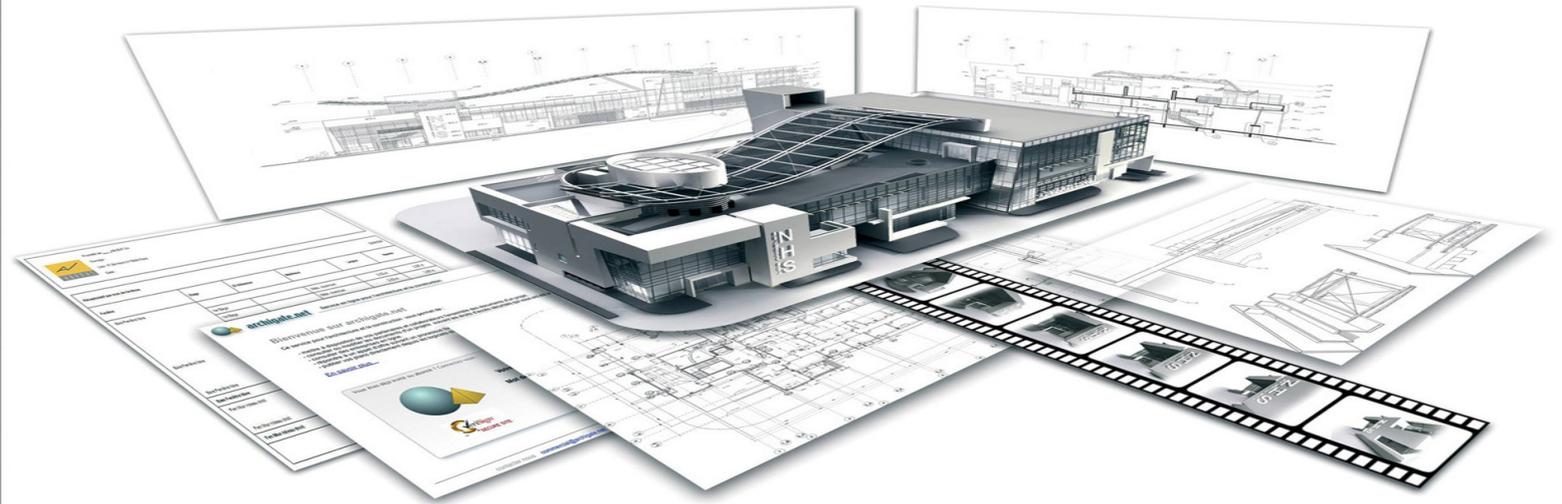
Parameter	Value
<b>Structural</b>	
Section Shape	Not Defined
<b>Dimensions</b>	
b	300.0
h	450.0
<b>Identity Data</b>	
Keynote	
Model	
Manufacturer	
Type Comments	
Type Image	
URL	
Description	
Assembly Code	
Cost	
Assembly Description	
Type Mark	
OmniClass Number	
OmniClass Title	

[<< Preview] [OK] [Cancel] [Apply]



Mohammed Abdulaziz

# TEAM WORK & DUTIES



Formation successful teamwork to be able to produce and achieve the desired goals of a modeling some building requires considerable effort.

The Main purpose of Collaborate Work is Unify the ways and mechanisms of action, and the information exchange between the different partners (the designer, contractor ... etc.) Through the stages of work .



## Axioms at the beginning of formation teamwork

- Teamwork has to understand his duty and work sequences
- Have to own common vision for the outcome of the work
- Teamwork needs to project time plan as a whole, as well as for each stage separately
- The division of the working groups and duties to accurate tasks require knowledge of the potential of every member of working group
- Every individual must get training and experience sufficient to face the challenges of working
- Must verify the reasons that keep the teamwork (suitable salaries, good treatment, providing hardware and software suitable for the volume of work)
- Unify the terminology used in the data and information exchange (language, the concept of each scientific term, suitable for different file naming way ... etc.)
- Holding regular coordination meetings between project teamwork to follow up on work (such as a review of the schedule, solving routine problems ... etc.)
- Implement an effective system to make the documentary cycle for the exchange of project documents effective , as well as the creation of electronic libraries for quick restoration of the various types of documents (families, tools, software, and add-ins programs, ... etc.)



“However, if the project is composed of more than one building and every building is executed by a different company and each building contains all the disciplines (architect, Electromechanics, structural ... etc.) Must exist BIM Champion or BIM specialist (a Person who implementation of BIM strategy in all parts of the building)

The greater the complexity of the work, the greater the needed for the distribution of roles and increasing team members, for example, in large projects may require (Chief BIM) to help (BIM Champion) which is thus an assisting (BIM Manager)

- **The BIM manager**

BIM manager is the liability person about the model at all, and during any meeting determines the needs and any development in the project life cycle

- Chose the BIM Platform which reflects his point of view

- We can consider facility management his main responsibility in the project life-cycle

- Cooperate with procurement section to prepare the material submittal list ((Procurement Requisites and Material Delivering – (Supply Chain))

- Check and improve the model look ahead time

- Develop specific training schedules to improve the qualifications of the Modeler through training and development and keep them updated on the latest technologies in BIM field.

- Apply a quality control system on the Model and all team members (Modelers & Coordinators ... Etc.)

- Collect deferent project data from all disciplines and sections (Design, modeling, implementation, procurement, etc.)

- He has to have technical Troubleshooting skills, so strong background for all engineering trades (elec., mech., str. and arch.) “AEC”

- **Coordination team**

The meaning of the coordination between the different engineering disciplines is to avoid the clashes and to connect each service to the place allocated to them safely, achieving the expected result of the design (implementation of safe design)

- To convert all instructions and information coming from senior management into executive tools that are easier for the model’s team for implementation. For example, modeling specifications and materials information to Families for using in the model

- Reporting on the work progress, what executed from the targets, the status of implementation schedule of the work on the model being implemented

- He is also the general coordinator between the development of the site and its requirements and between model level of development. It is responsible for converting these requirements into a visual form on the computer

- Develop the model’s tools and determine the program and tools needed

- Develop the modeler’s qualification

- Repair and maintain the model

- Distribute the team work model tasks

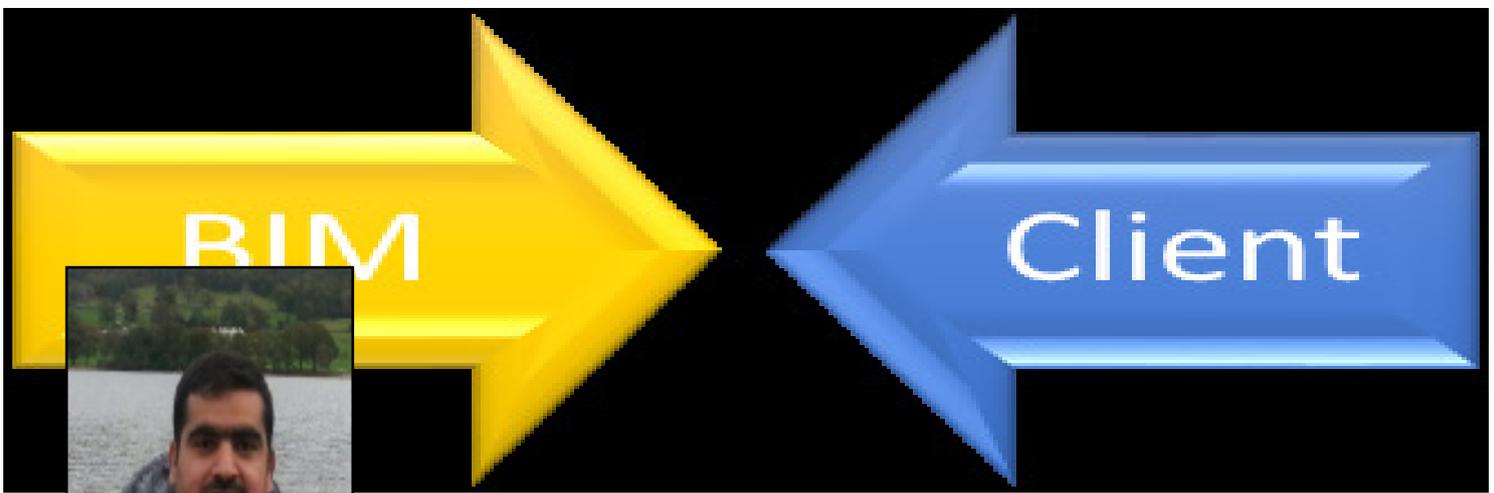
- **Modelers**

They are responsible for transforming the design concept, whether it is an idea, some level of “level of development” of the model, paperwork or AutoCAD design into an executable model (modeling)

- Therefore, they have to track the BIM Content Standards & Development Procedures

- They are responsible for implementing the model according to each discipline in a coordinated manner and to be easy for printing and converting to known formats (PDF. DWF. DWG. IFC. ... Etc.)





## BIM AND CLIENT PART

AMMAR JASEM

After we understood client's roles in BIM implementation which contain two main part. Firstly client ability to build his requirements in documents called EIR and send it to his supply chain, Secondly, client ability to validate the incoming information and make sure it meets his own needs.

It is an uneasy task to the client to perform these two roles effectively, it demands the client to provide several types of requirements such as:

- 1- Good level of BIM understanding among client organization.
- 2- Client staff have the ability to go through BIM model.
- 3- Client staff have the ability to use BIM model after project completion for operation and maintenance purposes.
- 4- Matching client organization standards with industry standards to improve information exchange.
- 5- Client ability to select the proper software.

Client ability to provide such requirements will affect client capability to use BIM effectively and increase his chance to achieve the desired benefit of BIM.

There are several research attempted to evaluate BIM users in term of maturity which reflect his ability to provide the requirements. These research provide several BIM maturity models which can be classified into three main categories. The first category focuses on project maturity in terms of BIM. The second one is focused organization in term of BIM implementation. The third and final one is based on individual evaluation.

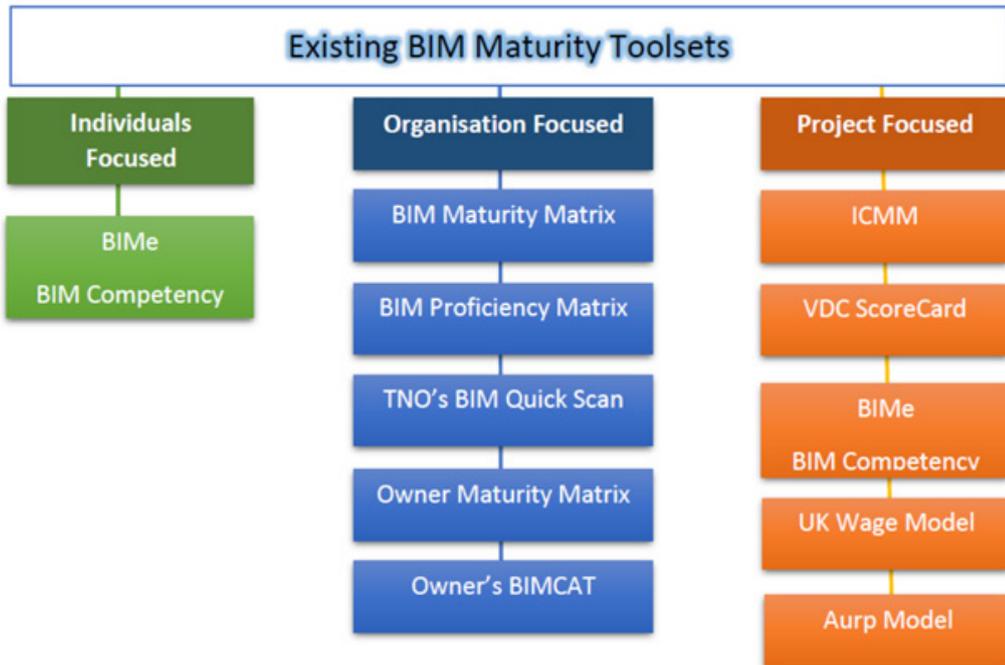
From the previous figure above, it can be seen there are some models have been created to evaluated client organization In particular. Usually client organization will be evaluated according to three main elements as follows:

### 1- People:

This section discusses how well the client's staff are able to use BIM as well as the acceptability of change within the system. In addition, this section illustrates the skills of the staff in the model of building information and how to develop them through the work of courses or through obtaining academic certificates to serve this purpose.

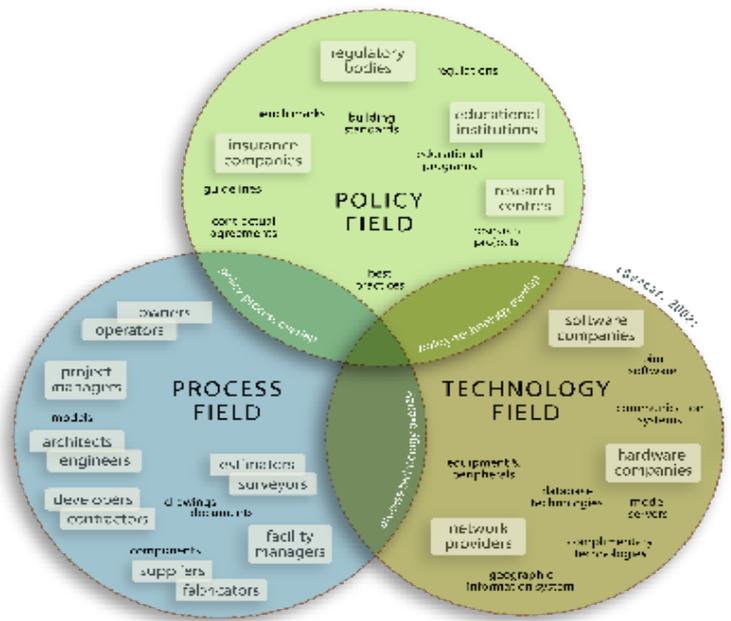
### 2- Process

How to introduce the information management process into the structure of the organization summarises the significance of this section. How to save, structure and share information within the organization and with the client's supply chain reflects the client's ability to use the BIM. The contents of this section change from one model to another according to the researcher's actual vision. The owner should carefully study these models to determine the purpose of using them.



### 3- Technology

This section explains the technology to be used within the organization, making it easier to read, and store and share information generated within the building information model. This section summarizes how to select and use Software and Hardware. Client organization has to provide these requirements to optimise their efforts and achieve their desired benefits of BIM. Client can seek assistance from BIM consultant as an initial step in BIM implementation process.



BIM maturity categories (Succar, 2009)



# HOW TO MAKE REVIT WORK FOR YOU ?

Translated by: Islam M. El-sayed



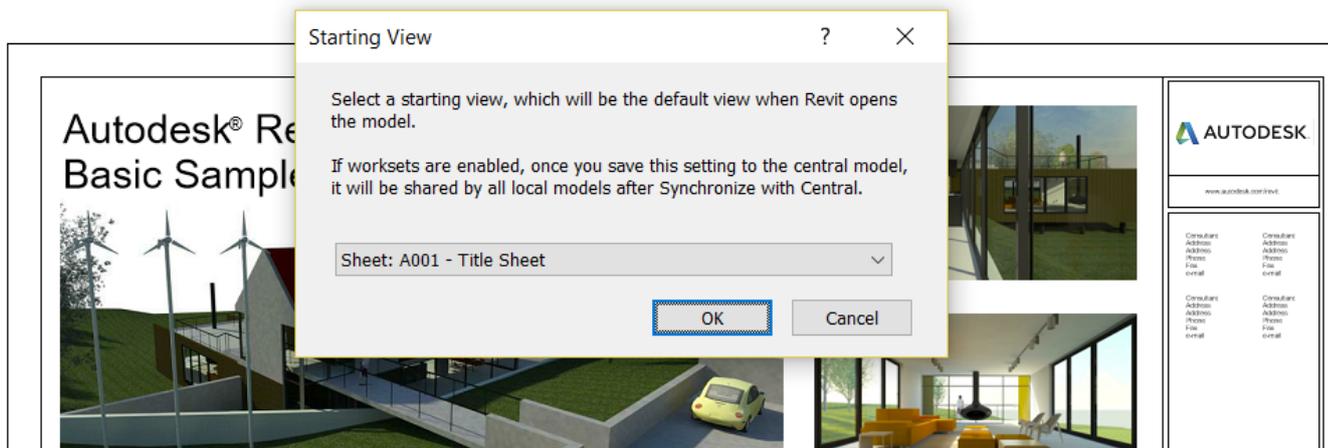
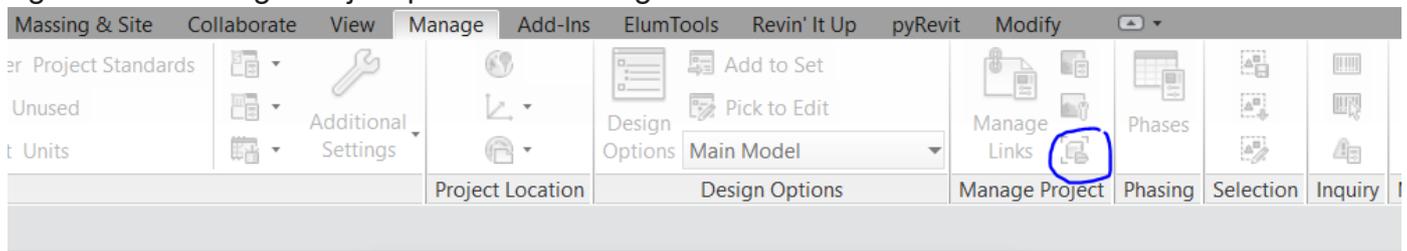
ENG. AMMAR AL TOM

Love to learn how to make Revit work for us?  
So listen closely I will tell you how the story begins though those interesting tips .....

## Splash screen:

Sometimes it is hard for us to find a certain project So you have to learn how to play this trick .. Start a new project to easily know the components and the elements of any project even before you open it by :

Manage tab >> Manage Project panel >> Starting View Tool

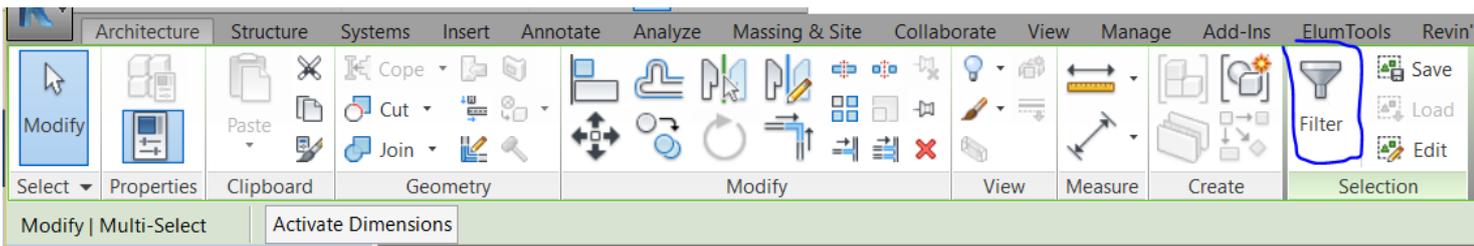


## Pinning :

This lovely useful tool which you can find it in the lower right corner of the screen . It is used to select and pin the element in its own place and highly used to connect an external Revit project with your current one so we use it to select the element you need edit or even to change it like curtain walls then pin it again

Filter Tool “ To easily find elements “:

Today, during our long journey in this lovely strange world “BIM” we would It is one of the most important tools in Revit as it make it easy for us to find elements in complicated projects or in a tight range of my choice .. Then you click on the tool icon , remove all selected elements and select wanted ones only ... What a lovely tool ! ...



### Understanding Sheets & Views:

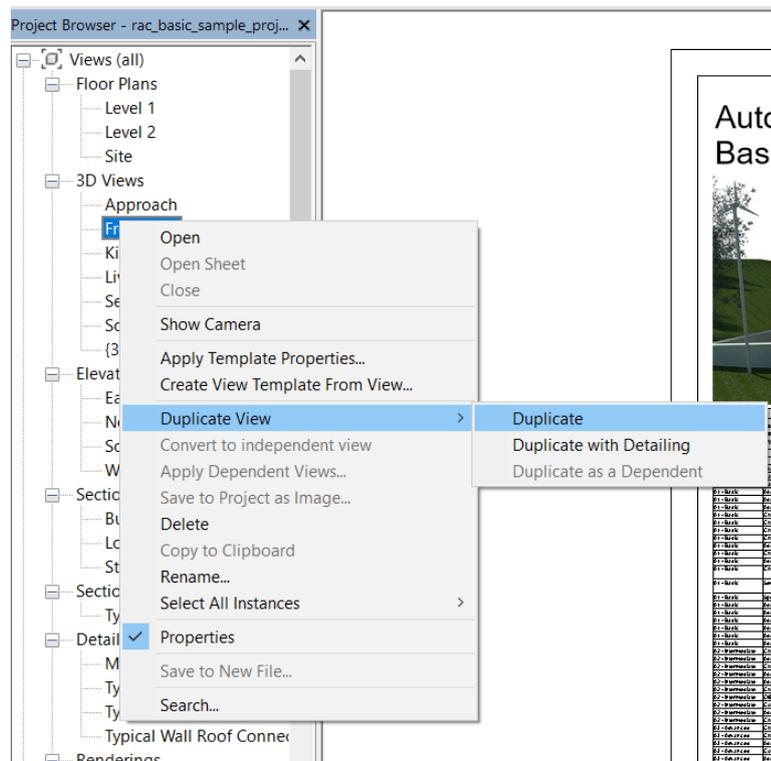
Sheets are used in the final output of the project as well as printing .. On the other hand Views are used while we are working on this software ... Technically we put views in sheets just one time in Revit as the program doesn't allow you to put the same view more than one time except by doing “ Duplicate “

1st Duplicate : It is used to copy views, plans but all dimension lines, texts, hatch and layout will disappear or will not be copied

2nd Duplicate with view detailing :

We use to copy fully detailed view.

3rd Duplicate as dependent : we use to copy fully detailed view but what makes it different is choosing a certain part of the view to zoom it using the previous tips .. so we find out that you can do it more than one time as we need it.



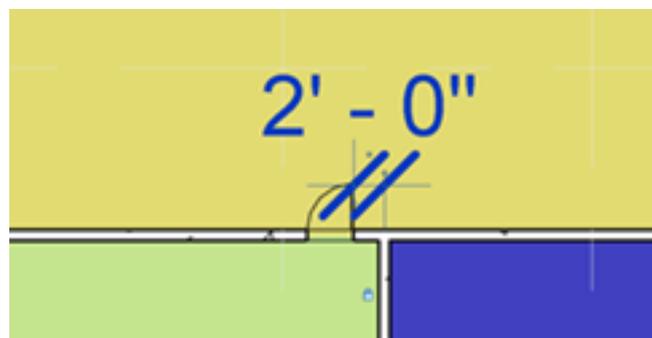
### Snapping:

Useful important tool in Revit as it makes us able to select, move and connect elements easily using tap bottom to move between different snapping points while choosing them ...

### Constraining Models:

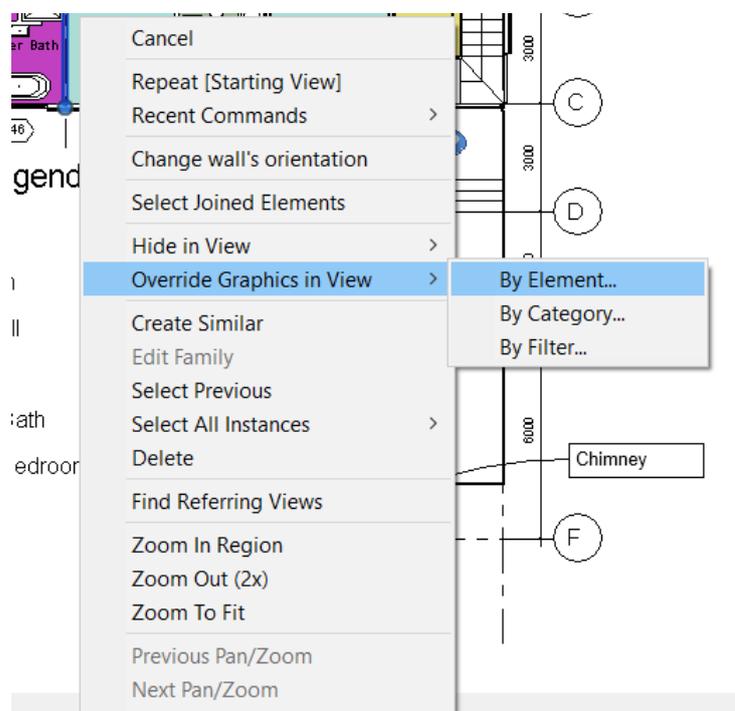
Constraining elements is a great tool to ensures that we fully control the movement of the element Ex: when we set dimensions to a door from the wall and then lock the element “ constraining “ will

make the door and dimensions as one unit .. it will not change its place or we will not be able to move it until we unlock it or delete the dimensions itself , in this case Revit will send you a warning to make sure you want to remove the constrains ...



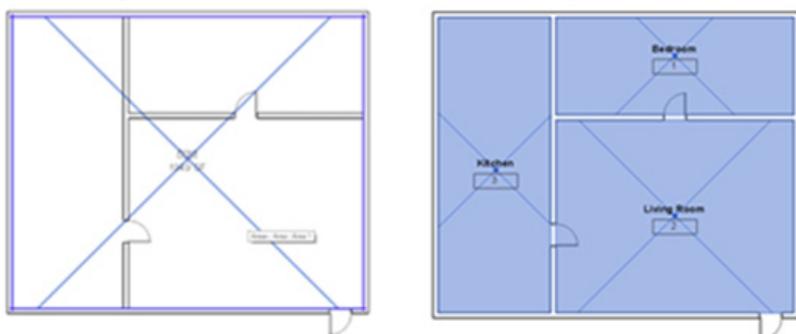
### Override Graphics in view :

This amazing advantage makes it easy for us to add a special characteristics to chosen elements as we change its shape , thickness and transparency or capacity , we use it a lot while importing a cad file to Revit as some times some optical interference happens which makes us unable to distinguish some special elements in Revit so make sure you disable all options in visibility graphics window



### Room area VS area :

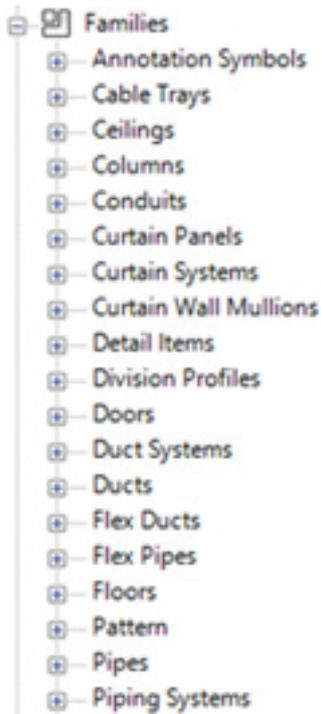
It is important for you to know the difference between Area Tag and Room Area Tag as the first one is used to measure the total area of the building including walls , on the other hand the other one is for measuring rooms and internal spaces only



### Understanding Families & Types :

We need to know the difference between families and types in Revit . Families are the main elements in our software like walls , doors , windows and furniture but types for an example in doors are doors with different thicknesses and dimensions , and types of walls like curtain walls , basic walls and staked walls

as well



Pick lines :

When we import an A Cad file instead of drawing single lines separately we can select lines we want to use in Revit or you also can use Tab bottom to draw polylines



Customize Double Clicking . . . . .

While working in Revit file , usually and by mistake we double click on some elements , Automatically Revit will open the edit window for the element or the family and if we want to go over all of this it will cost you a lot of time ...

So we can use this Tip :

Go to shortcut customization window → double click setting →

Choose not to do anything

Notice :

If you want to edit any element or family you can select it and use this option “ edit family “

Customize Keyboard Shortcuts :

Who don't want to go faster and improve his performance in Revit ?

So you badly need to know shortcuts or to create your Own

**VENTURE FUNDINGS**  
(Data provided by Crunchbase)

**Architizer\***  
(\$10.5M Raised)

**bridgit**  
(\$4M Raised)

**BUILDINGCONNECTED**  
(\$10.7M Raised)

**coUrbanize**  
(\$1.37M Raised)

**fieldwire**  
(\$7.7M Raised)

**FLOORED**  
(\$7.36M Raised)

**FLUX**  
(\$3.7M Raised)

**GRAITEC**  
(\$5.42M Raised)

**IA**  
(\$17.25M Raised)

**IA**  
(\$1.5M Raised)

**IA**  
(\$85.4M Raised)

**IA**  
(\$17.3M Raised)

**Architecture**

**FLUX** **Project Center** **REVIT** **SketchUp** **VECTORWORKS** **Chief Architect** **Deltak** **Architizer\*** **GRAPHISOFT ARCHICAD** **TINKER CAD** **Rhinoceros\*** **Clearview** **Axiom** **uMake** **TurboCAD** **SOFTPLAN** **BST**

**ecodomus** **lucid** **wineST** **Eos** **FIELDLENS** **PlanGrid** **bidoterk** **CM/C** **VIEWPOINT** **CONSTRUCTIONDATA** **IBUILD** **ASSETS** **asset panda** **NOTEVAULT** **Trimble Connect** **UDA** **AUTODESK** **ENR 3600CS** **maestro** **planswift** **Textura** **360 Workplace** **Skire** **getable** **aconex** **bluebeam** **PROCORE** **basestone** **projects** **Corecon** **VICO** **e-Builder** **COINS** **EPICOR** **PROLOG** **mdaren** **ORACLE** **ExakTime** **ComputerEase** **ConEst** **bridgit** **fieldwire** **ORACLE** **ProjectWise** **IBKNOWLEDGE** **Motion** **LATISTA** **VELA SYSTEMS**

**Engineering**

**INTERGRAPH** **AUTOTURN** **CSI** **KYPIPE** **Eagle Point Software** **GLASSETS** **Autodesk CIVIL3D** **S-FRAME** **GEOPAK** **GEO-3D** **SITEOPS\*** **Project Center** **GRAITEC** **CGS** **paviasystems** **TEKLA\*** **IES** **Carlson** **PLANCAL** **ProjectWise**

**Construction**

**SMRTVID.IO** **OmniEarth** **Sketchfab** **FLOORED** **coUrbanize** **SMRTVID.IO** **OmniEarth** **AUTODESK RECAP** **solus** **IrisVR** **DAQRI** **Microsoft HoloLens** **SEARCH** **VISIDRAFT** **acute3D**

**VENTURE FUNDINGS**  
(Data provided by Crunchbase)

**NEWFORMA**  
(\$21.3M Raised)

**OmniEarth**  
(\$5M Raised)

**paviasystems**  
(\$3M Raised)

**PlanGrid**  
(\$59.3M Raised)

**PROCORE**  
(\$99M Raised)

**IBUILD**  
(\$7.13M Raised)

**sefaira**  
(\$18M Raised)

**SITEOPS\***  
(\$59.3M Raised)

**Sketchfab**  
(\$9.5M Raised)

**SEARCH**  
(\$41.67M Raised)

**SMRTVID.IO**  
(\$6.8M Raised)

**uMake**  
(\$10.4M Raised)



Tamer Al Gohary

Translated by: Tamer Mohammed

## GENERAL COMPARISON BETWEEN BIM 4D SOFTWARES

The 4D BIM modeling is the next generation of project management including project planning , scheduling and data analytic . The 4D literally adds vision to the construction team also It integrates the ability to visualize your project and analyze dynamic spatial data on your computer, before you break ground creates a practice field for the delivery team that is highly engaging and efficient.

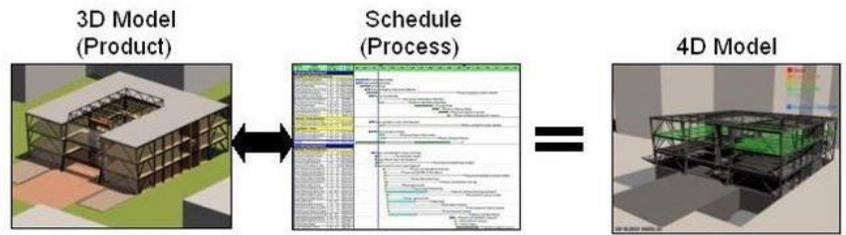
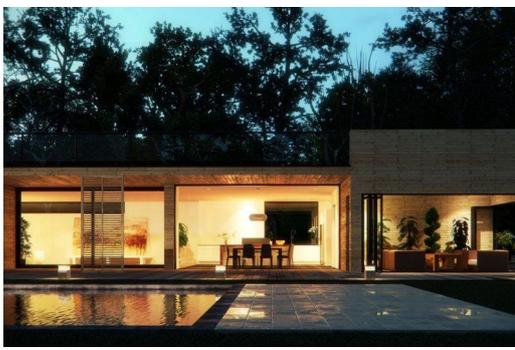
But the question here “ Which 4D BIM software do we have to adopt “ ?This question has been struggling all over the BIM discussions and the answer is really hard especially for AEC companies who are new to the BIM technology.

So I have prepared this paper based on many BIM expert’s reviews to answer that question and I will compare between the most common 4D simulation software in the market : Navisworks - Sychro - Bentley Navigator - ITwo - Vico control

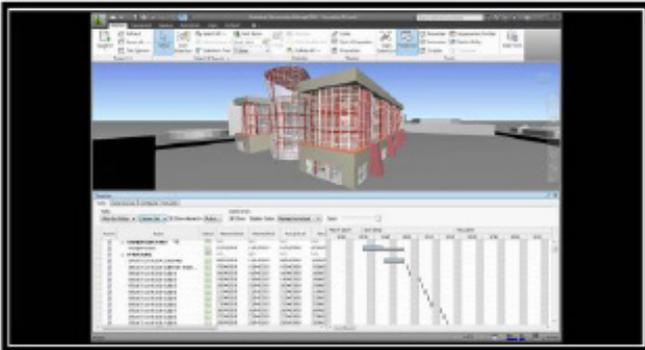
As a result I believe that :

- 1- Sychro is the most powerful tool in the market for the 4D simulation and schedule analysis but with good rendering output , visual clash detection only and fair EVA capabilities.
- 2- Navisworks is Powerful in Quantity take-off and clash detection with good 4D capabilities and good rendering output.
- 3- Vico is recommended for projects with repeated activities ( for example pipe laying activities ) , since it depends on flow line techniques based on location.
- 4- Navigator is Powerful in Quantity take-off and clash detection with poor 4D simulation capabilities and poor rendering output .
- 5- ITwo is very powerful in 5D simulation and quantity take of with low 4D simulation capabilities and good clash detection reports.

In my opinion the best powerful 4D software, is the one that will satisfy your 4D integration needs.



**Navisworks**



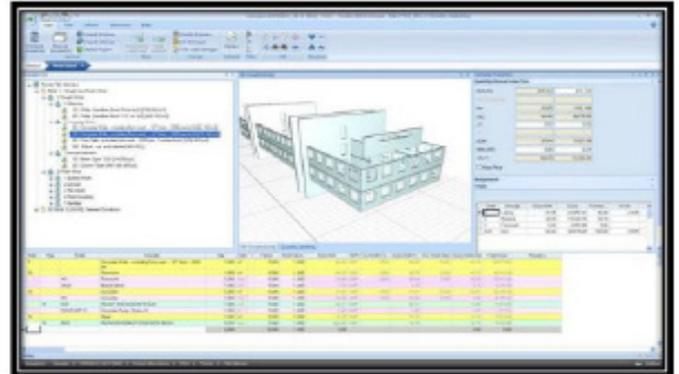
**Synchro**



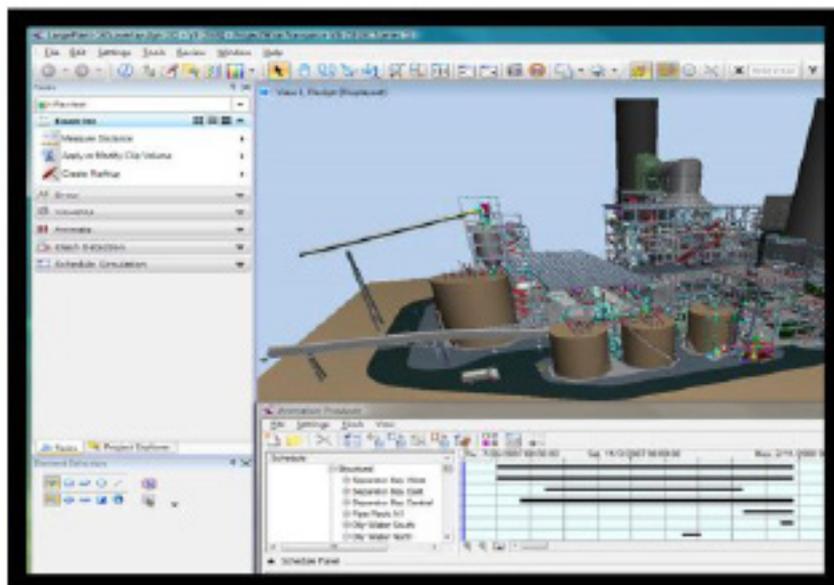
**Vico Control**



**ITwo**



**Navigator**





OMAR SELIM

## BIM MANAGER (ROLES AND RESPONSIBILITIES)

Translated by: Mohammed Metwally Ghattas

To implement successfully BIM a cooperating team is a must. And the team must have a leader whom they trust. BIM manager has many administrative and tactical roles which if he mastered, it will lead to maximize benefits from BIM.

### Administrative:

- Develop BIM execution plan inside company.
- Attend company meetings and communicate with other departments.
- Convince management with the importance of BIM, gain their support and making them excited by focusing on return on investment (ROI).
- Develop a method to exchange information among different company departments.
- Evaluate BIM workflow.
- Publish periodic reports on BIM achievements and problems.

### Technical Support:

- Support devices and network and make sure it works efficiently.

### Team members:

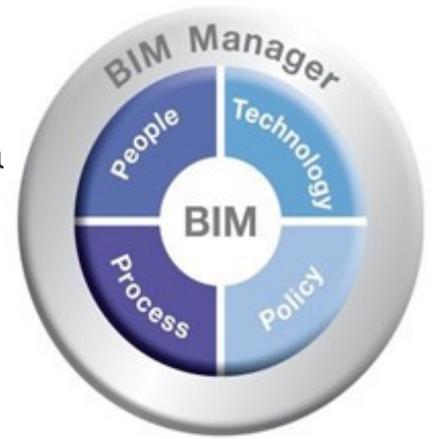
- Interviewee, test and acquire project team.
- Ask about them to check their compatibility with the team.
- Carefully choose team and make sure they are ready to work properly with BIM.
- Support, train, coordinate between them and determine roles and responsibilities of each person.
- Gain team members trust.

### Training:

- Train team members periodically.
- Maintain a high level of knowledge and efficiency.
- Providing attendance of conferences and courses for team members.
- Providing sources of information such as BIM ARABIA magazine and educational CDs.

## Standards:

- Setting standards inside company and ensuring it's been followed.
- Creating template files using approved standards.
- Automation repetitive processes which are transferring them into a
- Ensuring standards are followed in projects.
- Assuring quality and providing tools to help check.
- Coordinate with IT and maintenance teams.
- Communicating with BIM software developers.
- Determine network speed.
- Determine sharing space for every team member.
- Determine software to be purchased.
- Determine which devices should be upgraded.



## Project Interface:

- Create family, blocks and any other required elements.
- Help to create model.
- Solve issues facing team members.

## Software

- Choose the suitable software for team, there are many software other than Revit, you may find another suitable software that brings advantage to the team, for example a company have a great experience using AutoCAD, and the project has a competitive schedule, it is most appropriate to use Archi AutoCAD, Compare and choose the most suitable software.
- Manage software and necessary updates to implement BIM successfully.

## Ability to exhibit and persuade:

- Ability to persuade management and customers with BIM benefits, without exaggeration, as it hurts a lot.
- Prepare presentation to present your thoughts and progress of the project.
- Verbal, written communication skills and expounds desired meanings.

## Processes:

- Determine the requirement carefully, is it about quantity take off, facility management or clash detection, your response plan varies based on this.
- Monitor model and back up periodically.
- Update quantity take off and schedule.
- Compare actual progress versus planned.
- Solve model issues, conflicts and develop mechanisms to avoid conflicts and engineering problems earlier rather than detecting and treating them. Prevention is better than cure.

## Contracts:

- Review contract.
- Who owns the model?
- Who have access to model?
- What are model delivery phases?
- Determine LOD.
- Determine BIM manager's roles and responsibilities.
- Does contract have insurance?
- If the contract with main contractor, will it be mandatory for subcontractor?

These are the most important points of BIM manager's roles and responsibilities, which you can practice without formal appointment through the initiative to repair problems and exchange information



**OMAR SELIM &**

Ahmed Lutfi

## Introduction

There's many who quotes from Scott Simpson, the director of the American Institute of Architecture his saying:" BIM is a 10% technology and 90% sociology, this saying has spread like a wild fire and been used in many related and non-related occasions till it has been mannered and questioned, the aim of this article is to put this fact in spotlight and to focus on the social aspect and its 90% share.

## Abstract

Most of whom working in the AEC industry are aware of the seriousness of their positions and the decisions they make which may cost the firm much more or much less, so they already in a tense, highly competitive environment, and despite the development in CAD systems (Computer aided design), it had many cooperating loopholes worked as time bombs. For instance, the use of X-ref (external references) as a method of linking two disciplines in one work space to boost coordination or to split big projects into smaller parts to be easier to be handled, but it all turned out to be uncompleted concept and worked on contrary in case of losing the project file, editing, or duplicating it by mistake!.

Per contra, BIM brought a technology that contains of many virtual interactions ways and it's based on avoiding clashes using the principle of link. The X-references been replaced with the concept of "work sharing" which allow the model manager to define authorities of who works on it: reading only, reading and writing, editing. Etc. Corresponding to responsibility of the person in charge, in addition to the possibility of leaving written, printed, attached notes or even direct conversation and it is all great options but it will achieve better communication only if the work team choose to use it effectively to increase their productivity.

Many surveys about BIM and its benefits s has existed since 2007, noticing improvements in the construction costs, time schedules , budget evaluation and general performance between stakeholders, contractors and consultants . From all aspects there was a noticeable positive improvement and great benefits, then another question showed up and it's "Why?" What is the elements that made it useful that far? How can we make use of these elements? What makes BIM so special for real is the flexibility which is the ability to make use of pros from other branches of science like Sociology which is the subject of this article and the statistics of work groups (intersections, work groups similarities and differences, etc.

Translated by:Rafat EL-Jazzar

# BUILDING INFORMATION MODELING (A SOCIAL ASPECT)

So what is a “work group”? Is it another name for work teams? And which of them fulfill the concept of “team playing” this shiny term? Well, work group or team; we must agree that no single individual can complete a construction project alone, as the architect Hassan Fat’hy

Used to say: “a single person cannot build a house for himself, but ten persons can build ten houses”.

To define a work group we must differentiate between it and a work team

To define the work group we have to distinguish between it and work team because the difference between them is proportional and exacerbated with the increase in the number of individuals.

In the illustrations below, the individual is represented by a point and a connection between them by a line:

1- Work Group: A group of known or unknown number of people, with known or unknown Addresses may belong to the same or more than a contractual entity. They meet to exchange information, visions and decisions according to each of their interest.

2- Work team: A number of people with known addresses, with the possibility of assigning specific responsibilities and titles. They are connected and collaborated with each other, but in the end everyone have a specific goal. They might belong to one or more contractual entities. Each has a clear specific role to achieve a certain workflow.

Figure 1 represents communication in a work-group environment in the CAD system.

Figure 2 represents communication in the work-group environment of the BIM system.

The goals are the same that bring them together. It is a common form in the building information modeling workflow with exceptions; see Figure 3 and Figure 4.

Figure 3 represents the communication in a team environment in the CAD system.

Figure 4 representing the communication in a team environment in the BIM system.

The goal or benefit is the main factor distinguishing between the two types and to clarify the subject and its development we must mention two mathematical theories talking about the factors governing the possibilities and decision-making within groups or complex systems.

The first theory of the mathematician: Adam Smith 1723 - 1790 « Individual Competition and ambition serves the public good»

That means everyone has to seek for his own interest and the public benefits is achieved by the competition between individuals seeking to achieve their ambitions! This pattern is clearly found in the work style of the Work-group.

The second theory is for the mathematician: John Forbes Nash 1928 – 2015, that the public benefit is achieved by the work of each individual for his own interests that do not conflict with the public good or the interest of the group, which we see clearly in the work team method

You must have seen the famous movie beautiful mind, which spoke about the same theory and the story of Nash himself. The second theory has been used ‘which is an improved version of the first one ‘

in economics, biological evolution, software and electronic applications, artificial intelligence and military theories, and John received the Nobel Prize for it.

And to explain how is it important:

Groups begin to form a meeting of individuals and maintain their strength and stability as the number increase in response to the workload by increasing the means of communication with and goal sharing, and this is exactly what happened in BIM, where it used network communication, taking advantage of the social media revolution. But communication remains an individual choice based on the level of organizing and affinity between the team, so there won't be a successful application of BIM without treating the team members as a family and vital component of the system.

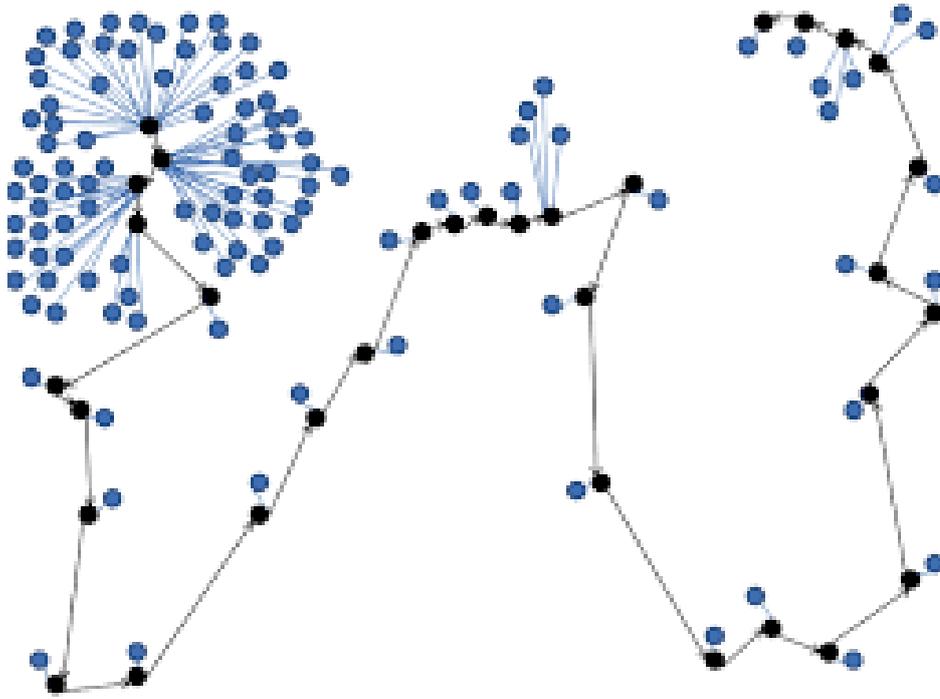
In Building Information Modeling we identify 5 key factors influencing individual decisions within the complex group:

- 1- Complex group type: work team or work-group.
- 2- Method of decision making: Was there participation in management (as in the work team) or is it a single and explicit director (work-group).
- 3- Communication: The volume of communication represents the level of information exchange and updating within the team or group, it is massive and organized in the work team and intermittent and uneven in the work-group.
- 4- How they work: Do team members work together and discuss and decide together (work team) or do they meet and discuss things and then postpone decisions to the next meeting due to the lack of sufficient information to make a decision (work-group).
- 5- Correction and accountability: the method of correction and changing the course of work in the team and conduct this process by holding meeting with all members and repair of mistakes (work team) or it just an error detection and rely only on error reports (work-group).

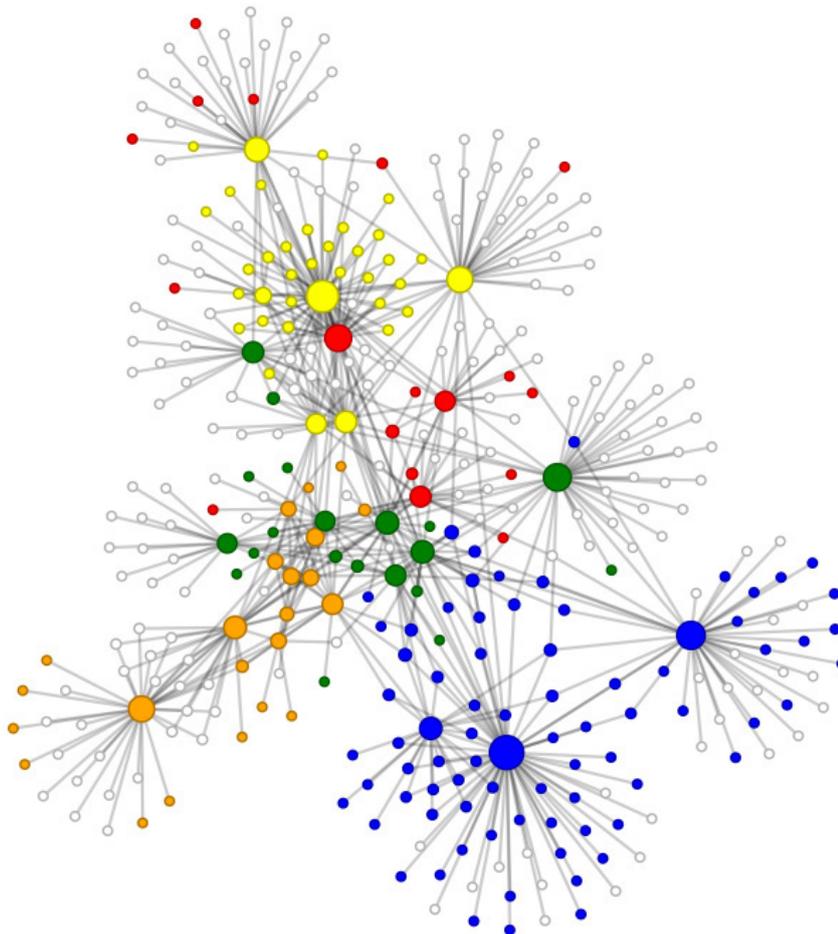
I has proven that all the above factors are important, but the most important ones to obtain remarkable progress and great benefit is the first and the fifth one and by focusing on them using the third factor you will get spectacular results.

There is a big difference if every returns to the team and discusses the problems and resolve it immediately (in one team) rather than just exposing the mistake to one of them to solve the problem (in many other groups).

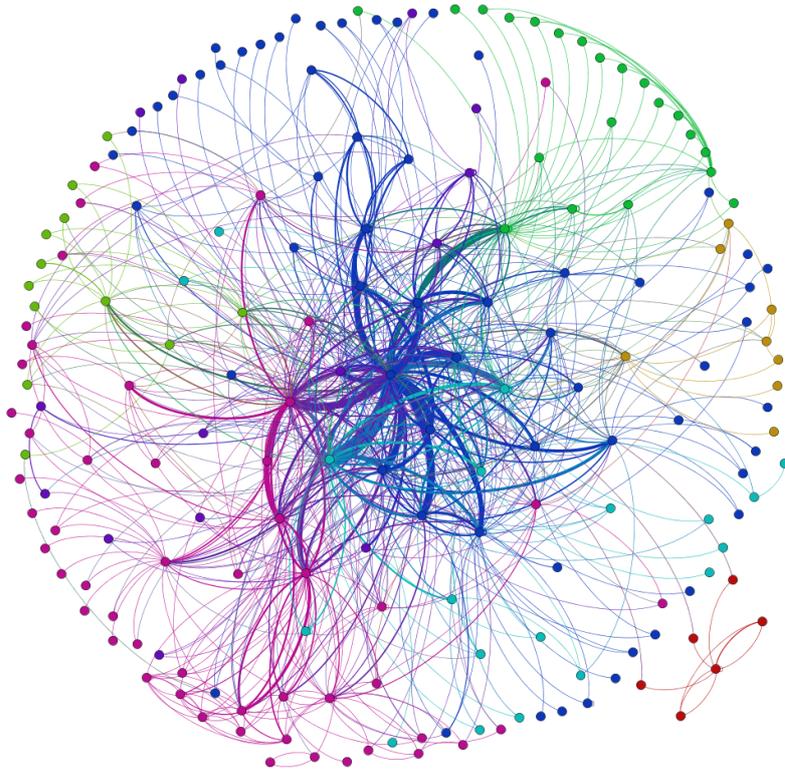
The work team can manage larger projects and accomplish a better teamwork to control the increasing randomness by increasing the number of members of the group by documenting the address and status of each individual and thus linking it with the rest of the team members through communication and connecting between them, where they combine public and private interest at the same time. As the randomness grows in the work group with the lack of documentation of the person's responsibility and address to communicate and the differences of interests and the interrupt of communication means and until it becomes a real administrative problem.



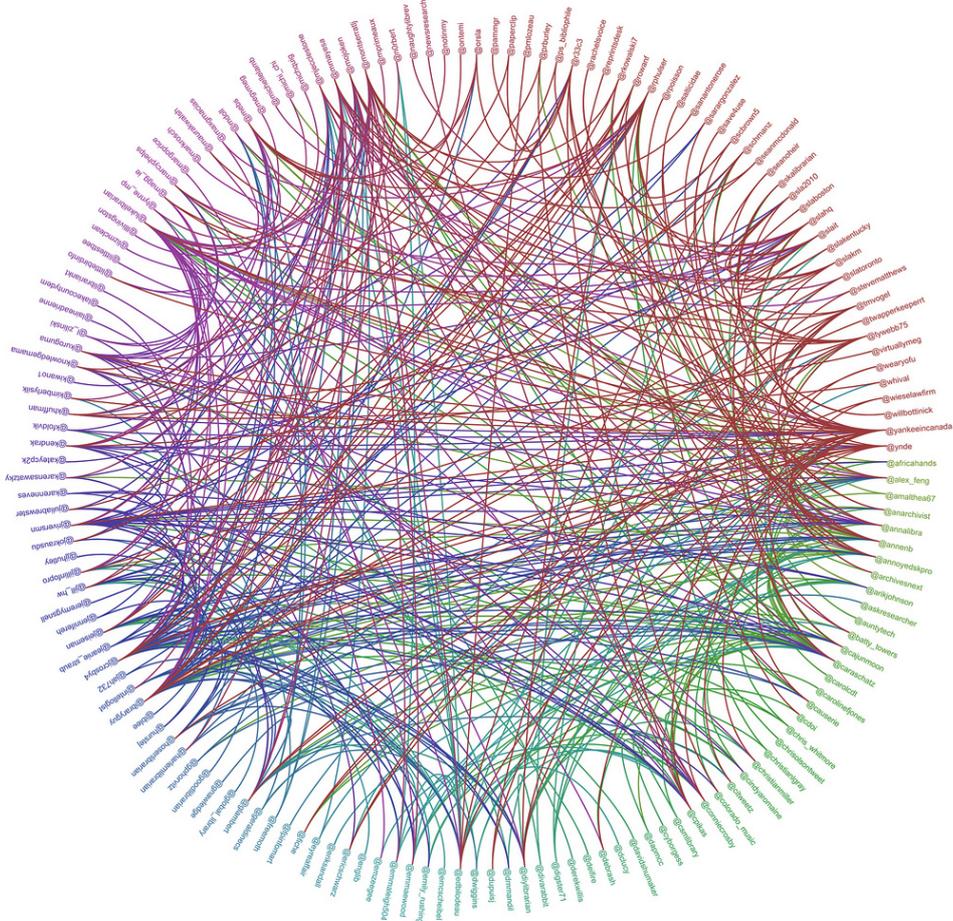
The model represents communication in an environment  
Working group in CAD system



The model represents communication in an environment  
Working Group in the BIM system



The model represents communication in an environment  
Working group in CAD system



The model represents communication in an environment  
Working Group in the BIM system

## Conclusion:

Despite the importance of building information modeling and its benefits of organizing the work, obtaining the required information, completing the bill of quantities quickly, multiple design options, reducing the time and cost, and reducing errors for a cooperative system for exchanging information both inside and outside the organization From more than one country - if necessary - and to share updates in real time, And with the possibility of connecting the design team in the office with the construction team on the site ... Despite all this technology, it will not work without the cooperation of the members of the work team and not the work groups, in spite of the availability of hardware, programs, training and implementation plan ...

There is a missing part which is not little: 90%: It's the part about being human above all else.



## INTERVIEW WITH DR. YASSER AL MUTAIRI

**In the name of God, we begin. Is it possible to put a profile about yourself, your testimonies and experiences?**

Dr. Yaser bin Rizkan Almutairi, graduate of the Faculty of Environmental Design from King Abdulaziz University. Holding a master's degree in digital architecture from the University of Adelaide, Australia. Currently, studying the PhD program at the University of Salford, UK, on the application of Building Information Modelling in the educational system of architecture departments and lecturer in the same university. Holding a Project Management Certificate using the BIM technology from Cad Teacher and is certified by Autodesk with 5 years of experience in the public and private sectors.

**In your opinion, what is the appropriate definition of Building Information Modeling from an education perspective?**

There is more than one definition for BIM, and this is due to the identifier. Since most of the definitions are based on the perspective of the identifier. For example, BIM has been defined as a modern technology that helps design and manage the project. As it was identified as a new work mechanism. But these are not radical differences. Most researchers agreed that BIM is an integrated approach to design, implementation and project management operations.

**What are the expected benefits of using Building Information Modeling in education?**

Before narrating the benefits of teaching BIM in education, we should know that implementing BIM in the construction market will have a positive impact for all project participants from designers, engineers, and owners. With regard to BIM education benefits, we can say that the higher level of integration in education the better positive response of BIM to the students. For example, if students are taught BIM only, then this will help them solve their architectural problems in a 3D digital environment. However, if an institution is teaching the BIM system

through an integrated design studio, with a team of different disciplines involved in project design, will benefit the students more than the previous example, as they will develop themselves through the method of collaboration and communication using BIM technology.

In all cases, BIM application in the construction market is increasing. Hence, teaching BIM through educational institutions will help meeting the market needs of BIM experts.

### **Are there any barriers to the integration of building information modeling application with current teaching methods?**

According to studies, there are more than 15 reasons that constitute a barrier to the application of BIM in education. They can be divided into educational, procedural, and technical reasons. Of the educational reasons: the lack of space allowing the introduction of new thought, the lack of references that help in teaching this approach, there is no clear way to teach. Technically, there is some concern regarding the program to be used and whether it will adversely affect students. Most of these reasons have been mentioned by researchers from around the world, but each country has some of these problems as a huge barrier and the other can be solved.

### **In a simplified way, how can Building Information Modeling be applied in the curriculum of architecture colleges?**

The application of BIM in architectural schools must be fully integrated into the curriculum, teaching it as an independent material or in part of a curriculum will serve students to understand a small fraction of the benefit, but overall integration helps students solve architectural issues that sometimes require computer technology like sustainability. And also helps them develop their communication skills with different disciplines.

### **How flexible is the model to apply to other engineering colleges?**

If we assume that the new BIM method is a style closest to the architecture classes, then BIM application has encountered several problems in applying it. Compared to engineering departments, I think they will find it difficult. But eventually, it depends on the knowledge of the faculty members of the new concept and its usefulness. This will help to apply good thought.

### **What are the knowledge areas covered by the proposed curriculum? Does it also include project management, sustainability and restoration of historical buildings?**

BIM is a new system that can replace the old system. In the field of teaching, it can be provided through most of the architectural curriculum such as architectural drawing, executive drawings, project management. Also, it can be devised to solve some architectural issues and problems like sustainability, preservation of information that includes restoration of historical buildings. To illustrate this, there are some studies on the use of BIM and laser scanning techniques in the preservation and documentation of historic buildings. Such a technique may be offered to students in their senior stages or in the Master's and Ph.D.

### **What are the best technological applications that are compatible with the BIM curriculum at the Engineering College?**

It is assumed that the appropriate application should be determined on a given basis. The educational institution should determine the best application suited to it based on the most used application in the construction market and its cost to the educational department and ease of access to the supportive curriculum.

**How to overcome the interoperability problem between different engineering programs related to architecture?**

At this point, I think the department should take into account choosing the best programs that can interoperate without problems. For example, you can choose Revit, Navisworks and Green Building Website where the compatibility between these programs is very high.

**In case of rely on an integrated software platform from one company, do not you think this will contribute to increasing monopoly?**

Yes, but monopoly is expected. I mean, for example, Revit the well-known program was never owned by Autodesk. Autodesk could not develop a similar program and in the end bought the company in full. Ultimately , there are many programs that serve BIM and the choice among them goes back to the points mentioned in the previous question.

**After applying the proposed BIM curriculum at universities, will student's expected level be consistent with the needs of the market?**

A difficult question to answer, the construction market develops every day, and researchers to measure the output of universities and compared to the needs of the labor market. But if BIM is applied effectively, I think the return will be positive.

What about the use of modern technology in education (augmented reality - 3D printers or even BIM Cave), do you think it will contribute to enhancing student awareness of the benefits of BIM?

Yes, but such a technique is suggested to be presented in the upper stages. Some of these issues have not been fully covered in terms of research.

**Can BIM education in universities affect training centers?**

If we assumed that BIM is just a technique, I'll compare teaching AutoCAD and 3D Max at both universities and training centers, has an effect happened?! I do not think there is any effect as the goal of both of these is different.

**In your opinion, is it possible to formulate an academic curriculum for BIM in professional engineering education (without university)?**

Yes, but needs to draw a road map for the whole system to identify the outputs from each educational body.

In the Arab world, are there current or future experiences of using BIM in university education?

Some Arab universities have implemented BIM. But all examples understood BIM as a technology and accordingly taught a BIM program like Revit. But in the near future, Arab universities will catch up with the ride and BIM implementation.

**Whether in the Arab world or abroad, what educational institutions offer courses for the diploma, the bachelor's and master's degrees on the BIM?**

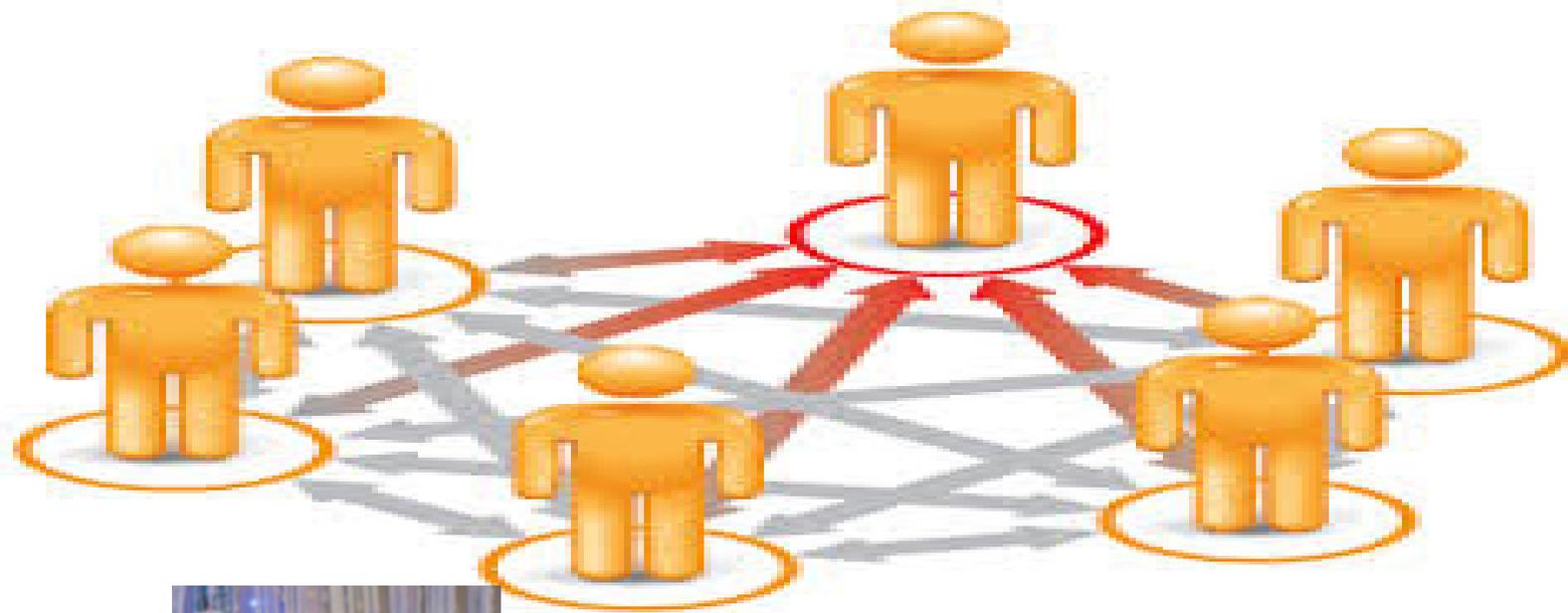
In the Arab world, so far there is none. This is due to the lack of references of this topic. As for educational institutions around the world, in Britain, BIM is offered in most of their universities in the master's and doctorate degrees, as in America and Australia. But in Australia and America, BIM has been integrated into most undergraduate programs in architecture, construction and engineering.

**Does the Online study of BIM differ from university study in terms of the information provided and the recognition of the certificate?**

It depends on the provided material and proposed issue. For example, if the subject was to use BIM technology with laser scanner, I think the study in a classroom is better than the distance study. Anyways, the answer to this question depends on the type of study.

**Are there universities providing free / subsidized grants at nominal prices in the field of BIM?**

Scholarships have their own terms, and I do not know whether they apply to BIM or not.



Translated by: Mohammed Etman



kamal Shawky

## COORDINATION SECTION

One of the most important advantages of BIM technology is to solve the problem of conflicts between the different elements of the same specialization or different disciplines. Therefore, we must follow some important steps before starting the model and during the process of establishing the model itself. The most important of these steps is the coordination section before starting the process of creating model itself.

### The importance of coordination section:

Before the beginning of the project, the project coordinator will conduct a meeting between the representatives of the various departments to know the systems used in the design and its initial sectors. The coordinator of the project will then draw a coordination section to clarify the locations of the different sectors and their heights, So as to fade the conflict between the elements and some of them, whether of the same specialization or different disciplines and above it comes from the importance of coordination section so as to avoid conflict due to poor coordination between the project team.

- Because one of the most important BIM technology goals is to coordinate the elements of different teams in design.

If we assume not to do this step before the start of the project will result in a lot of problems especially that each engineer in each discipline will work its model from his point of view appropriate, without considering the rest of the teams.

Therefore, there is a lot of problems between the various elements. Therefore, the periodic meeting between the members of the different specialties, especially before the start of the project, avoids problems that may occur as a result of lack of coordination

Is there a coordination section in the whole project?

I do not think we can provide the necessary time for this work, but the coordination section is done in the important places of the project and places of convergence of different elements, especially in the corridor.

Is there a coordination section in the whole project?

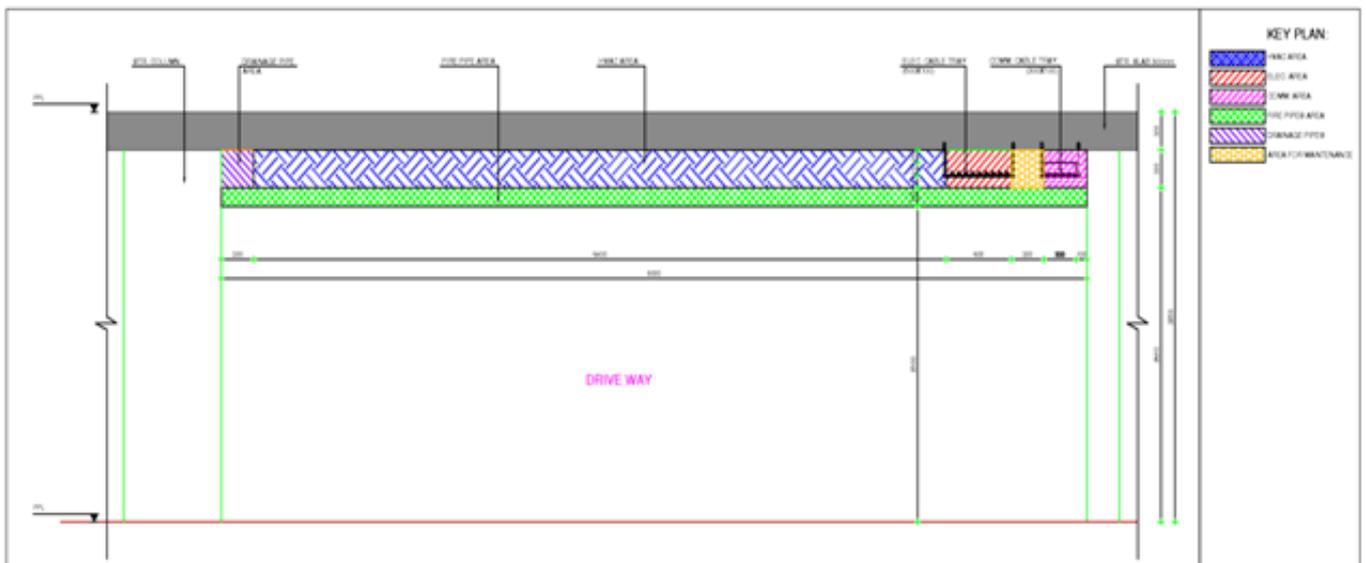
I do not think we can provide the necessary time for this work, but the coordination section is done in the important places of the project and places of convergence of different elements, especially in the corridor.

# It provides time for the design team to focus on the design elements.

# Provide an initial perception of the general shape of the sectors and their sizes before starting the implementation to take the appropriate decision from the beginning.

# Reduce the problems that may occur as a result of the lack of coordination between the team elements.

# Experience is given to the design team when designing different projects.



# DEVELOPMENT

# SUPPORT

# INFORMATION



Ahmed Zakzouk

## BIM DEVELOPMENT

One of the most important advantages of BIM technology is to solve the problem of conflicts between the different elements of the same specialization or different disciplines. Therefore, we must follow some important steps before starting the model and during the process of establishing the model itself. The most important of these steps is the coordination section

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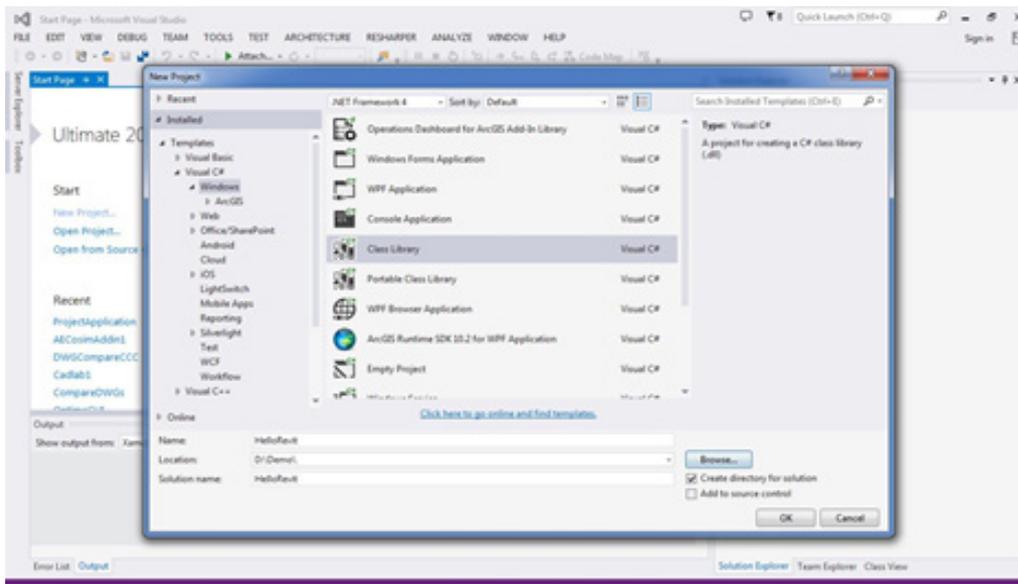
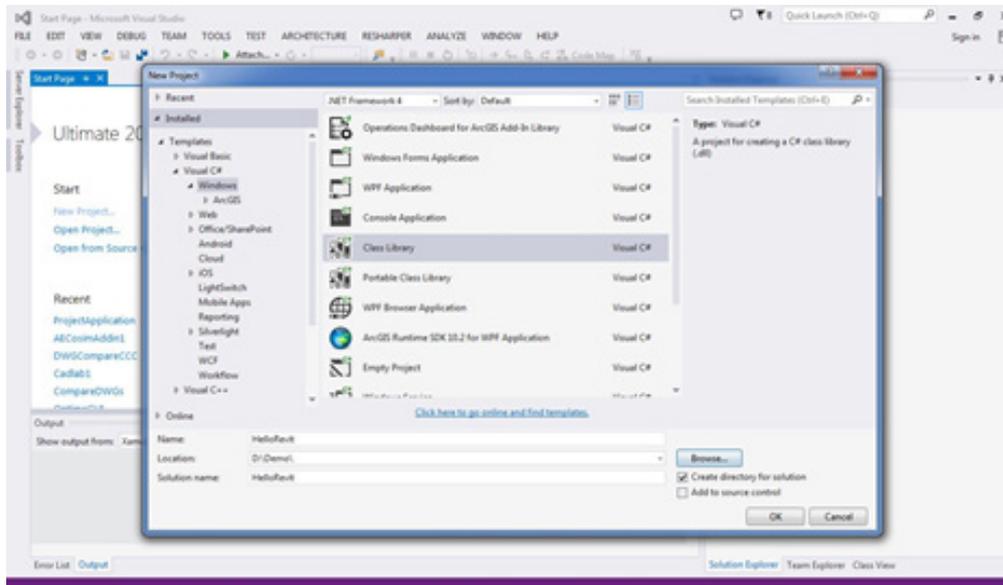
Then the screen of editing codes of the program appears

- On the right, Solution Explorer appears, which shows the project files and they are divided as follows.

- Properties which are files to reserve project settings

- References a place to save any used library to develop the project. It is very important as the development of engineering programs often must add special files of API to the References in your project so you can access the Functions of the program

- Then the Classes Project which keep and review the project files which will be added and developed.



\*- If we look at the bottom of the graph, we will find the Output where the results of the program operation or the Compilation process appear, it is responsible for transforming the code to intermediated language, after that it turns to machine language 01 and so.

- At the top the various program tools and settings and other

- In the middle the code editor

- Before starting the development process we must add the DLL files for API of Revit program through

-Right Click on References, then ADD, next Browse and access to the place of the installation of the software and the selection of these files

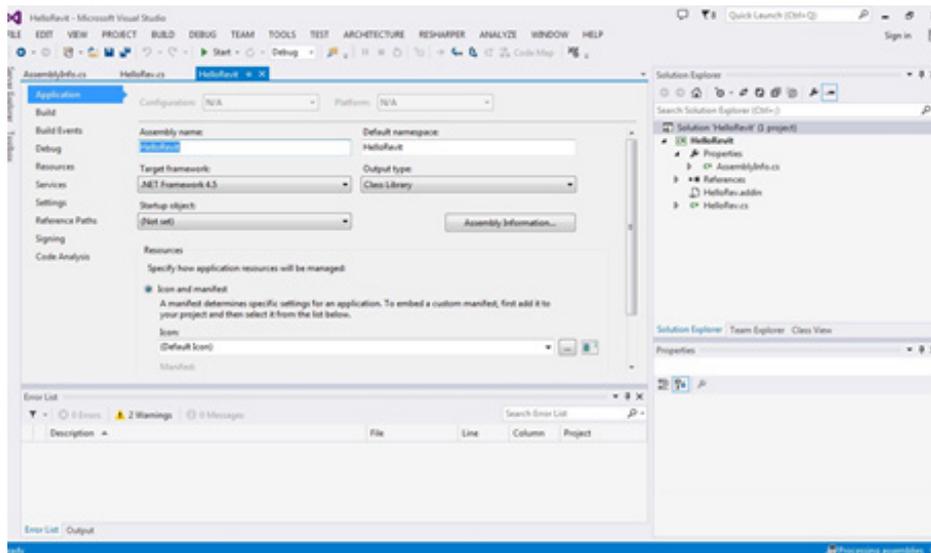
RevitAPIUI.dll RevitAPI.dll

Then press ok

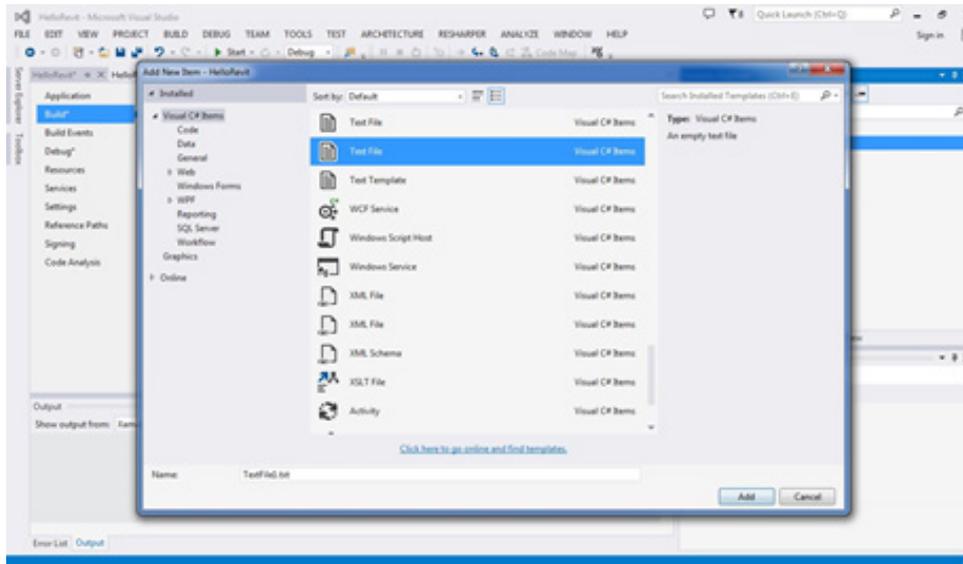
<input checked="" type="checkbox"/>	RevitAPIUI.dll	C:\Program Files\Autodesk\Revit 2015\RevitAPIUI.dll
	RevitAPIUI.dll	C:\Program Files\Autodesk\Revit 2014\RevitAPIUI.dll
	DynamoSimulationRSA...	D:\Academic Courses\ITI9 Month Diploma - CEI\09-Graduatio...
	Optimo.dll	D:\Academic Courses\ITI9 Month Diploma - CEI\09-Graduatio...
	GraphLib.dll	D:\Academic Courses\ITI9 Month Diploma - CEI\09-Graduatio...
	RevitAPI.dll	C:\Program Files\Autodesk\Revit 2014\RevitAPI.dll
<input checked="" type="checkbox"/>	RevitAPI.dll	C:\Program Files\Autodesk\Revit 2015\RevitAPI.dll

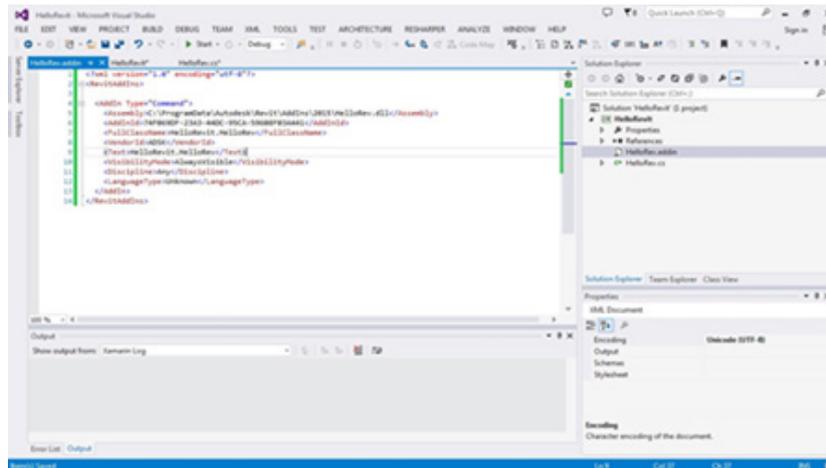
The next step is to control the program settings of visual studio to link the code test with Revit program, we do the following

- Right click on Hello Revit Project
- Then we choose Properties
- We set the settings as in Pictures

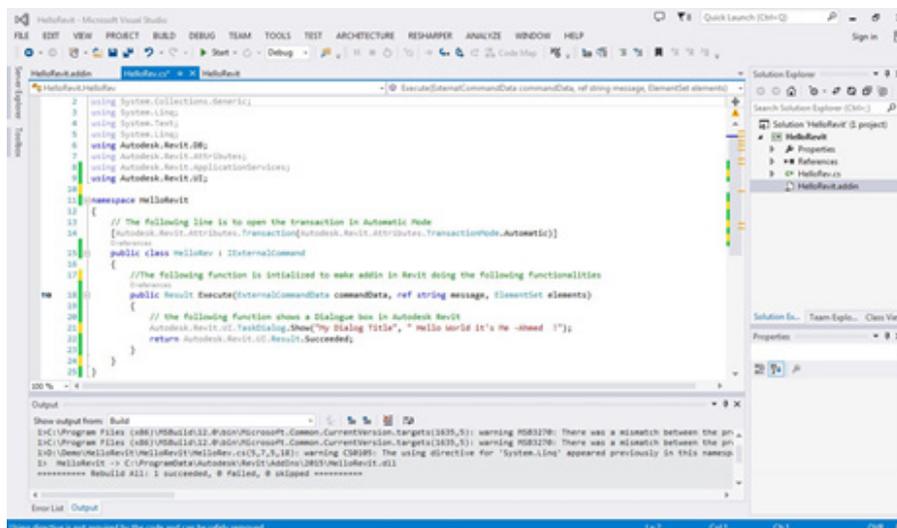


- Before you start typing the code, you must know that each tool or La Plagne on Revit program is a dll file and the file of the first Add-In is the output of the compilation process and the other is the text file, where the Revit program understands the quality of the instrument and how to load it in the next step, we will see how to make AddIn file - the path of this file must be as we indicated earlier





We start typing the code through a very simple Hello World Program



```

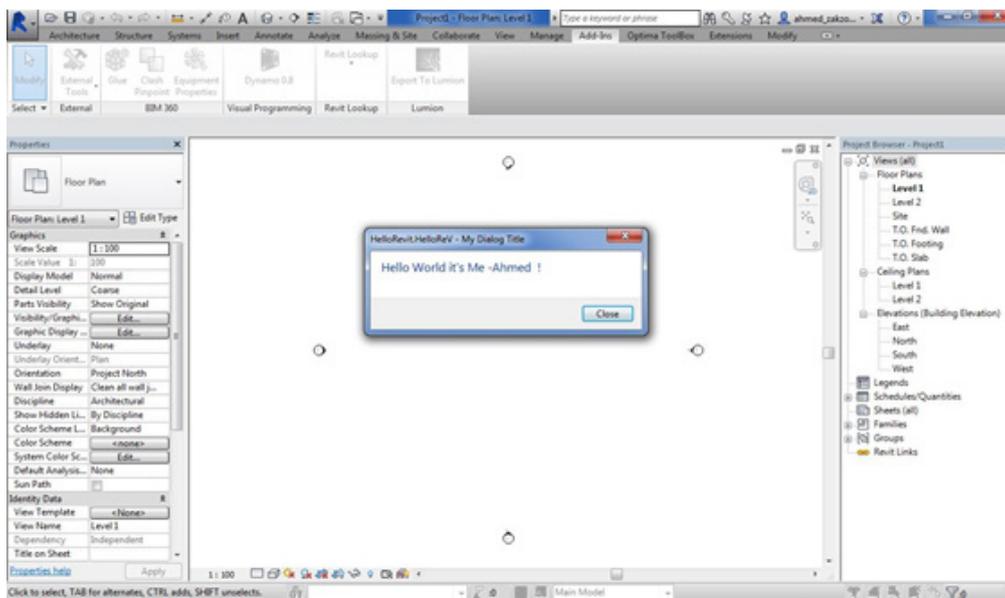
namespace HelloRevit
{
    // The following line is to open the transaction in Automatic Mode
    [Autodesk.Revit.Attributes.Transaction(Autodesk.Revit.Attributes.TransactionMode.Automatic)]
    References
    public class HelloRev : IExternalCommand
    {
        //The following function is initialized to make addin in Revit doing the following functionalities
        References
        public Autodesk.Revit.UI.Result Execute(Autodesk.Revit.UI.ExternalCommandData commandData,
            ref string message,
            Autodesk.Revit.DB.ElementSet elements)
        {
            // the following function shows a Dialogue box in Autodesk Revit
            Autodesk.Revit.UI.TaskDialog.Show("My Dialog Title", " Hello World it's Me -Ahmed !");

            return Autodesk.Revit.UI.Result.Succeeded;
        }
    }
}

```

Then we run the program

```
Output
Show output from: Build
I>----- Rebuild All started: Project: HelloRevit, Configuration: Debug Any CPU -----
I>C:\Program Files (x86)\MSBuild\12.0\bin\Microsoft.Common.CurrentVersion.targets(1635,5): warning MS83270: There was a
I>C:\Program Files (x86)\MSBuild\12.0\bin\Microsoft.Common.CurrentVersion.targets(1635,5): warning MS83270: There was a
I>D:\Demo\HelloRevit\HelloRevit\HelloRev.cs(5,7,5,18): warning CS0105: The using directive for 'System.Linq' appeared p
I> HelloRevit -> C:\ProgramData\Autodesk\Revit\AddIns\2015\HelloRevit.dll
***** Rebuild All: 1 succeeded, 0 failed, 0 skipped *****
```



Now we test the program

- Visual Studio will automatically open Revit program
- We press tab addin
- Then we choose the external tools
- Next we choose the tools which we have evolved?



## TRANSLATION TEAM

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# BIMarabia



**KEEP  
CALM  
AND  
LET'S  
BIM**

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