



## Communicate and Collaborate by using Building Information Modeling

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# Communicate and Collaborate by using Building Information Modeling

*Thomas Fænø Mondrup, Jan Karlshøj, and Flemming Vestergaard*  
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Technical University of Denmark



THE EUROPEAN  
UNION  
The European  
Regional  
Development Fund

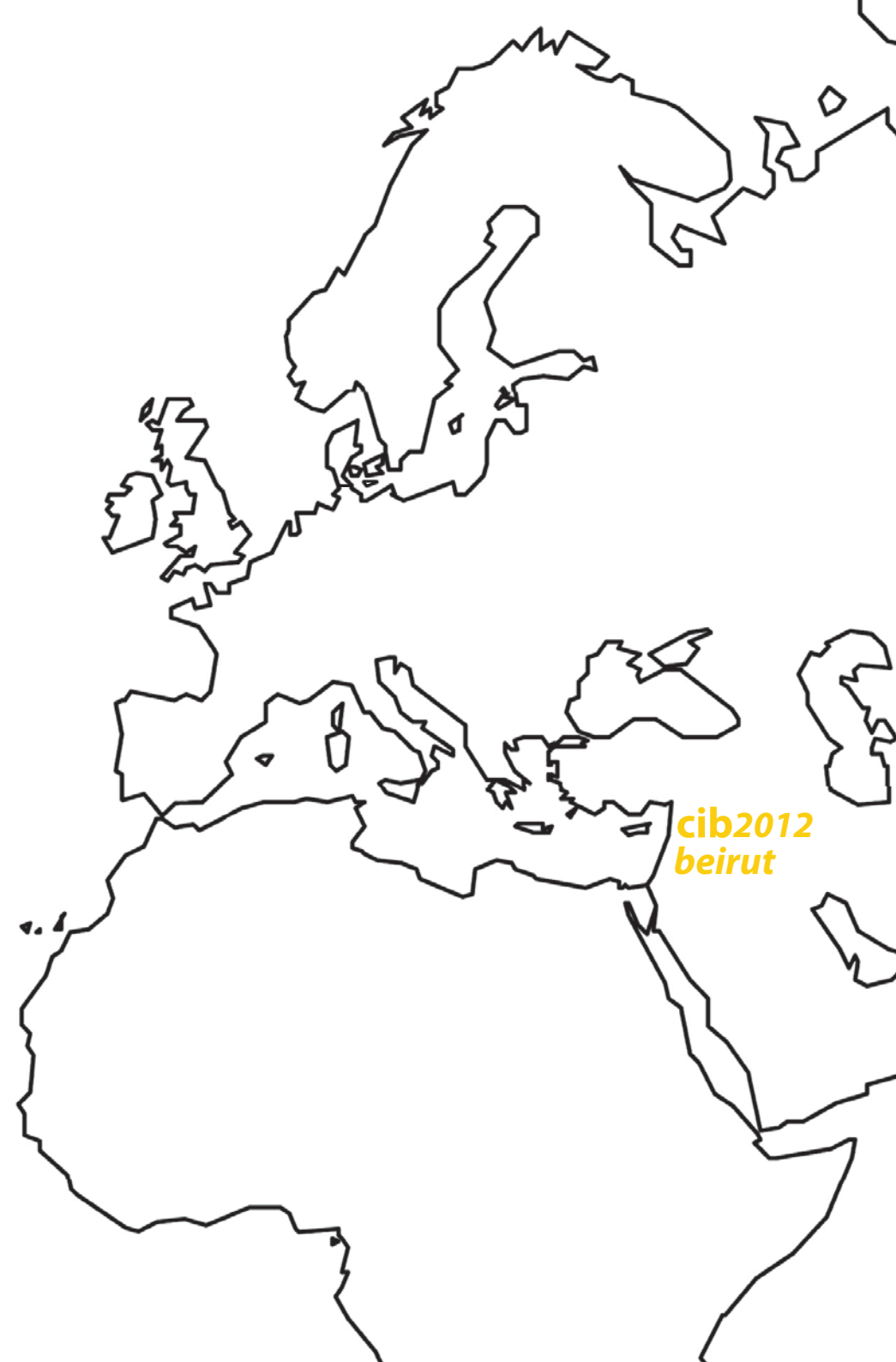


Interreg IVA

ÖRESUND – KATTEGAT – SKAGERRAK

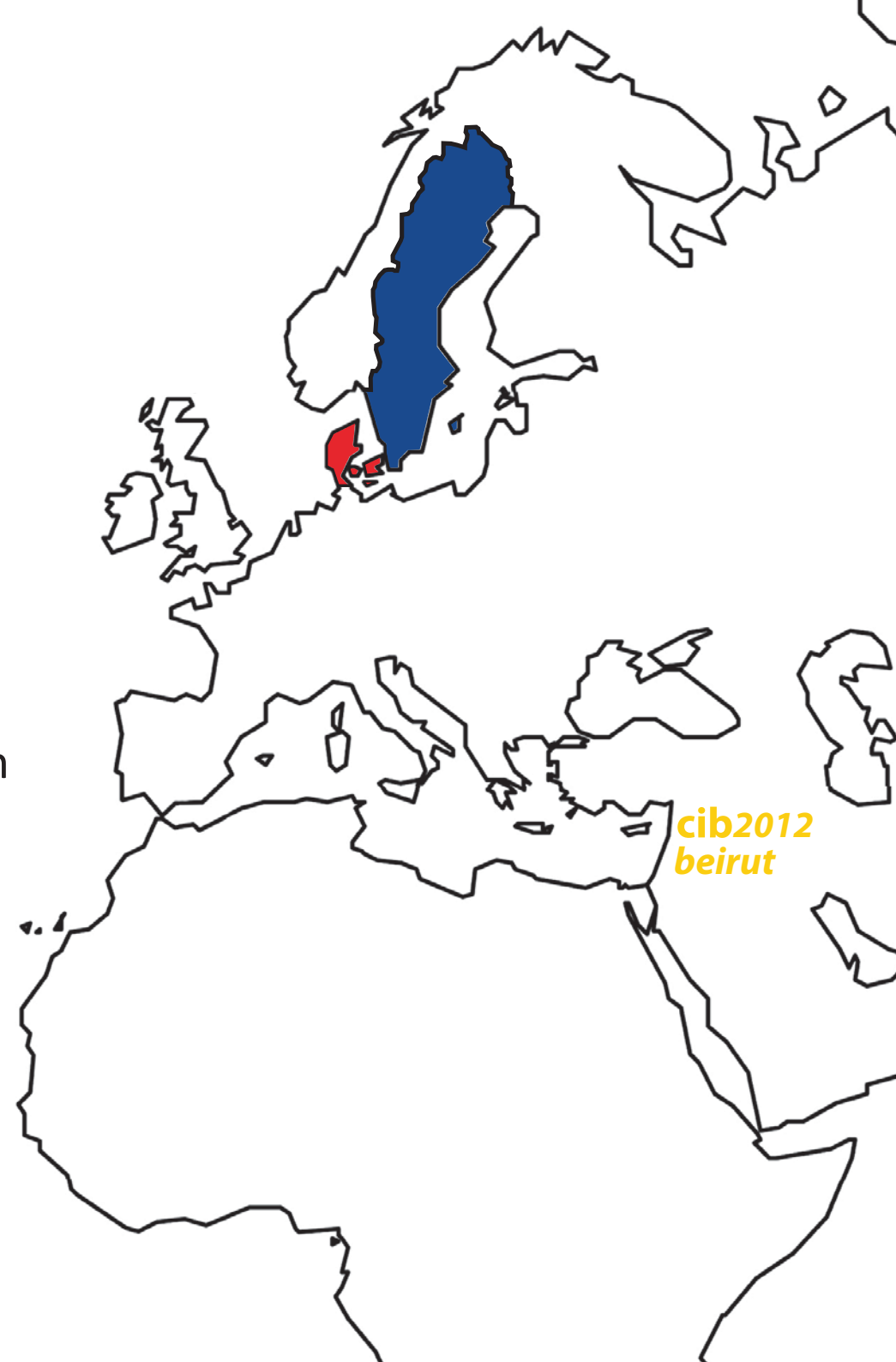
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# Study Framework

- **Interreg IVA Öresund Programme**
  - Öresund Region (Denmark and Sweden)
  - Collaboration in Öresund AEC Industry
- **Interregional Agenda**
  - Create shared regional network
  - Harmonization of national standards
  - Develop common translators
  - Focus on integration of ICT and BIM
  - Digital communication and collaboration
- **Interregional Partners**
  - Lund University (LTH)
  - Danish Building Research Institute (SBI)
  - Technical University of Denmark (DTU)

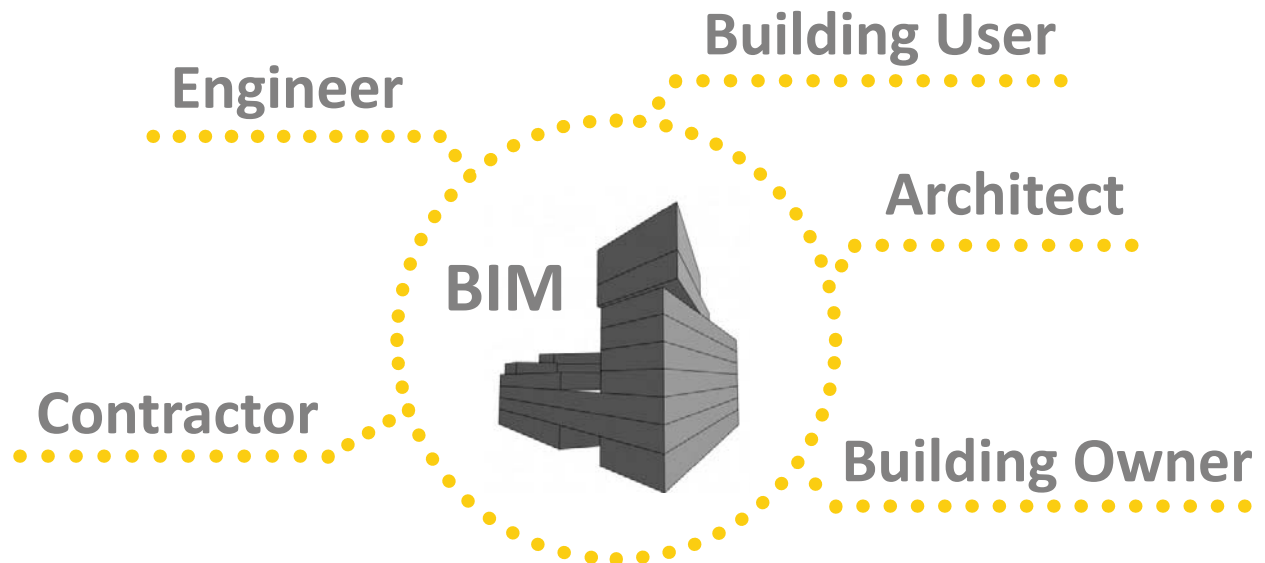


# Background to Study

- **BIM Creates Communication**

- BIM affects all stakeholders on a project, creating constant communication.
- BIM is by its nature multidisciplinary.

**HIGH LEVEL OF COMMUNICATION**



*Communicating by using BIM*

# Objectives and Scope

- **Two Study Goals**

- The first goal is to explore the benefits and possible risks connected to BIM adoption in the Öresund Region.
- The second goal is to develop recommendations and guidelines for facilitating communication and collaboration through the use of BIM.

## RECOMMENDATIONS AND GUIDELINES

- **Multifaceted Study**

- This study includes a **review** of relevant BIM literature to understand the background.
- This study includes a **survey** of Danish and Swedish industry professionals to gain an understanding of their knowledge and expectations from BIM approach.
- This study includes **mapping** of Danish and Swedish BIM standards to get an overview of existing guidelines.

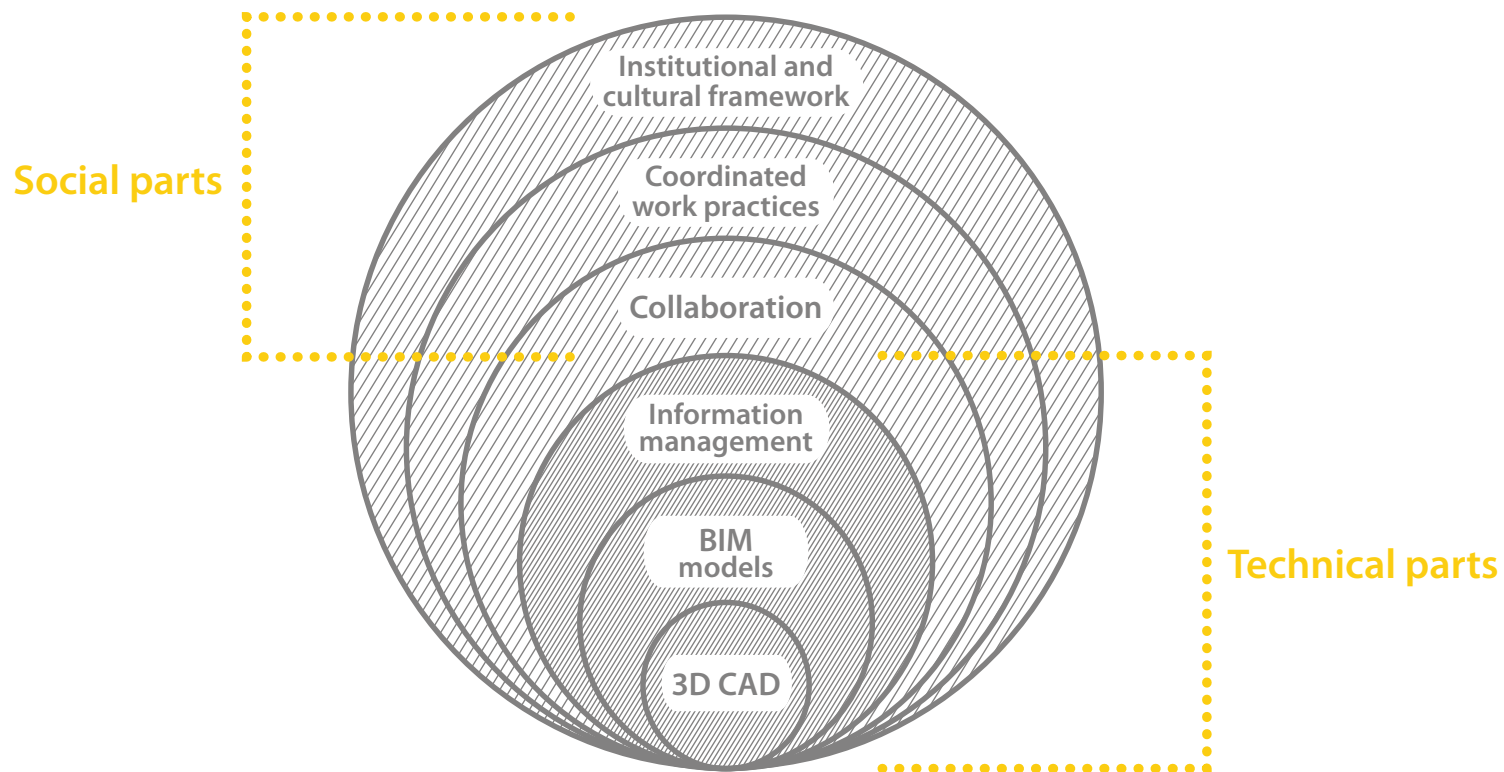
## (A) REVIEW, (B) SURVEY, AND (C) MAPPING

# Research and Key Issues

(A) REVIEW

- **Review of BIM Literature**

- Utilizing BIM as a communication and collaboration tool, and BIM adoption in general, involves functions of social and technical matter.



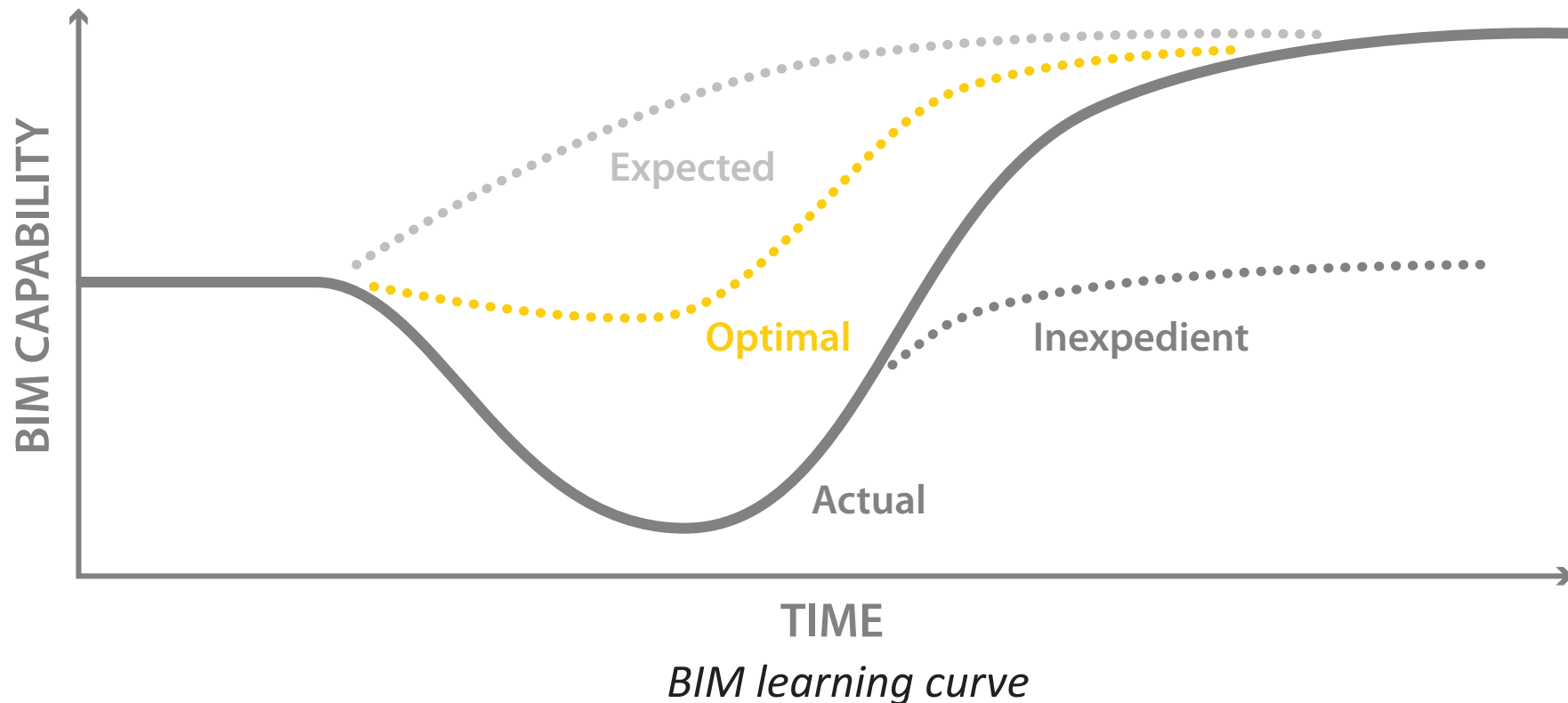
*BIM as a socio-technical system*

# Research and Key Issues

(A) REVIEW

- **Review of BIM Literature**

- BIM adoption takes time and resources, creating an unavoidable learning curve.
- If done well, BIM adoption will lead to improved communication, allowing disciplines to collaborate effectively.



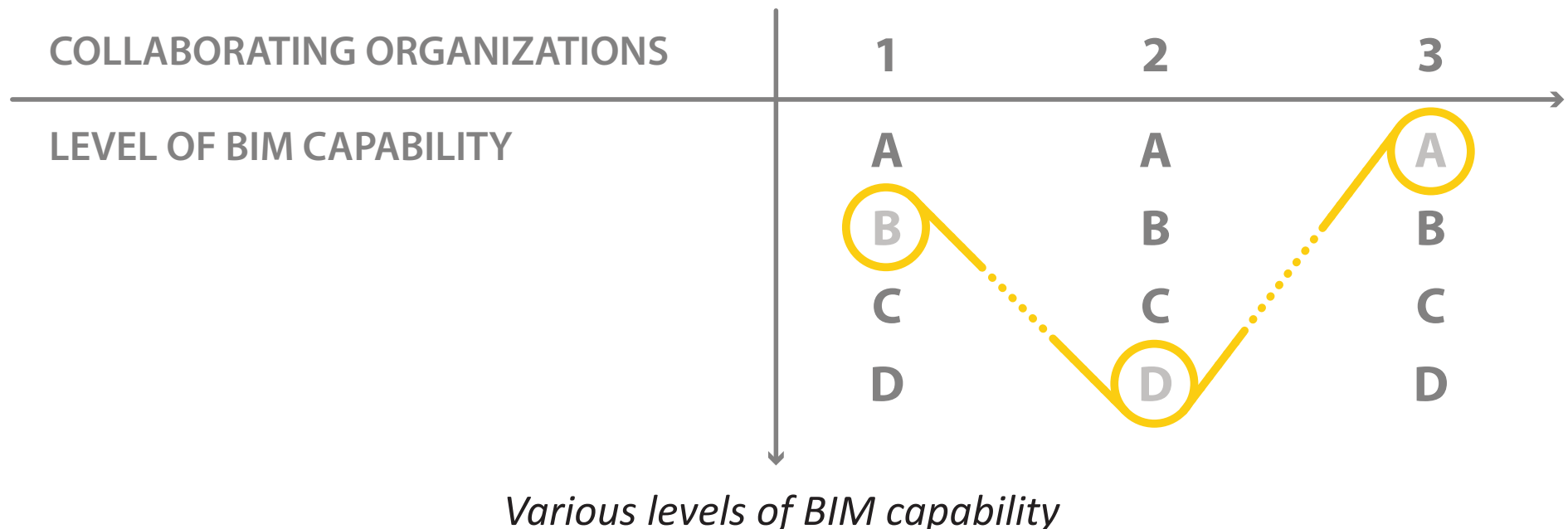


# Research and Key Issues

## (B) SURVEY

- **Survey of Industry Professionals**

- All survey participants highlighted the potential of adopting BIM as a communication and collaboration tool.
- In particular, the participants highlighted improved in-house communication.
- However, BIM collaboration across organizations appeared problematic, often creating misunderstandings.

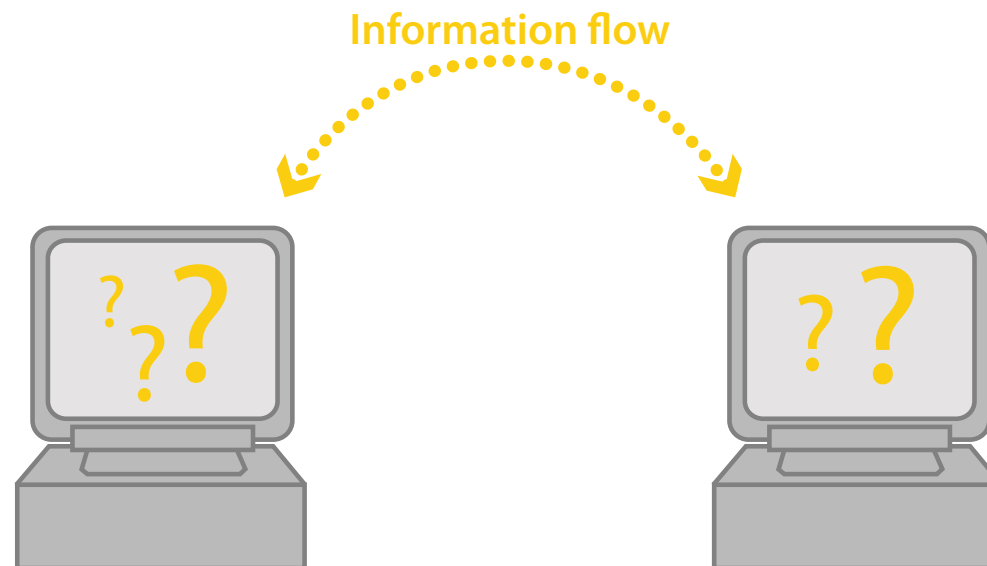


# Research and Key Issues

(B) SURVEY

- **Survey of Industry Professionals**

- Based on survey responses, BIM adoption and digital collaboration leads to a number of technical challenges, for example, getting BIM tools to communicate properly.
- Survey participants highlighted the issue of developing shared IT regulations and standardized exchange formats (e.g. IFC).
- Several participants stressed the potential of BIM-model servers as collaboration platforms.



*IT communication and information flow*

# Research and Key Issues

## (C) MAPPING

- **Mapping of Danish and Swedish BIM Standards**
  - Comparison of Danish *bips* (multiple documents) and Swedish *Bygghandlingar 90* (single document).
  - Mapping compared various BIM subjects such as *Object Structures*, *Exchange Formats*, *Classification Systems*, and further.



*Danish and Swedish BIM standards*

# Research and Key Issues

(C) MAPPING

- **Mapping of Danish and Swedish BIM Standards**
  - Two kinds of correlations have been mapped, via a direct link or via missing link.
  - Similarities and differences were demonstrated, and deficiencies were identified.



*Mapping of Danish and Swedish BIM standards*

# Research and Key Issues

## (C) MAPPING

- **Mapping of Danish and Swedish BIM Standards**
  - Danish bips covers all audience levels, containing comprehensive guidelines, templates, and concrete examples.
  - Swedish Bygghandlingar 90 contains guidance on administrative aspects only.



**Danish BIM adoption is supported by the Danish government.**



**Multiple common standards that organizations simplify.**



**Swedish BIM adoption is developed within private organizations.**



**Individualized standards developed by organizations.**

*Danish and Swedish BIM adoption*

# Conclusions

- **Benefits of BIM Adoption**

- Sustainable BIM adoption will improve project communication, allowing stakeholders to collaborate more accurately.
- BIM brings project members together, creating constant communication.
- BIM-model servers can be used as online databases, communicating information to all project members involved.

**BIM SUPPORTS COMMUNICATION AND  
PROJECT COLLABORATION**

# Conclusions

- **Challenges of BIM Adoption**

- BIM adoption comes with a learning curve, requiring extensive preparation and training of employees.
- BIM collaboration between organizations, and across national borders, appears problematic.
- Interoperability between BIM tools appears problematic, requiring shared IT regulations and standardized exchange formats.
- BIM adoption leads to organizational change, changes in work practices and interpersonal dynamics.

**BIM LEADS TO ORGANIZATIONAL CHANGE AND  
REQUIRES PREPARATION AND TRAINING**

# Recommendations

- **Common Standards**

- Standards that cover all audience levels and communicate with all disciplines.
- Standards that provide guidance on both social behaviors and technical issues.
- Standards that consist of concrete examples and adaptable templates.
- Standards that are simple and available online.

**ONLINE STANDARDS CONSISTING OF CONCRETE EXAMPLES AND ADAPTABLE TEMPLATES**

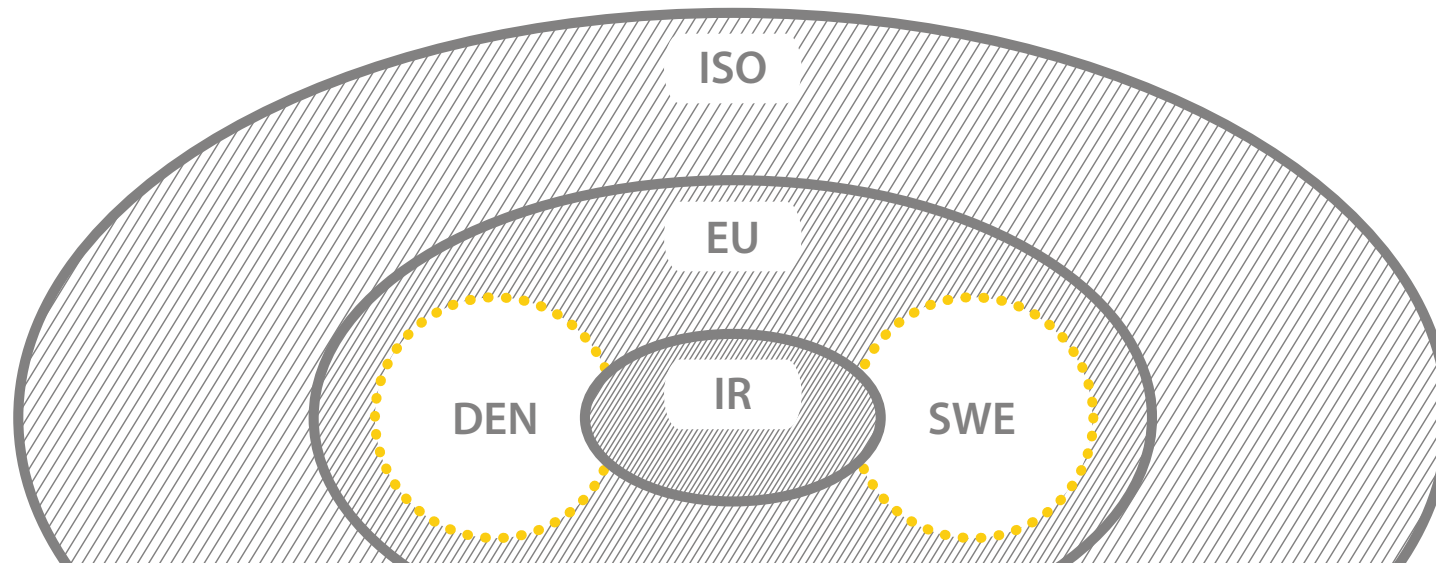


# Recommendations

- **Common Standards**

- Common Interregional BIM standards should be developed on the foundation of European or International standards.
- BIM standards should be flexible enough to allow adaption at both company and national level.

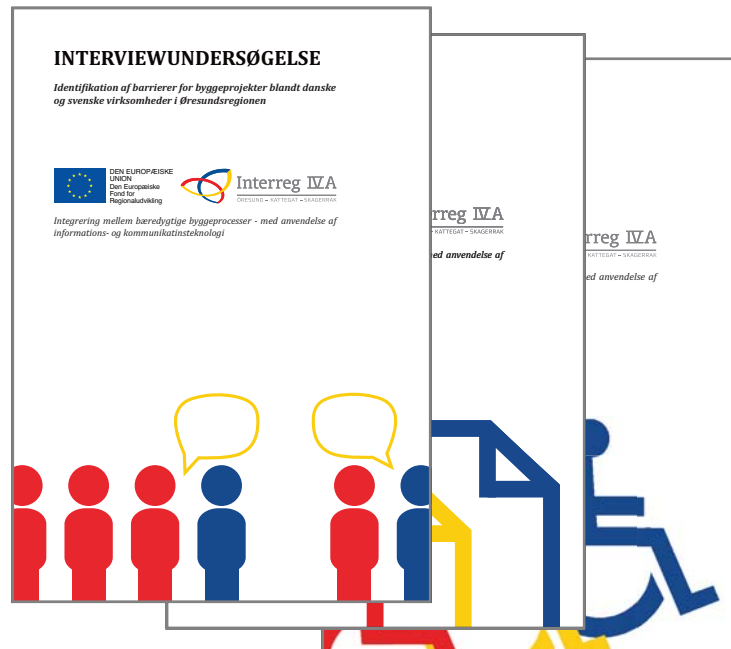
**FLEXIBLE INTERREGIONAL STANDARDS  
BASED ON EU OR ISO**



*Interregional standards with EU and ISO foundation*

# Contributions

- **Documents and Webpage**
  - Within the study multiple documents have been generated, reporting on interview survey and mapping.
  - The study is presented on the webpage [www.bygbygg.org](http://www.bygbygg.org) with the purpose of functioning as an online translator of Danish and Swedish approaches.



*Multiple documents and webpage*





**Vi har bevidst valgt ikke at udvide vores aktiviteter til Danmark.**

*Tomas Andersson, Ejendomsudvikling i Norden, PEAB*



**Danske arkitekter besidder ikke tilstrækkelige BIM-kompetencer – dette betyder mere arbejde til Tyréns som BIM-kordinator.**

*Pål Hansson, Udviklingschef, Tyréns*



**Samarbejde på tværs af landegrænser kræver et særligt fokus på kommunikation – her kan BIM være en hjælp.**

*Gunilla Qvarnström, Grundlægger, ProjTools*

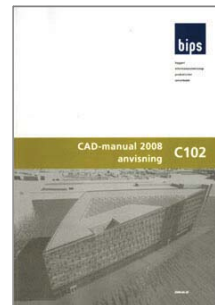


## Udveksling af filer

Med voksende fokus på implementering af BIM og IKT henvises der til ensartede rutiner for udveksling af datafiler.

### Anvisninger Danmark

Herunder følger en mapning af danske anvisninger målrettet emnet *udveksling af datafiler*.



#### *bips C102 (Udveksling)*

Herunder følger en gennemgang af danske anvisninger målrettet *udveksling af filer*. Der tages udgangspunkt i bips C102 (Udveksling).

### Anvisninger Sverige

Herunder følger en mapning af svenske anvisninger målrettet emnet *udveksling af filer*.



#### *Bygghandlingar 90 Del 8 (Informationsutbyte)*

Herunder følger en gennemgang af svenske anvisninger målrettet *udveksling af datafiler*. Der tages udgangspunkt i Bygghandlingar 90 Del 8 (Informationsutbyte).

Søg

## CAD-manual 2008

 Tags: [bips](#), [cad](#)


### Introduktion

### Vejledning

### Baggrund

### Relateret

Cad-manual 2008 indeholder foreskrifter for 2D/3D cad-produktion for både fil- og databasebaserede cad-systemer og cad-samarbejde. Cad-manualen omfatter følgende emner: koordinat-, højde og modulsystemer, sektionering, byggeobjekter, bygningsmodel, fagmodel, fællesmodel, fagspecifik model, mastermodel, tema, informationsniveau, notifikationsfil, udtræksfil, viewfil, digitalt plot, simulering, konsistenskontrol, visualisering, dataudtræk, dokumentation, udveksling, kontrol og ordliste.

CAD-manual 2008 er software- og applikationsneutralt.

Cad-manualen findes også på engelsk.

### Anvisning (2 elements)

- C102, Cad-manual 2008, anvisning 30. jun. 2008  
 Anvisningen indeholder basisbeskrivelsen og vejledningen.

- CAD-filer og -mapper 2008 30. jun. 2008  
 CAD-filer og -mapper 2008 indeholder retningslinjer for filnavngivning, mappestruktur og tegningsnummerering. Anvisningen tager udgangspunkt i ibb Arkiv- og dokumentstruktur og beskriver udelukkende strukturen for mappen 07\_TEGN.

[Se værktøjsemne](#)

### Basisbeskrivelse (1 element)

- C202, Cad-manual 2008, basisbeskrivelse 30. jun. 2008  
 Basisbeskrivelsen indeholder entydige forskrifter og begrebsdefinitioner, som er alment gældende.

### Paradigme (1 element)

- IKT-teknisk CAD-specifikation 12. jul. 2011

### Nyheder

Der er ikke tilknyttet nogen nyheder til dette indhold.

[Vis alle nyheder for dette område](#)

### Logbog

Area does not have any change history.

### Cases

#### Skotte med styr på CAD-manualen

20. aug. 2012  
 Rod Geddes fra Rørbæk og Møller Arkitekter giver gode råd til, hvordan du bruger bips' CAD-manual. [Læs mere](#)



#### Video: Arkitekt fortæller om CAD-manualen

12. jul. 2012  
 Det koster både tid og penge, når der er tvivl om cad-arbejdet, siger Rod Geddes. [Læs mere](#)



#### Orbicon fortæller om CAD-manualen

19. jun. 2012  
 Hør bl.a. om ingeniørvirksomhedens såkaldte quickguides. [Læs mere](#)



[Vis alle cases](#)

### Hjælp

[Kontakt](#)

SWEDISH  
STANDARDS  
INSTITUTE

# Bygghandlingar 90

1 2 3 4 5 6 7 8

Logga in

## Del 8, Digitala leveranser för bygg och förvaltning

Bygghandlingar 90 Del 8, Digitala leveranser för bygg och förvaltning ersätter tidigare utgåva med titeln Redovisning med CAD.

Verktyg

Exempel

Länkar

Uppdateringar

Standarder

Fråga experterna

## Bygghandlingar 90-8

Har du frågor inom området digitala leveranser?  
Ta hjälp av våra expertgrupp som förvaltar Bygghandlingar 90.

Registrera konto

Se fördelarna

### Aktuellt

#### BIM för Byggmästare

Sju byggmästarföretag har tagit fram en lättbegriplig handbok som ska hjälpa byggare att använda och dra nytta av BIM. Läs mer här.

#### Metadata för dokument

Under menyn [Verktyg](#) kan du nu ta del av de rekommendationer för dokumenthantering med metadata som togs fram av Bygg- och fastighetssektorn i utvecklingsprogrammet IT Bygg och Fastighet 2002

### Ladda ner dokumentmallar



### Ritningsexempel i full storlek



### Köp boken Bygghandlingar 90-8



1.795,00 kr

Köp

Aktuellt [BIM för byggmästare](#)

### Sammanfattning Bygghandlingar 90 Del 8

► Digitala leveranser för bygg och förvaltning ersätter tidigare utgåva med titeln Redovisning med CAD. Det förändrade innehållet innebär dels en utvidgning mot övriga delar av bygg-

► Avsikten är att komplettera den beskrivning av redovisningsformer och redovisnings sätt som behandlas i delarna 1-7 med den underliggande hanteringen av data, för att

► Denna del har alltså tillämpning för informationsutväxling inom alla skeden av processen. Därmed är också målgruppen för denna del betydligt utvidgad, till alla aktörer

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Technical University of Denmark

**THANK YOU!**

