

# Evolution or revolution



Innovations in precast concrete industry



# Content

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- What is innovation?
  - Innovations in construction business
  - Innovation approaches
  - Market structure
  - Practical problems in innovation work
  - Some cases
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# Innovation

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- **Innovation**: Implementing **new ideas** to **create value**
- **Innovation process**: Starts from a **market need** or an **idea** and ends to a **commercial product , system or service.**
- *Innovation process is normally divided into three stages:*
  - *Idea creation*
  - *Development stage*
  - **Commercialization**
- **Innovation ≠ Invention**

# Some general statements

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- The role of new innovations is essential in all businesses and industries.
- Each company should be able to bring to the market something new which is also recognised by the paying client.
- Construction business is regarded as a very conservative industry
- In building industry new products and technologies are progressing very **slowly**.
- Lifetime of many building products is very **long** and all **durability** aspects should be studied very carefully.

# Some general statements

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- The number of **revolutionary innovations** ( revolutionary innovation changes the rules of the game ) in construction business is very limited.
- Typically new things are done through **evolution** and improvements are done **step by step**.
- **New systems, products and services** are the **publicly** visible part of innovations.
- It is important to think also **innovation possibilities** through the whole **building process** and **own business process** from marketing, design, production and related site works.

# Some general statements

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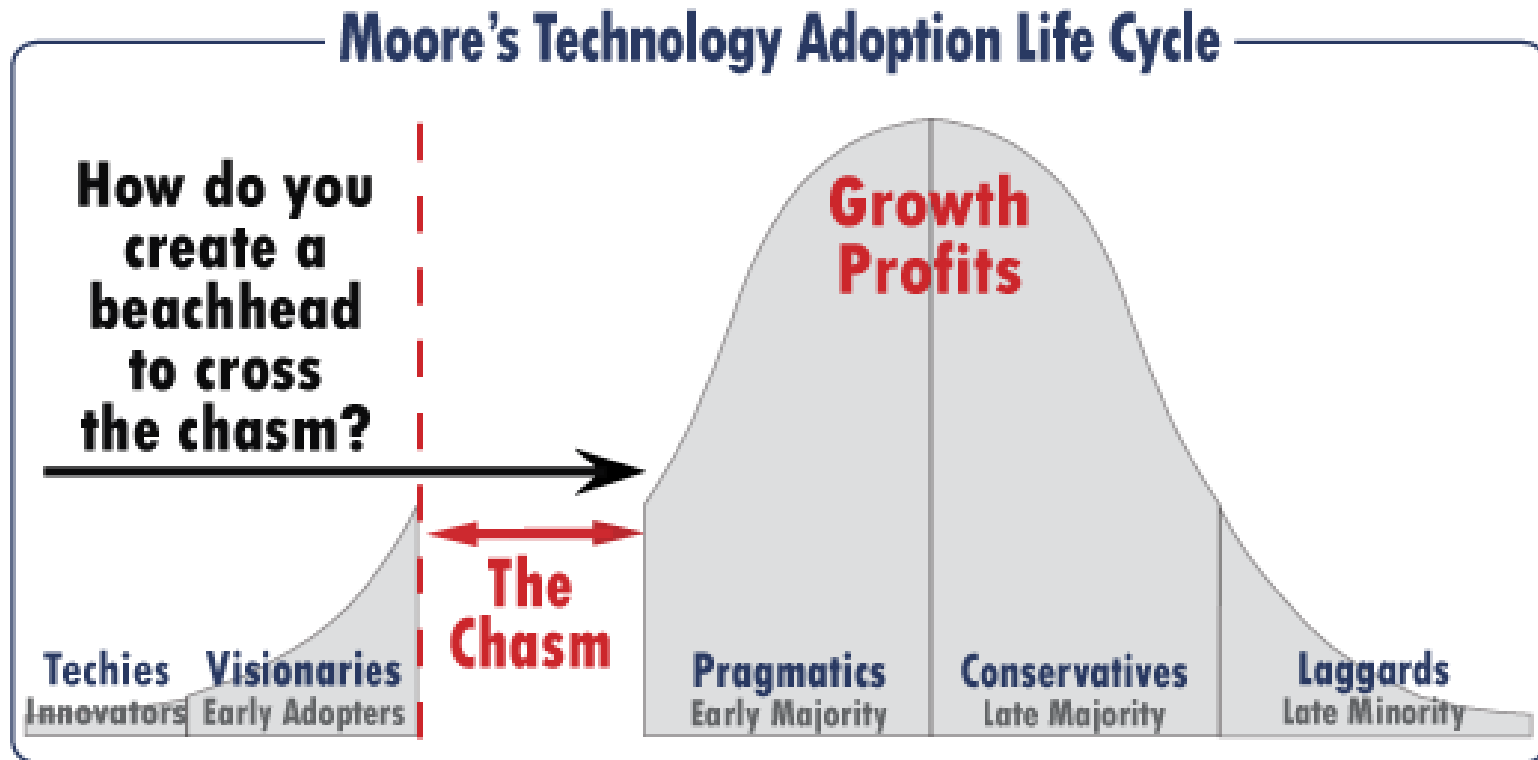
- The offered systems and products must be competitive
  - Cost or quality advantage against competitors
  - Benefits to the customer, different products or services against competitors
- The need of continuous improvements in all parts of the operations.

# Different innovation approaches

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- Radical / incremental
- Revolution / evolution
- Progressive / defensive
- Active / passive
- Forerunner / follower
- Basic research / application development
- Cost reduction / added value
- Authority or regulation driven / own
- Investment / cost
- Centralized / decentralized
- Own work / partnering / associations

# Market structure?



Source: "Crossing the Chasm", Geoffrey Moore, Collins Business Essentials, 2006



# Practical problems

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- How to recognise real customer needs?
- Very fragmented market structure
- How to create an innovative supportive atmosphere in the company?
- How to get more idea seeds from customers and knowledge network?
- How to enrich the idea seeds?
- How to organise the idea bank?
- How to finance projects?
- How to organise commercial involvement?

# Cases

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## Building systems

- Frames
- Mixed construction

## Design

- BIM

## Products

- Hollow-core slab evolution ( product / production technology )
- Fastenings

## Production technology

- Automation

## Material technology

- Additives

# Some examples

<b>Business area</b>	Innovation
<b>Design</b>	3 ( 4 )-D modelling <b>BIM</b> Calculation programs 3-D analysing tools ( moisture, heat etc. )
<b>Systems</b>	Integrated flooring systems ( heating & cooling, piping ) <b>Steel inserts for connections</b> <b>Low profile beams, mixed systems</b> Wind mills/ concrete towers Passive/ 0-energy houses Absorbing sound walls Slabtrack for high speed trains
<b>Products</b>	New hollow-core slab applications <b>Graphic concrete facades</b> New concrete facade surfaces 60+ m long precast bridges 3,6 m wide TT-slabs Fiber concrete applications

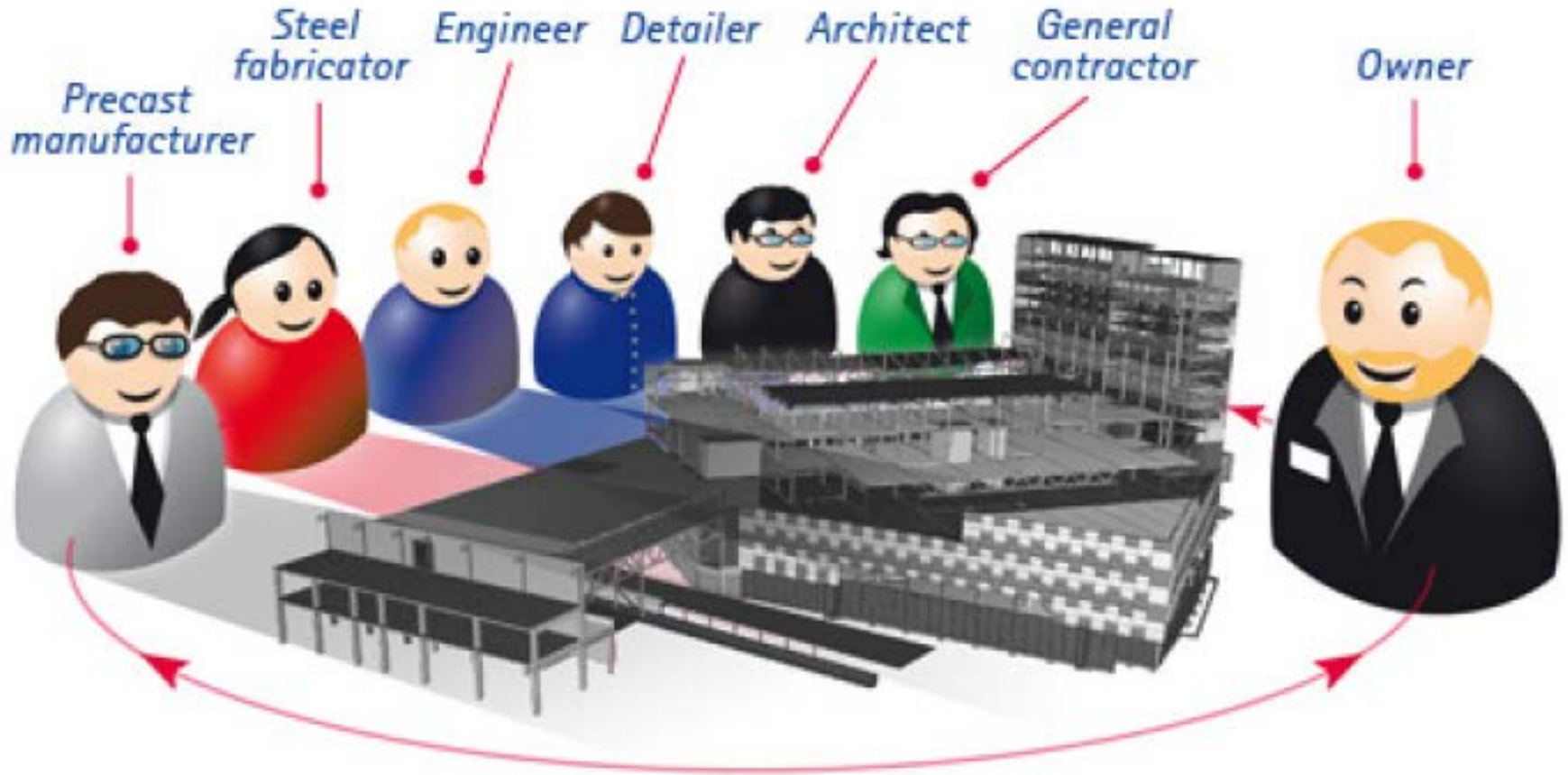
# Some examples

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<b>Business area</b>	Innovation
<b>Production</b>	Fully automated half slab lines Modern circulation wall lines <b>Casting machine automation /control ( compaction )</b> Use of magnets Pumping as concrete transportation
<b>Materials</b>	<b>High performance concrete</b> <b>SCC-concrete</b> Fibers Special admixtures ( accelerators etc. )
<b>Sitework</b>	Steel connectors Site automation
<b>Sustainability</b>	Alternative binders Blended cements Low-energy / passive houses

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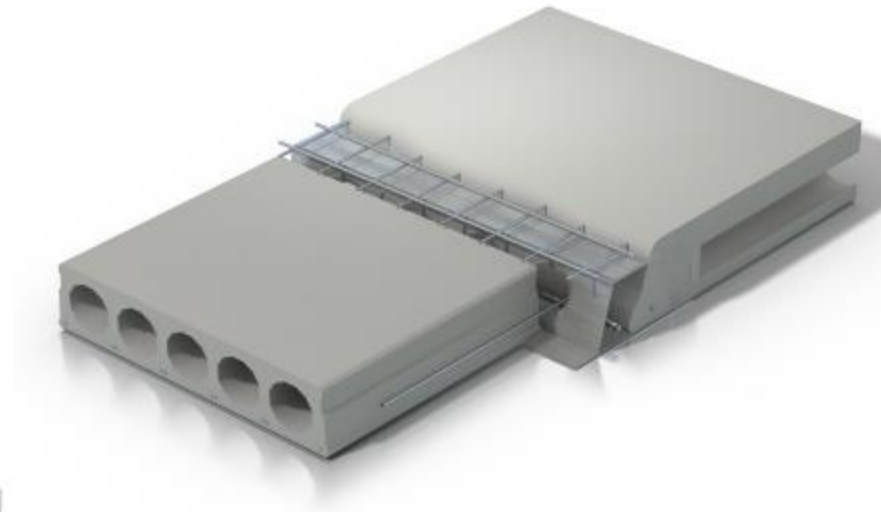
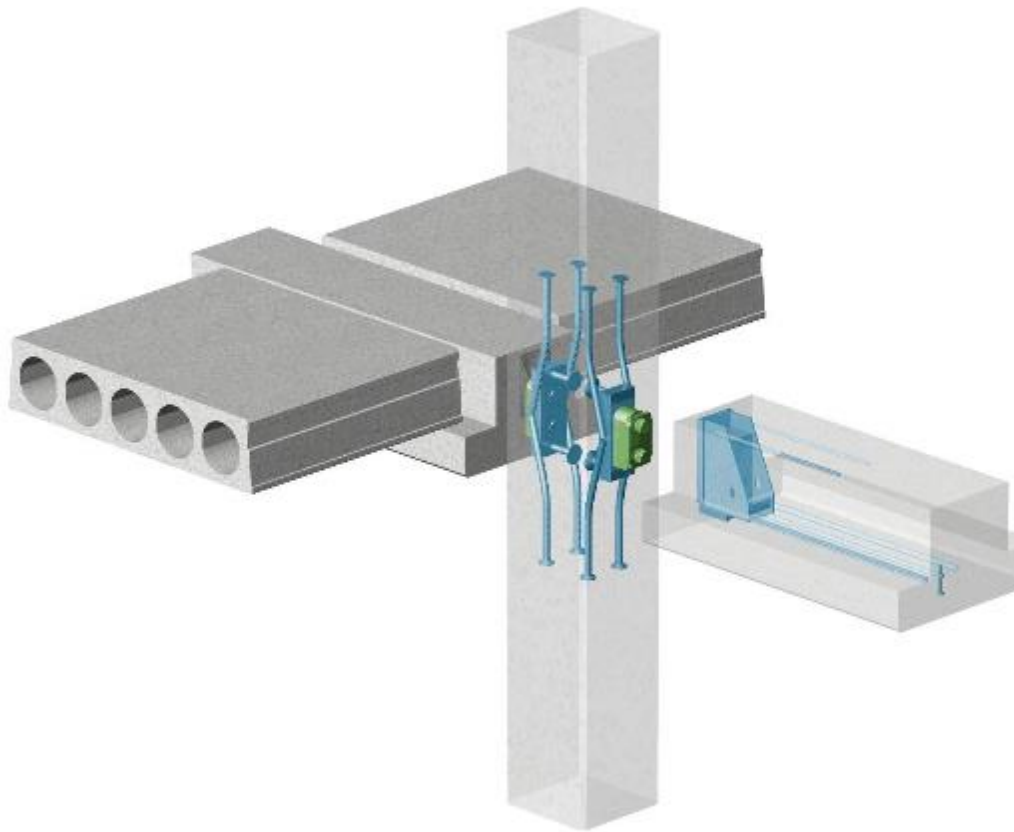
# BIM ( Building information model )



**Same transparent view on the project**

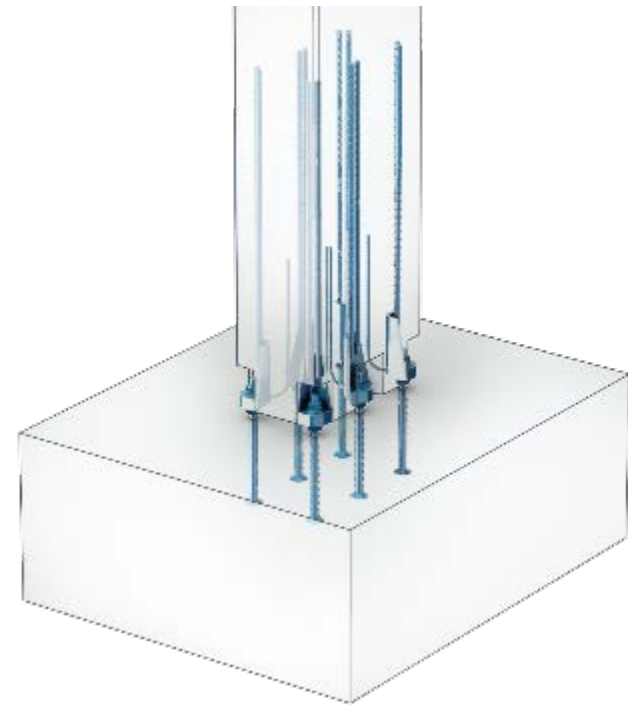
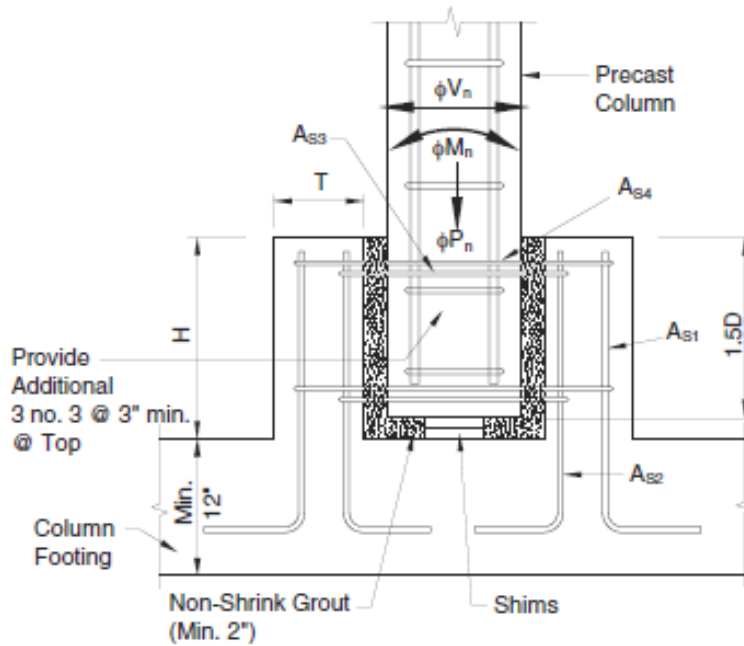
# Systems / mixed construction

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Architecture  
Assembly of building services  
Competition with other materials  
Fast assembly

# Column / foundation connection



Fast and safe assembly  
Industrial products  
Total costs / product costs

# Facades

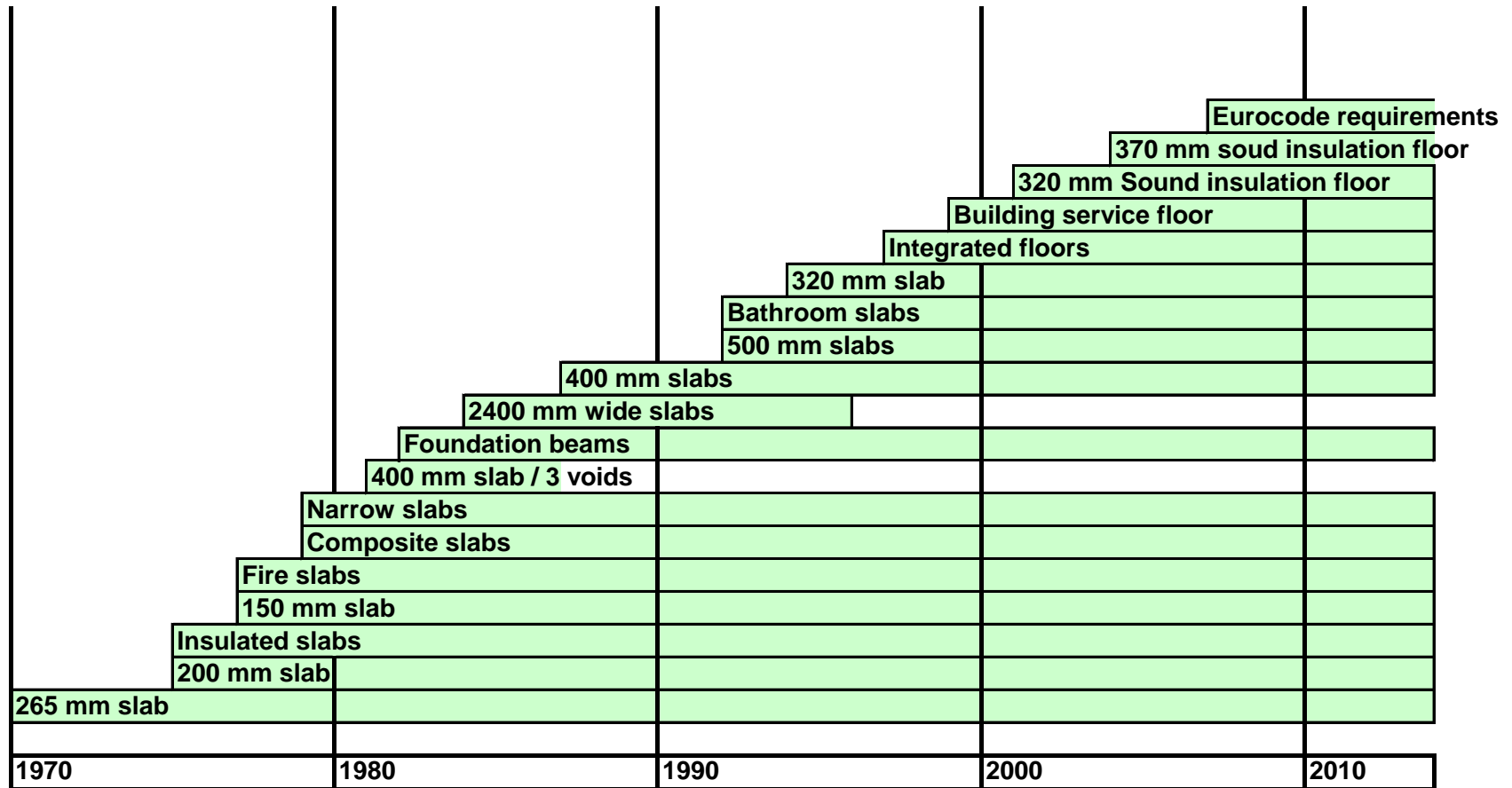


New possibilities  
Co-operation with  
architects



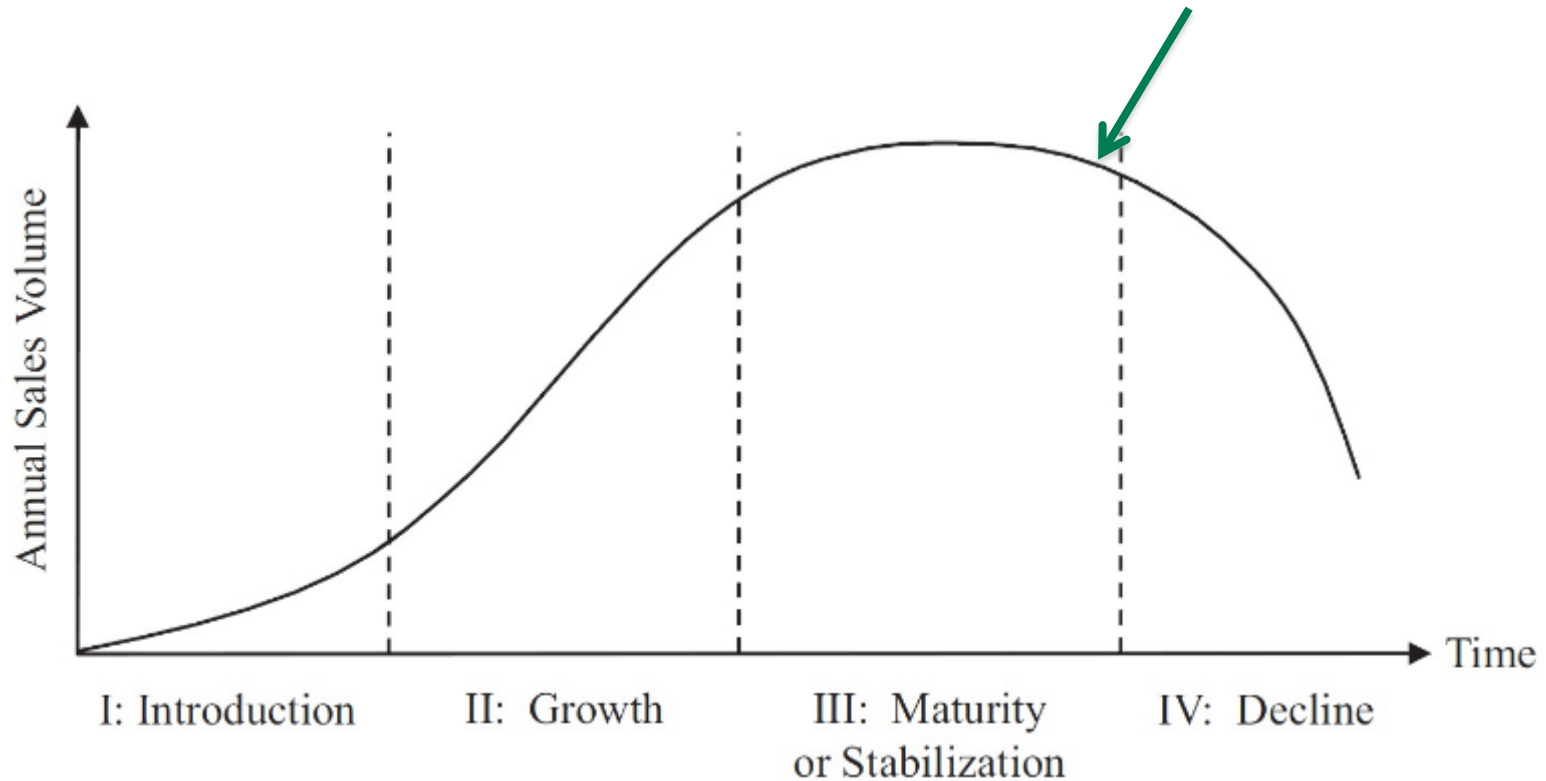
# Hollow-core slab, product evolution

## Case Finland



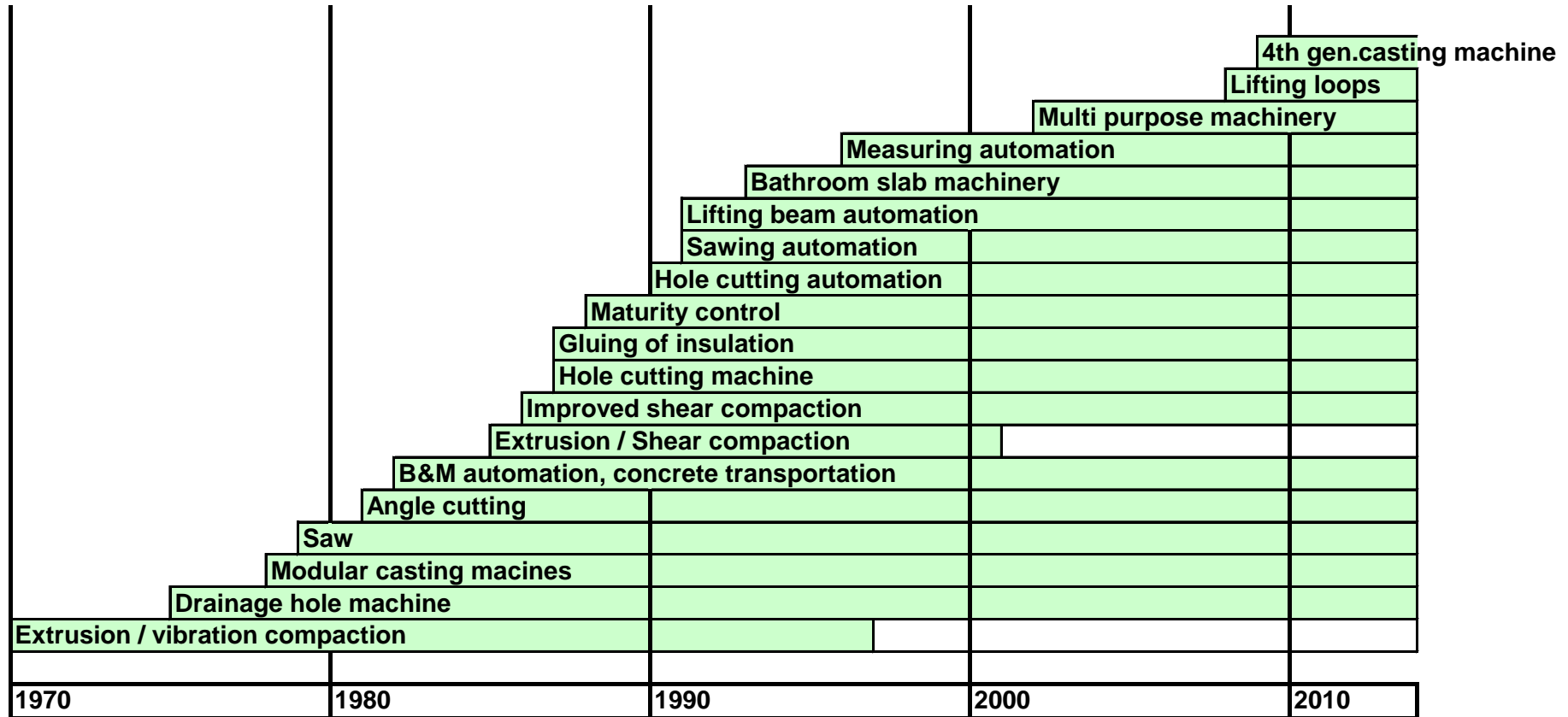
# Hollow-core slab, product evolution

Case Finland



# Hollow-core slab, production evolution

Case Finland



# New competitors

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# Hollow-core slab, casting evolution

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Case: Extruder

1970 ->



2000 ->



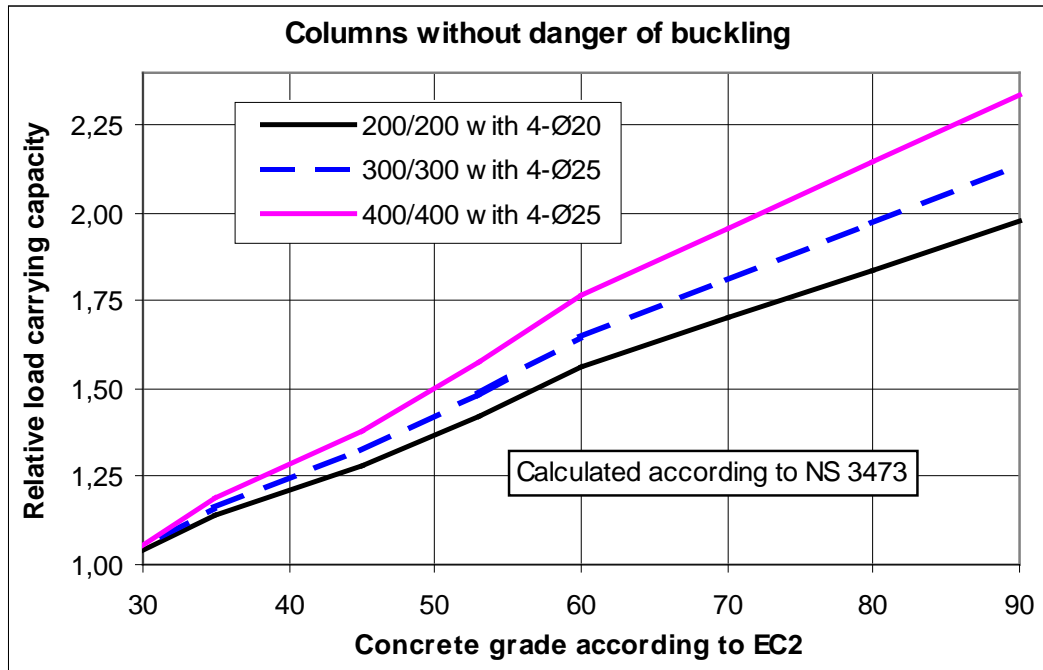
1990 ->



2010 ->

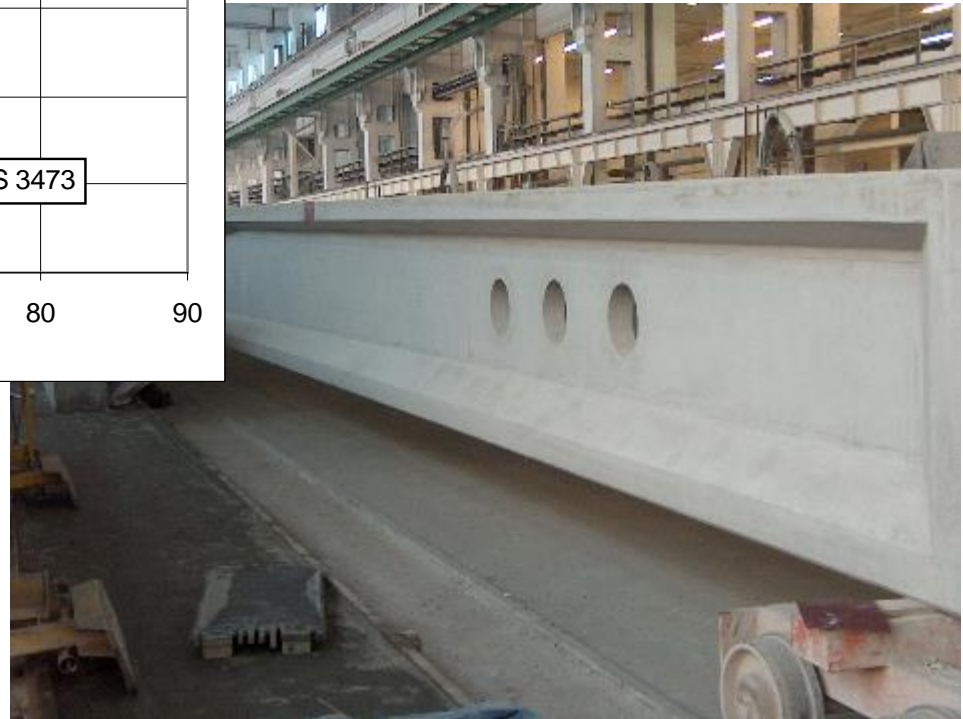


# Material development



High performance concrete

**Self compacting concrete**



# Future

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- **Evolution** will continue but ...
  - **Co-operation** with other players and materials
  - **Environmental** challenges
  - **Industrialization of total building process**
    - Design the key area
    - Pre-fabrication as a main tool
    - Automation and mechanization
  - More emphasis on **material technology**
    - Cost
    - Quality / outlook
    - Sustainability
  - **MORE INNOVATIONS NEEDED**
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