



Industrialised construction in Sweden: lessons from the great northern experiment

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A bit of Swedish history...

- Inspiration from the US and UK: Dimensional lumber + machine-made nails → the balloon framing in 1833 (Chicago)
- Pre-1900: Prefab timber buildings already being made in Swedish carpentry shops and delivered by companies like Fogelfors Bruk since 1886
- 1900s–1910s: Urbanization and introducing state home-ownership loans in 1904 → a high demand for affordable housing → early factory production of standardized wooden parts
- 1920s: Cookie cutter designs and expanded housing factories → regularly producing systematic, factory-built home kits → first modular home built in 1929
- 1960s: Modular and panel factories helped solve the housing crisis → heavily influenced by Operation Breakthrough in the US
- Caveat: O.B. resulted in interesting prototypes but no long-lasting effect on the industry → ca. 3% market penetration



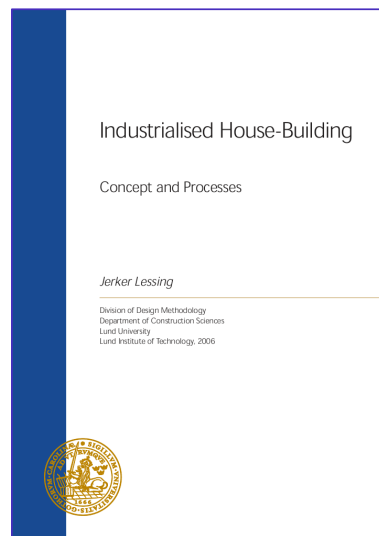
... to the present day

- 1965-1974: The Million Programme (*Miljonprogrammet*) → A massive public housing initiative that built one million new homes → an industry with 70+ factories
- 1975-today: Gradual uptake → The industrialized sector currently accounts for ca. 45% of total construction in 2026
- Market share: Prefab and industrialized methods cover 80% of single-family homes in 2026
- Methods: 3D volumetric modules, closed wall panels, floor and roof cassettes, standardized timber systems, etc.
- Automation, digitalization, sustainability, and innovation goals
- Raw materials: (Primarily) locally available and sourced timber
- Examples of major players: Lindbäcks Bygg, Derome, BoKlok, Folkhem, Älvsbyhus, Eksjöhus, etc. → A variety of business models and market strategies



Defining industrialised house-building

*Industrialised house-building is a **thoroughly developed** building process with a well-suited organization for efficient **management, preparation and control** of the included **activities, flows, resources and results** for which highly developed components are used in order to create maximum customer value (Lessing, 2006; Lessing et al., 2015)*



Producing in manufacturing vs construction

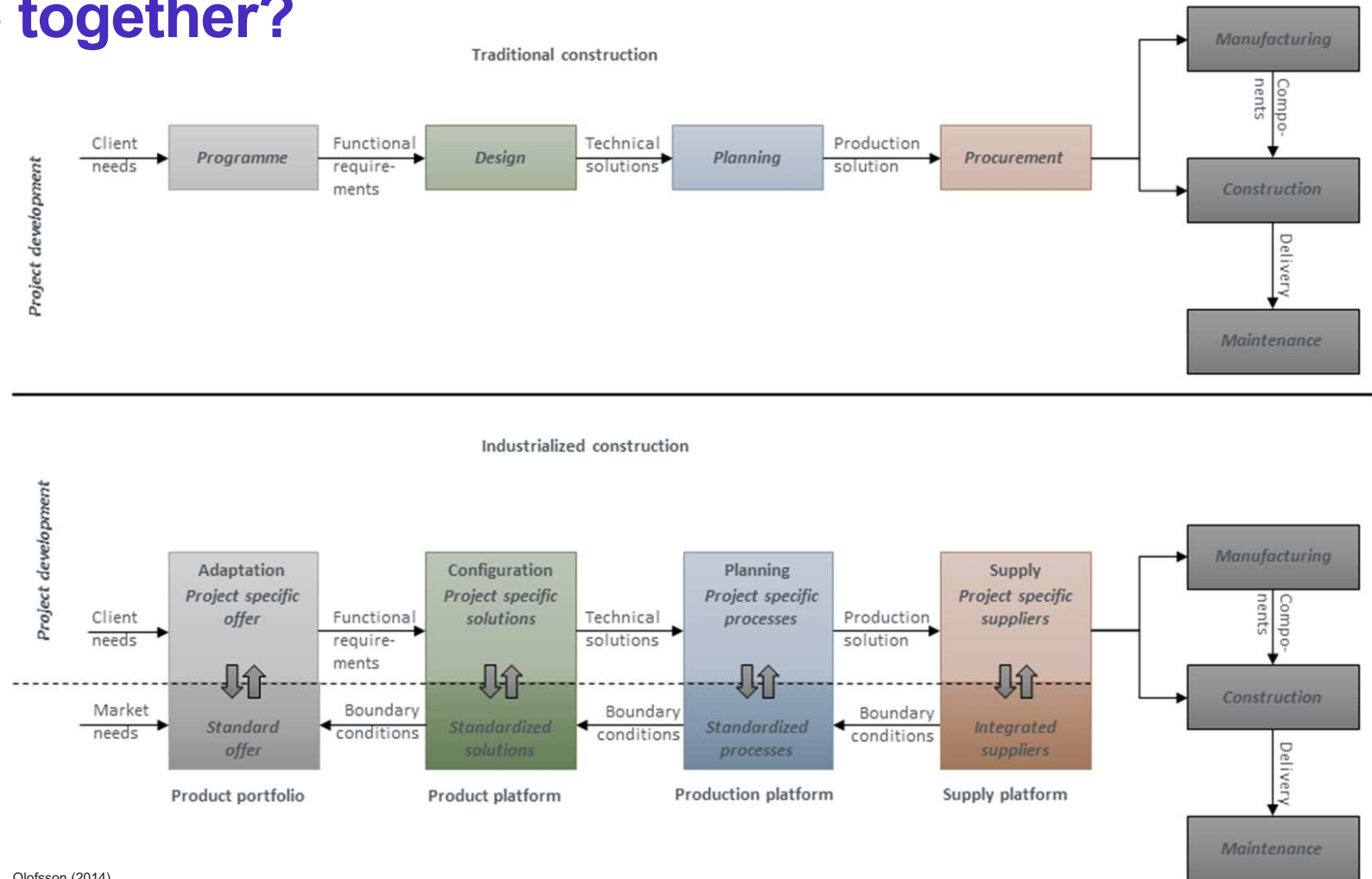
- Manufacturing:
 - Stable site with a specified production space
 - Predefined production flows
 - Controlled environment
 - Create and maintain flow
 - Continuous improvements
 - Product-centric
 - Planning to delivery date
- Conventional construction:
 - Changing site – the production space moves with the erection
 - Project-specific production flows
 - Exposed and changing environment
 - Plan flow through trades and subcontractor crews
 - Constant transformation
 - Project-centric
 - Forecast planning



Lidelöw (2026)

Mashing those together?

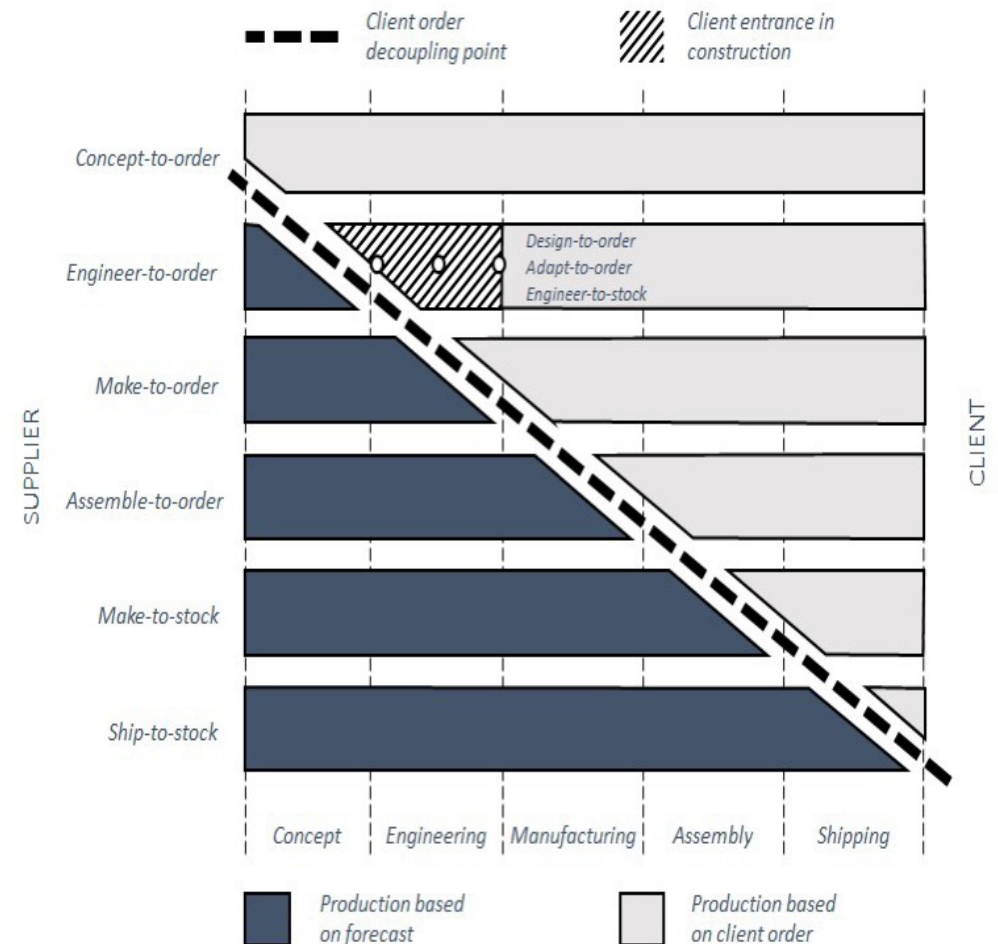
- Piecewise prediction and stability
- Manufacturing + design can now be prepared before the client enters the process
- Repeatable standardized solutions, increasing speed and output
- **Repeatable supply chain requires good relations with good suppliers!**



Olofsson (2014)

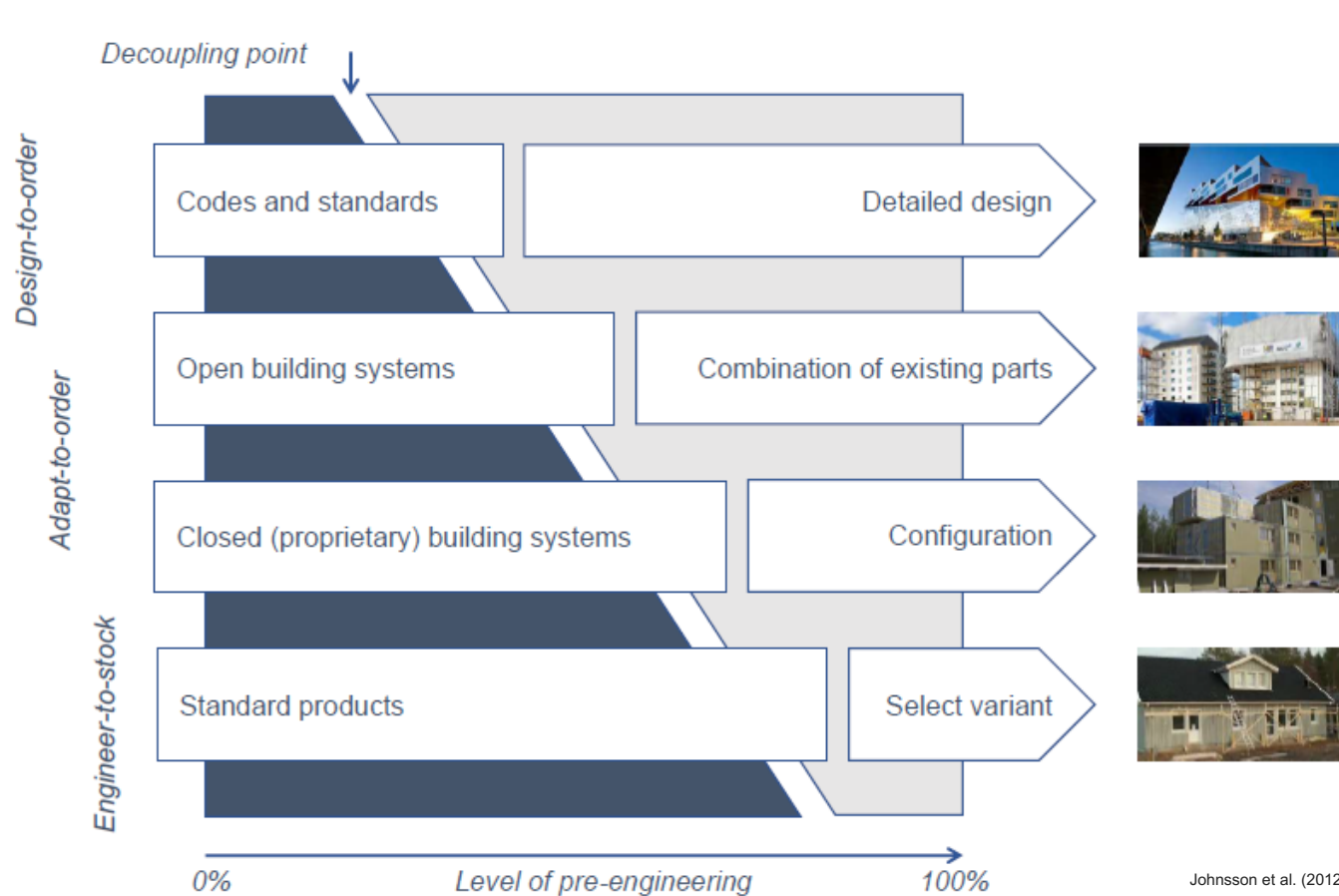
Production strategy

- Construction: Low predefinition
- Difficult to scale, problems with quality control and cost precision
- Repeating cost overruns, project delays, and design and execution errors
- Engineer-to-order production strategy where the client is involved in engineering the final artefact
- Most other products are predefined and offered to the customer, without the latter being involved in design



Johnsson (2013)

Business models in Swedish industrialized construction

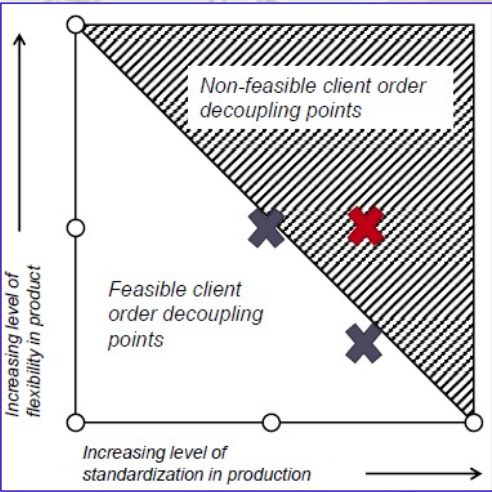
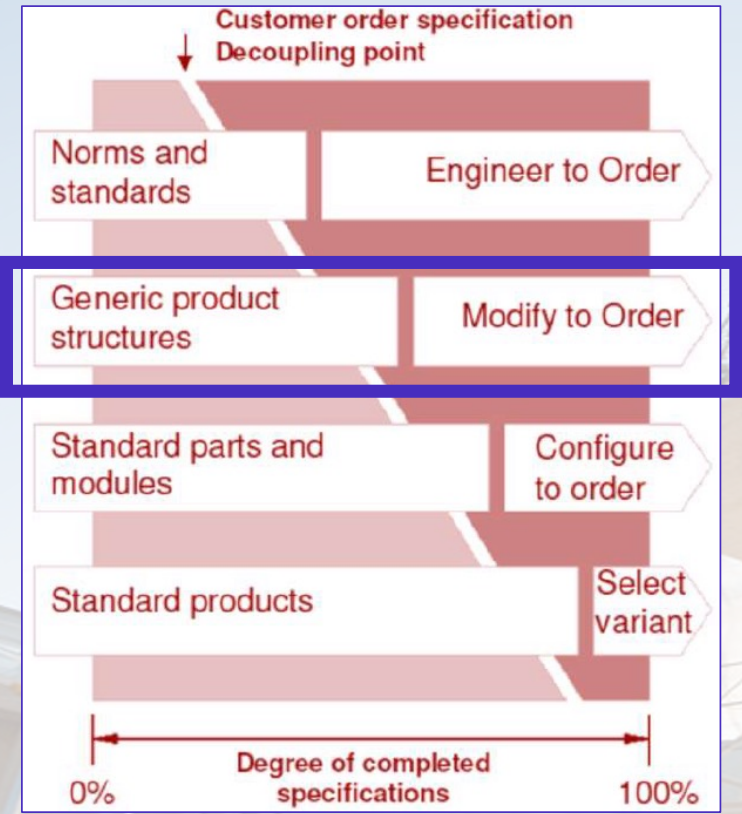


Johnsson et al. (2012)



Brege et al. (2014)

Business model example 1: Martisons



Lidelöw and Olofsson (2017)

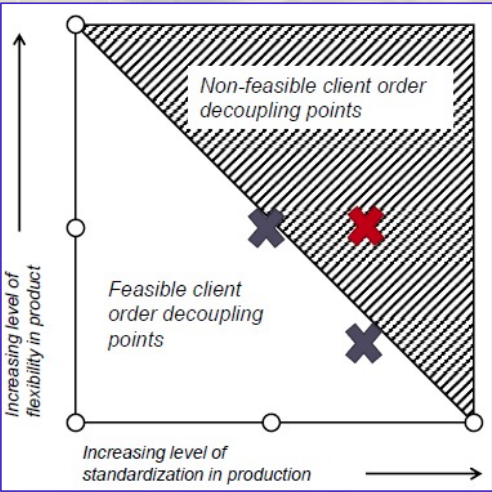
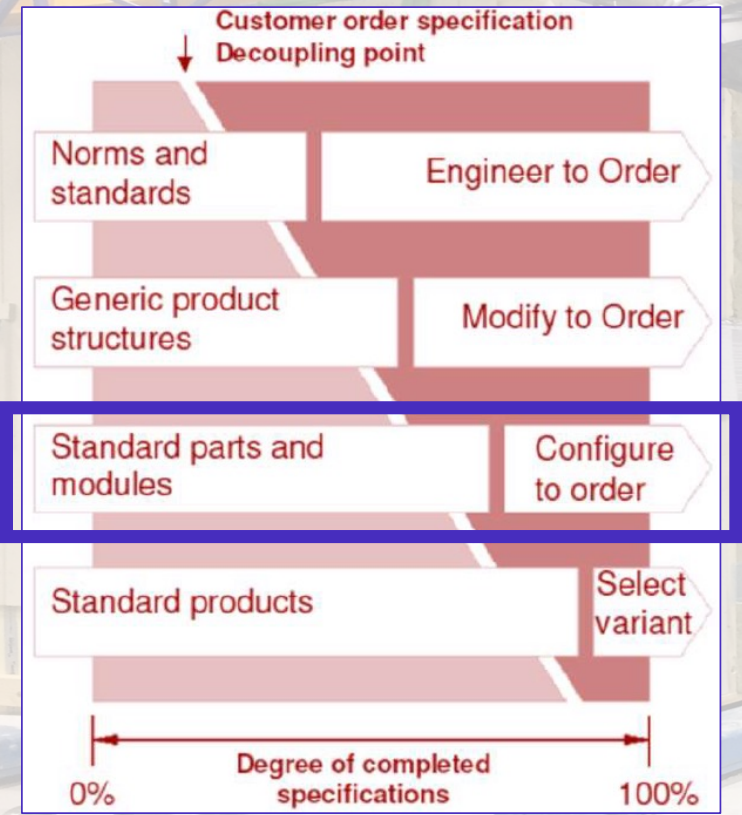
Market position:
Sweden's largest CLT and glulam supplier. Strong product developer. Large export operations. High customisation.

Offer: Supplying design services and CLT components to building contractors

Operational platform: In-house design, planning and production of glulam and CLT panels in own factory. No on-site assembly.

Lidelöw (2026)

Business model example 2: Lindbäcks



Lidelöw and Olofsson (2017)

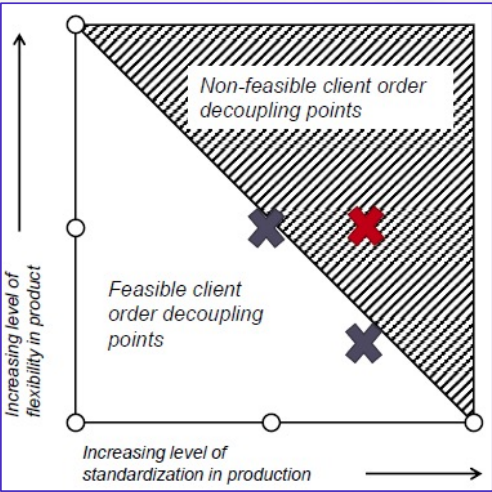
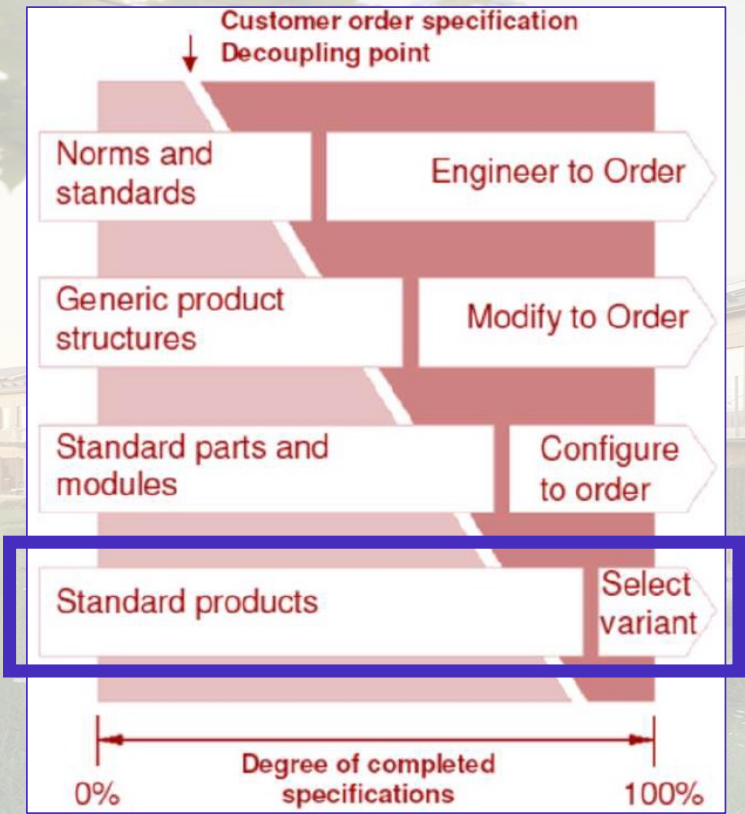
Market position:
Design-build contractor or developer for mid-budget homes. High customisation. Competes with conventional contractors.

Offer: Design and building of multi-family residential buildings; defined building system and production method

Operational platform: Complete in-house development and production of volumetric elements in own factory. On-site assembly performed by own stuff.

Lidelöw (2026)

Business model example 3: BoKlok



Lidelöw and Olofsson (2017)

Market position:
Project developer and design-build contractor for budget dwellings. No customisation. In competition with conventional contractors.

Offer:
Standardised building types and apartments

Operational platform: Complete in-house development and production of volumetric elements in own factory. On-site assembly performed by own stuff.

Lidelöw (2026)

Example of factory innovations: Lindbäcks



- Work organised into workstations
 - Product comes to the worker
 - Tools stay at the station
 - Materials delivered to the station
- Subprocesses organized through takt planning and line balancing
- Parallelised workflows by kitting and preassemblies
 - Prefabricated pieces on the side (plumbing trees, harnesses, precut wood, precut sheathing, bathroom pods, kitchen kits)
 - Sped assembly line to motivate factory investment
- Ergonomics
 - Workplace built to minimise distance that workers need to walk



Lidelöw and Olofsson (2017)

Lidelöw (2026) & Lindbäcks

So, what does the great northern experiment show?

Can industrialised house-building help solve the problem of affordable housing? Yes! The Swedish example shows the potential benefits:

- Lower cost per unit – but only if the entire project is executed with speed **AND** the client gains from that speed; if not, it is on par with traditional construction
- Increased production speed – but see the caveat above
- Increased productivity with linear production – but only if the entire ecosystem is supporting it; If not, it can lead to faster losses for the company trying to execute it
- Continuous improvements in production, with the largest positive effect realized in product repetition between projects

... but bankruptcy (especially for the manufacturing facility) is around the corner if:

- The factory is fed products that do not fit its lines
- There are long time gaps between projects
- The factory is starved for materials: Clients and lenders need to approach the payment scheme with large upfront payments to avoid this





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Thank you!



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