

Max Rudolph, MA Thesis project, TU Berlin

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## Bauhütte 4.0 - Perspectives for the construction of tomorrow

EM4I - Energy Materials for Innovation -  
4th webinar

**Prof. Dr.-Ing. Holger Kohl**

Deputy Director

Fraunhofer-Institute for

Production Systems and Design Technology (IPK)

Head of Chair Sustainable Corporate Development

Institute for Machine Tools and Factory Management

Technical University of Berlin

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# VISION FOR URBAN TIMBER CONSTRUCTION

*„The fight against climate change can only succeed through radical digitalization and inevitably leads us to building with wood/ renewable materials on an urban scale.*

*By realizing timber construction, we are making a clear contribution to climate protection and creating affordable living space.“*

Transforming the city from a CO2 source to a CO2 sink



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# THE WORLD'S LARGEST TIMBER CONSTRUCTION QUARTER WITH LIVING SPACE FOR UP TO 10,000 PEOPLE IS TO BE BUILT ON THE SITE OF THE CLOSED TEGEL AIRPORT



- In order to make the energy supply of the Schumacher Quarter as efficient and sustainable as possible, it is to receive a so-called "**LowExergy Network**". This enables a particularly low flow temperature of only 40°.
- The SQ is to be **built largely of wood**. In addition, the site is to be built according to the so-called "**sponge city**" model with the aim to retain rainwater in the settlement. In the hot months, this evaporates and cools down the neighbourhood; in winter, it slowly seeps into the groundwater. This reduces drainage costs and supports biodiversity.

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# COMMON GOAL

## Schumacher Quarter as a model quarter for urban timber construction

- Understanding urban spaces as a reflection of a sustainable society
- Resolving the tension between individual design and standardized, collective planning
- Ensure individualization in economic, urban timber construction
- Increasing urbanization and forest cultivation must be considered strategically integrated

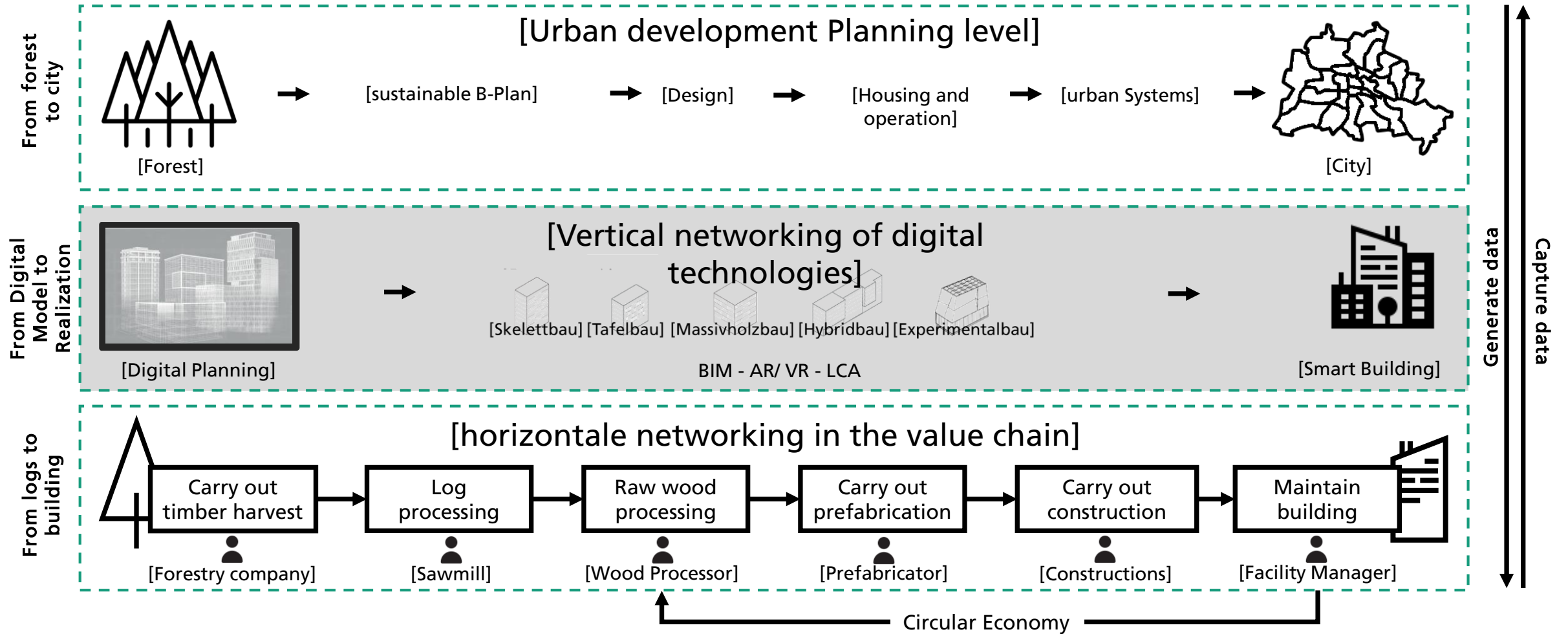
### Goal:

- **Establish agile and ambidextrous (economic-ecological) design and execution processes.**

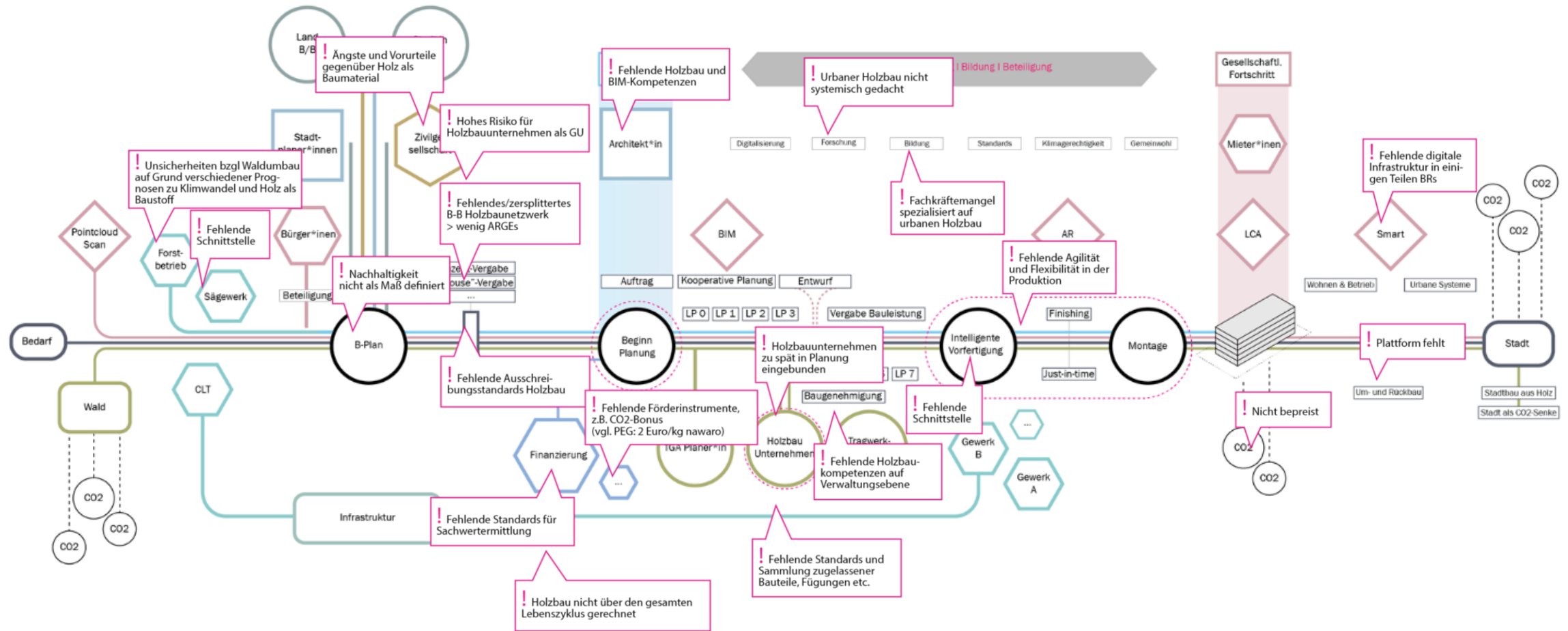


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# VALUE CHAIN "URBAN TIMBER CONSTRUCTION SYSTEM"



# INTEGRATED PROCESS CHAIN, URBAN TIMBER CONSTRUCTION SYSTEM





# BAUHÜTTE 4.0 AS AN ENABLER EINER WERTSCHÖPFUNGSKETTE

- In order to achieve the climate goals of the state of Berlin, the construction industry must be **rethought and radically revolutionized**. Bauhütte 4.0 is the orchestrator of the **forest-to-urban value chain** and develops horizontal as well as vertical networking.
- The networking of the regional and supra-regional timber construction industry is indispensable in order to be able to meet the demand for **urban timber buildings**.
- Urban housing construction in wood must become **affordable and competitive**. To this end, Bauhütte 4.0 is developing new ways of digitalisation, networking and standardisation.
- Bauhütte 4.0 creates economic efficiency effects through **crowd production** and the connection of small digitally driven companies, regional timber construction companies and large anchor companies.
- **Cooperative planning** (early involvement of timber construction companies) in timber construction creates economic efficiency through time savings, open standards and must follow a standardised process.



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# BAUHÜTTE 4.0 - FUNCTIONS

- Construction and operation of the Bauhütte 4.0 as an **innovation factory** for urban construction in wood
- Bauhütte 4.0 as the center of the new **forest-to-urban value chain**
- Bauhütte 4.0 as a **driver** for innovation, production, networking and participation



**1 Production**  
Production of the residential units of the SQ

**2 Research & Development**  
Applied research value chain urban timber construction

**3 Innovation**  
Innovations and standards through partnership  
-> Development of business location, innovation needs

**4 Wooden buildings**  
Different construction principles  
-> Model quarter



# PRODUCTION VALUE CHAIN

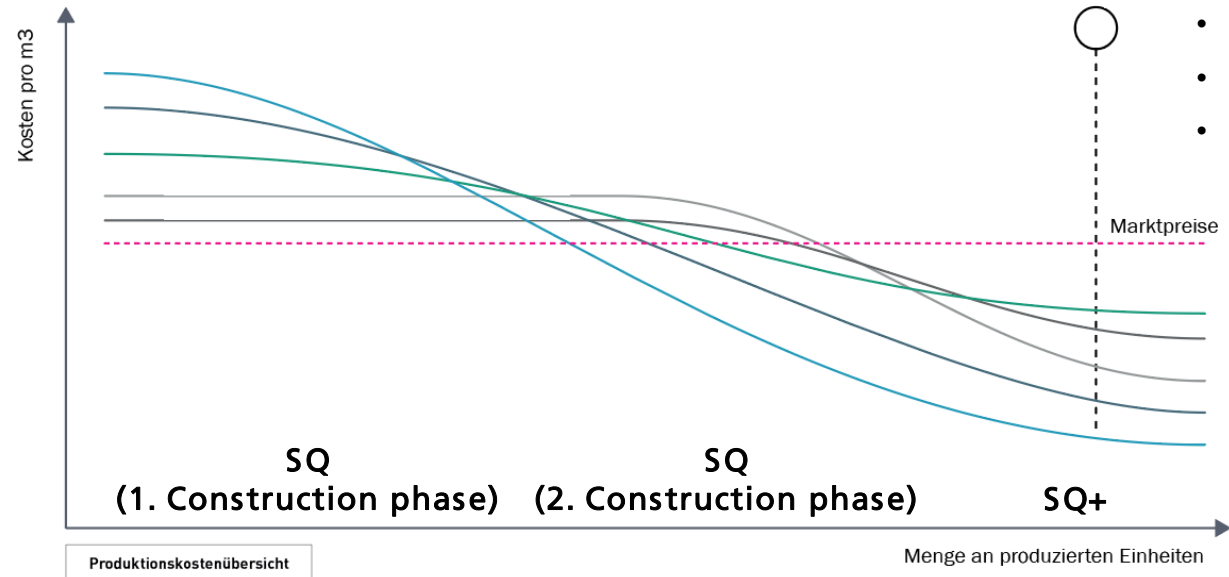
**Goal:**

SQ offers potential for competitiveness

**Recommendation for action:**

Detailed analysis of various options for financing the urban wood building system:

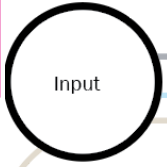
- **Public**
- **Partnership**
- **Private**



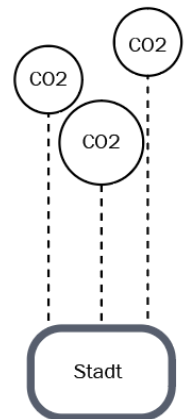
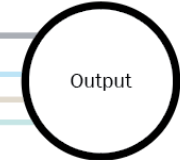
**Goal: Competitive advantage through**

- Competitive production costs
- High quality
- Minimal resource consumption & efficiency

**Advantage:** Direct supply chain and possible control over supply chain/inputs



Unlocking research, innovation and production potentials

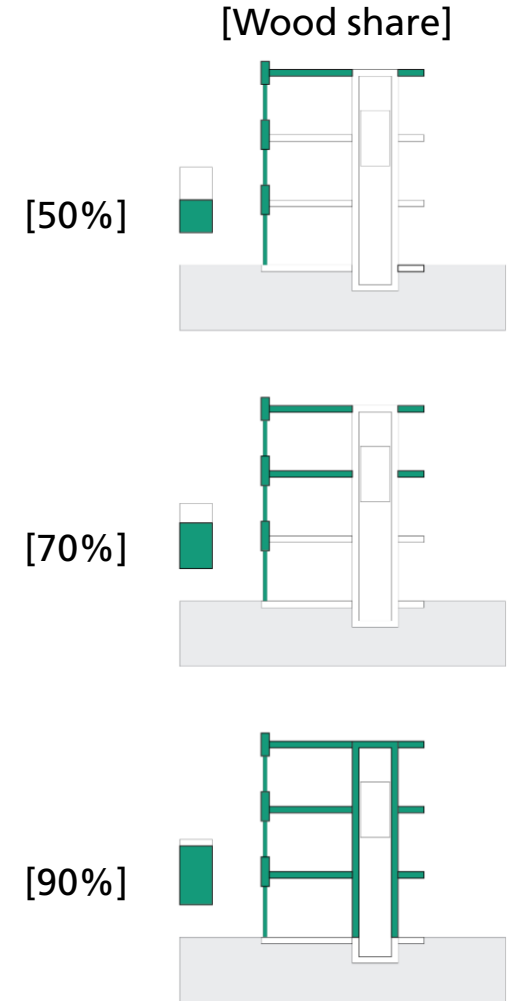
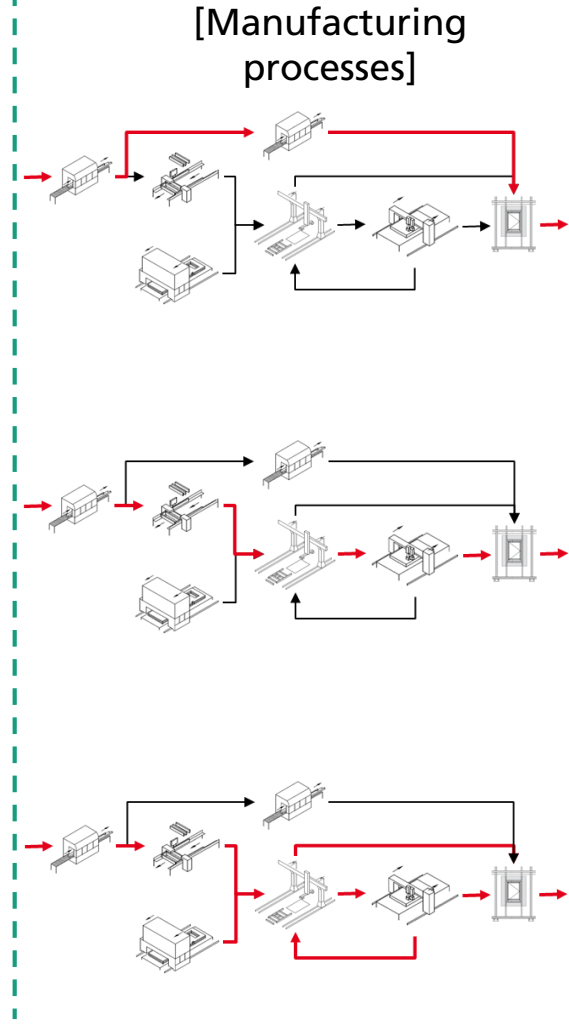


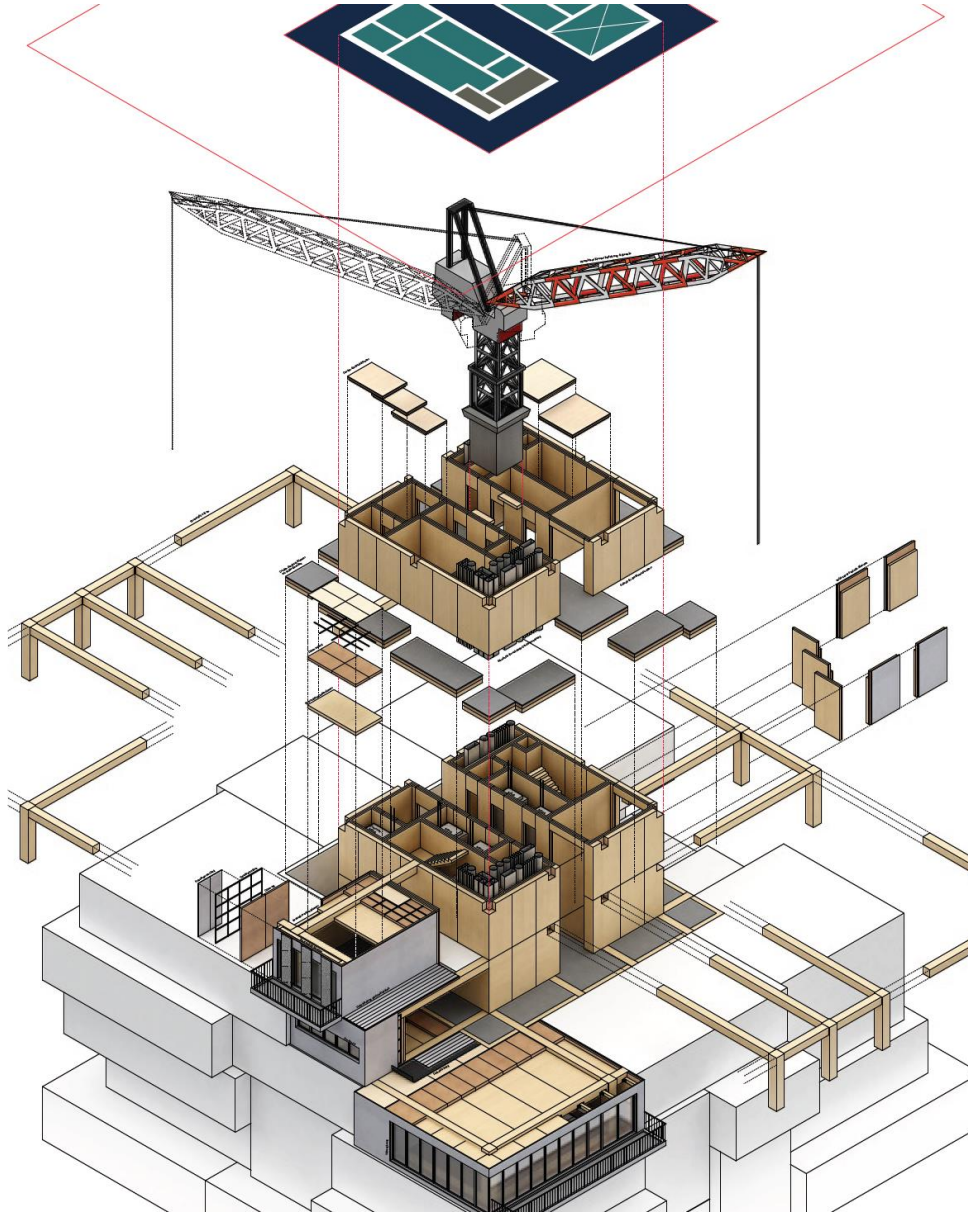
# "THE GREATER THE VARIETY OF DESIGN PRINCIPLES, THE GREATER THE MODEL CHARACTER"



**"THE HIGHER THE WOOD CONTENT, THE GREATER THE MODEL CHARACTER"**

- [Design principles]
- ① [Skeleton construction]
  - ② [Panel construction]
  - ③ [Solid wood construction]
  - ④ [Hybrid construction]
  - ⑤ [Experimental Construction Hybrid]
  - ⑥ [Experimentalbau-Innovativ]





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