Mapping the structure and business processes in the wood product industry
– a framework and a case study of a saw mill supply chain

Magnus Larsson, Anders Roos, Matti Stendahl
Magnus Larsson

MSc Forestry, Licentiat

SCA Forest Products 1989-2013

PhD-studies SCM 2014-2016
Research area
- wood product supply chain

Forest  Saw mill  Retailer/Market
Results from presstudy:
(Larsson et al. 2015 unpubl)

Need of:

• enhanced cooperation and coordination

• common SC goals and measurements

Uncertainty in both supply and demand
A model for development of a supply chain

1. Map the supply chain
2. Identify KPAs
3. Define desired performance
4. Develop objectives and metrics
5. Test and evaluate
Aim of the mapping study
(a part of the PhD project)

- To define and adapt a framework for supply chain mapping in the wood product industry with the purpose of finding KPAs
- To evaluate the framework in a case study of a real life example
Research questions

• What components should a wood SC mapping model consist of, to find KPAs?

• How can these components be applied?
Theory

SC mapping and Value stream mapping

Customer value

Performance indicators / metrics

Uncertainty / disturbances
1. Map the supply chain

- Actors and relationships
  - interactions and offerings
- Customer value
- Goals and PIs
- Value stream (lead times)
- Disturbances

→ Potentials for adding value
• Actors and relationships
  - interactions and offerings
• Customer value
• Goals and PIs
• Value stream (lead times)
• Disturbances
→ Potentials for adding value
Case study: saw mill SC

Forest | Saw mill | Market/sales

Raw material supply | | Customers / Products:

- Value added domestic
- Value added foreign
- Standard products
Method

A mix of quantitative and qualitative methods:

Mapping of: actors and links, inventories, lead-times

Semistructured interviews
Actors

Forest company

Saw mill company

Forest region

Saw mill

Procurement department

Saw mill

Saw mill

Mills sales department

Supply company (3)

Wood prod industries

Wholesalers

Retailers

Builders merchants

Retailers

Builders merchants

Customers tier 1

Customers tier 2
Relationships

- Interactions
  - operative links, information exchange, legal bonds, cooperative norms, adaptations

- Offerings
  - products and services, logistics, consultation
Customer value, definition

Customer value =

(Quality * Delivery performance * Flex) / Price
## Customer value, example

<table>
<thead>
<tr>
<th>Scale; 1 - 5</th>
<th>Quality</th>
<th>Delivery performance</th>
<th>Flexibility</th>
<th>Price</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>-</td>
</tr>
</tbody>
</table>

scale 1-5 (1 = not at all; 5 = very much)
Goals and performance indicators

Strategic and operative level
Financial and non-financial

<table>
<thead>
<tr>
<th>Goals:</th>
<th>Forest region</th>
<th>Procurement dep</th>
<th>Saw mill</th>
<th>Supply company</th>
<th>Retailer</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PIs / metrics</th>
<th>Forest region</th>
<th>Procurement dep</th>
<th>Saw mill</th>
<th>Supply company</th>
<th>Retailer</th>
<th>Customer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Value stream mapping

- Number of days in inventory
- Plaining
- Transporting
- Manufacturing
- Transporting
- Harvesting
- Number of days in manufacturing or transporting

+ Value (or cost) added in each step

Difference in standard and value added products
Disturbances

Forest

Saw mill

Retailer/Market

Supply: Frequent

Manufacturing: Small

Demand: Moderate - frequent

→ Constant re-planning and re-scheduling
Lead times

- Example: builders merchant company with > 600 warehouses in UK

<table>
<thead>
<tr>
<th>Stage</th>
<th>Lead Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forestry</td>
<td>4 w</td>
</tr>
<tr>
<td>Saw mill</td>
<td>1,5 w</td>
</tr>
<tr>
<td>UK plaining mill</td>
<td>4 w</td>
</tr>
<tr>
<td>DC at UK customer</td>
<td>1,5 w</td>
</tr>
<tr>
<td></td>
<td>7 w</td>
</tr>
<tr>
<td></td>
<td>5 w</td>
</tr>
<tr>
<td></td>
<td>2 w = 25 weeks</td>
</tr>
</tbody>
</table>
Putting it all together

Cost efficiency
Volume before quality
Metrics: "$ per m³"
Low inventory levels
Constant re-planning

Delivery performance
Consistent quality
Metrics: OTIF
Buffer of finished goods
Profit loss
Conclusions

• Lack of strategic fit: competitive vs SC strategy
  \(\rightarrow\) responsivity vs cost efficiency

• SC design \(\rightarrow\) high risk, sub optimization

• Goals and PIs focused on cost efficiency in each unit in stead of the total cost \(\rightarrow\) sub optimization
Key performance areas, examples:

1. Information about quality → min. uncert
2. Inventory levels
3. Common SC goals and perf. indicators
4. Cross-functional communication and routines
Thank You!