PARAMETRIC VALUE STREAM MAPPING FRAMEWORK:

A CASE STUDY OF A SMALL SWEDISH INDUSTRIALIZED HOUSE-BUILDING SUPPLIER

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Introduction

- Industrialisation are dependent on supplier networks
- The need for product development capabilities
- Many small (SME) suppliers and sub-contractors
- High risk associated with product development
Contextual setting

Prefabricated house-building

Industrialized house-building

Systems Building

INDUSTRIALIZED BUILDING
Research question

Can product development done by small and medium-sized suppliers of industrialized house-building be supported by parametric Value Stream Mapping?
Parametric VSM Framework

Product selection → Map Customer Values → Map Current state → Identify current gaps → Design Future state → Implement VSM plan

Parameters $P_1, P_2, P_n$ → Analyze product attributes → Prod. Dev. Suggestions
Method

■ Case study

■ Two products at two construction sites:
  1. Roofing with tongue board (Product A)
  2. Roofing with tongue board with an integrated membrane (Prod. B)

■ Video recorded participant observations:
  ▪ Assembly on construction site (Product A and Product B)
  ▪ Total of 24 hrs.

■ 6 recorded and transcribed Interviews with
  ▪ 3 purchasing roles
  ▪ 3 on-site construction workers
Product B

Glue

Tongue Board

Overlapping Membrane
Product B
Analysis

1. Video recorded material in-reverse
2. Value stream mapping based on parameters $P_1$, $P_2$ and $P_3$
3. Spreadsheet to categorized waste ($P_2$)
4. Recording and analysis verified by construction workers
5. Transcribed interviews marked with $P_1$, $P_2$ and $P_3$
6. Analyze results from VSM, interviews and spreadsheet
## Findings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Respondent</th>
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<tbody>
<tr>
<td><strong>P1</strong></td>
<td>Truss interval</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>Stabilization</td>
<td>A, B</td>
</tr>
<tr>
<td></td>
<td>Project adjusted from factory</td>
<td>A, B, C, F</td>
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<tr>
<td>Project based packaging</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>Reduction of Assembly time</td>
<td>A, B, C, D, E, F</td>
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<tr>
<td><strong>P2</strong></td>
<td>Good fit</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Better quality on visible parts</td>
<td>A, B</td>
</tr>
<tr>
<td></td>
<td>Visual numbering</td>
<td>B</td>
</tr>
<tr>
<td><strong>P3</strong></td>
<td>Walk on board</td>
<td>A, B</td>
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<td></td>
<td>Crane lifting</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>Reduce time on roof</td>
<td>A, B</td>
</tr>
<tr>
<td></td>
<td>Reduced weight</td>
<td>A</td>
</tr>
</tbody>
</table>
Findings
Conclusions

- VSM can support product development process
  - Analyzing the relationships between Process and product attributes
    - Based on $P_1$, $P_2$, ..., $P_n$
- Support managerial decision making and understanding
Future research direction

- **Framework development:**
  - Define interfaces/interrelationships between steps
  - Enhance the model with simulation of parameters

- **Method development of the video-recording**