Business Oriented Product Structures
Presented at the Workshop Design-Konstruktion on Product Structuring
TU Delft, The Netherlands, June 22-23, 1995

The presentation discusses the use of different types of product structures identified in literature and industry. The focus is the order handling process aspects on product structuring, including product development, parts production, purchasing, logistics and assembly.

Leif Janson
June 1995

Swedish Institute of Production Engineering Research, IVF
Teknikringen 1
S-583 30 Linköping
SWEDEN
Introduction

1. Could it be favourable to look upon the order handling process as two separate processes, one on-line process where no development is done and one off-line process which includes product development?
Demands on a product structure

2. What are the different types of demands of parts production, purchasing, logistics and assembly in the off-line process, and how to satisfy them?

3. What are the significant in the demands of the different departments?
Vision

One way to make both the off-line and the on-line processes more efficient is to build many product variants by creating a box of building blocks (including a minimum of articles), and describe the relations between them in a more comprehensive way than what is normal.
Business oriented structures

4. Is it useful to have more than one structure (with different objects) in a company, and if so, why?

5. Does this conflict with established design theory?

6. What is best practice in industry?
Combination of design characteristics

Selection of conditional characteristics

Selection of additional characteristics

Article number
Article number
No article number
Article number
Article number
Article number
### Physical Constructional Structure

<table>
<thead>
<tr>
<th>Production Volume</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Variants</td>
<td>A few</td>
<td>Many</td>
</tr>
<tr>
<td>Integration</td>
<td>Integration Enclosed Material combination</td>
<td></td>
</tr>
<tr>
<td>Base object</td>
<td>Enclosed Material combination</td>
<td></td>
</tr>
<tr>
<td>Building blocks</td>
<td>Qualitative structuring (big blocks)</td>
<td></td>
</tr>
<tr>
<td>Base object</td>
<td>Qualitative structuring (big blocks)</td>
<td></td>
</tr>
<tr>
<td>Building blocks</td>
<td>Qualitative structuring (small blocks)</td>
<td></td>
</tr>
</tbody>
</table>

### Logical Constructional Structure

<table>
<thead>
<tr>
<th>Number of Variants</th>
<th>A few</th>
<th>Many</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variant Characteristics</td>
<td>Similar</td>
<td>Design characteristic</td>
</tr>
<tr>
<td>Straight</td>
<td>Straight open (openings on a high level)</td>
<td></td>
</tr>
<tr>
<td>Completely open</td>
<td>Straight Design open characteristic (openings on a low level)</td>
<td></td>
</tr>
<tr>
<td>Different</td>
<td>Straight</td>
<td>Completely open (openings on a low level)</td>
</tr>
</tbody>
</table>
Use the knowledge

7 Are there any design principles that can be useful?

8 Can the conditions under which the principles and structures ought to be used, be described?

9 How should the principles be presented to be useful in product development? - Can it be described in a methodology?

10 What supporting tools does such a procedure need in forms of guidance, examples, tables, diagrams, check lists, forms, and so on?

Isn't modularization the way to solve this problem?
Logical component structure check list

<table>
<thead>
<tr>
<th>Priority</th>
<th>Not important</th>
<th>Very important</th>
</tr>
</thead>
</table>

**Market**
- Good product assortment overview
- Possibility to read the structure
- Possibility to read price
- Possibility to predetermine characteristics combinations
  - Against applications
  - Against markets
- Sales material handling (brochures, etc)
- Computer aided sales material handling (PC)
- Possibility to create dedicated instruction manuals

**Sales**
- Final conditional characteristics selection authority
- Complete information concerning selected product (price, etc)
- Connections to other information systems (order register, sales statistics, etc)

**Product development**
**Design**
- Use of the system in development of new products
- Use of the system for one of the kind design
- Use of the system for application specific equipment
- Connections of drawings
- Connections to geometry (CADCAM system, drawings)
- Cost estimation abilities

**Technical administration**
- History
- Handling of revisions and status
  - Replaced by
  - Replaces
  - Excluded
- Assembly information
  - Included in
  - Consists of
  - Authorisation to read and write

**Production**
...

**After sales**
...
PROBLEM ANALYSIS
- Company analysis
- Existing structure analysis
- Crucial factor analysis

PROBLEM DEFINITION
- Goal setting
- Variance definition
- Variation definition

SYSTEM SYNTHESIS
- Implementation of a new structure based on structure relations and solution principles

SYSTEM ANALYSIS
- Solution analysis
- Variance evaluation
- Variation improvement evaluation

EVALUATION AND DECISION
- Elaboration
- Realization decision

STEP I
- Product A
- Product B
- Product C

STEP II
- Product common
- Variant specific
References


