Abstract
The customer context and the external characteristics of a system are described in the Customer Objectives, Application and Functional views. This chapter describes submethods to support these views: key drivers, positioning the business of the customer, modelling, use cases and system specification.
Example of the four Key Drivers in a Motorway Management System

<table>
<thead>
<tr>
<th>Key-drivers</th>
<th>Derived application drivers</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Reduce accident rates → Enforce law → Improve emergency response</td>
<td>Automatic upstream accident detection</td>
</tr>
<tr>
<td>Effective Flow</td>
<td>Reduce delay due to accident → Improve average speed → Improve total network throughput → Optimize road surface → Speed up target groups → Anticipate on future traffic condition</td>
<td>Weather condition dependent control</td>
</tr>
<tr>
<td>Smooth Operation</td>
<td>Ensure traceability → Ensure proper alarm handling → Ensure system health and fault indication</td>
<td>Traffic speed and density measurement</td>
</tr>
<tr>
<td>Environment</td>
<td>Reduce emissions</td>
<td>Cameras</td>
</tr>
</tbody>
</table>

Note: the graph is only partially elaborated for application drivers and requirements
### Submethod to Link Key Drivers to Requirements

- **Define the scope specific.** in terms of stakeholder or market segments
- **Acquire and analyze facts** extract facts from the product specification and ask why questions about the specification of existing products, where requirements may have multiple drivers
- **Build a graph of relations between drivers and requirements** by means of brainstorming and discussions
- **Obtain feedback** discuss with customers, observe their reactions
- **Iterate many times** increased understanding often triggers the move of issues from driver to requirement or vice versa and rephrasing
### Key Driver Recommendations

- **Limit the number of key-drivers**
  - minimal 3, maximal 6

- **Don’t leave out the obvious key-drivers**
  - for instance the well-known **main function** of the product

- **Use short names, recognized by the customer.**

- **Use market-/customer- specific names, no generic names**
  - for instance replace “ease of use” by “minimal number of actions for experienced users”, or “efficiency” by “integral cost per patient”

- **Do not worry about the exact boundary between Customer Objective and Application**
  - create clear **goal means** relations
Map of Complementors

Complementers (can also be competitors)

Competitors

From: COPA tutorial; WICSA 2001
Context of Motorway Management System

- Maintenance contractors
- Fleet management
- Urban traffic control
- Advanced vehicle control
- Environmental monitoring
- Bus lanes
- Lorry lanes
- Restaurants
- Gas stations
- Airports
- Railways
- Car repair
- Towing service
- Toll
- Tunnel

Submethods in the CAF Views

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AVcontextMotorwayManagement
Commercial Graph

- **basic product**
- **excluding options**
- **optional option**
- **option dependency**
Logistics Decompositions

- **Commercial Decomposition**
  - Saleable features

- **Service Decomposition**
  - Replaceable items (such as consumables)

- **Goods Flow Decomposition**
  - Stockable items
  - Purchasable items
## Use Case

<table>
<thead>
<tr>
<th>typical use case(s)</th>
<th>worst case, exceptional, or change use case(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>interaction flow (functional aspects)</td>
<td>functional</td>
</tr>
<tr>
<td>select movie via directory</td>
<td>multiple inputs at the same time</td>
</tr>
<tr>
<td>start movie</td>
<td>extreme long movie</td>
</tr>
<tr>
<td>be able to pause or stop</td>
<td>directory behaviour in case of</td>
</tr>
<tr>
<td>be able to skip forward or backward</td>
<td>extreme many short movies</td>
</tr>
<tr>
<td>set recording quality</td>
<td></td>
</tr>
<tr>
<td>performance and other qualities</td>
<td>non-functional</td>
</tr>
<tr>
<td>(non-functional aspects)</td>
<td></td>
</tr>
<tr>
<td>response times for start / stop</td>
<td>response time with multiple inputs</td>
</tr>
<tr>
<td>response times for directory browsing</td>
<td>image quality with multiple inputs</td>
</tr>
<tr>
<td>end-of-movie behaviour</td>
<td>insufficient free space</td>
</tr>
<tr>
<td>relation recording quality and storage</td>
<td>response time with many directory entries</td>
</tr>
<tr>
<td></td>
<td>replay quality while HQ recording</td>
</tr>
</tbody>
</table>
## Function Feature Matrix

### Technical Functions

<table>
<thead>
<tr>
<th>Products</th>
<th>Home Cinema System</th>
<th>Flat Screen Cinema TV</th>
<th>Bedroom TV</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD display</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>SD-&gt;HD up conversion</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>HD-&gt;SD down conversion</td>
<td>+</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>HD storage</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SD storage</td>
<td>0</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>HD IQ improvement</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>SD IQ improvement</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>HD digital input</td>
<td>+</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>SD digital input</td>
<td>+</td>
<td>+</td>
<td>0</td>
</tr>
<tr>
<td>SD analog input</td>
<td>0</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>6 HQ channel audio</td>
<td>+</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>2 channel audio</td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

**Legend:**

- **+**: Present
- **0**: Optional
- **-**: Absent
Dynamic Models

flow models

state diagrams

time line

scheduling

Submethods in the CAF Views

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TCAFdynamicModels
Throughput Model

lithography job
required dose
field size
field map
alignment procedure

waferstepper throughput model

wafer throughput
External Information Model

- Patient
  - Attributes
  - Examination
    - Attributes
    - Scan
      - Attributes
      - 3D Volume
      - 2D Images
    - Scan Procedures
      - Attributes
  - Exam Procedures
    - Attributes
    - Work-list
      - Attributes
Forces of Standards

- well defined standards and legislation
  - HL7
  - DICOM
  - HIPAA
  - EMC
  - FDA
  - VDE
  - ISO 9001

but many thousands of pages

- realization consequences

- conceptual assumptions

- business objectives

- application intention?
### Overview of CAF Submethods

<table>
<thead>
<tr>
<th>C</th>
<th>Application</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer objectives</td>
<td></td>
<td>Functional</td>
</tr>
<tr>
<td>key drivers</td>
<td>context diagram</td>
<td>case descriptions</td>
</tr>
<tr>
<td>value chain</td>
<td>stakeholders and concerns</td>
<td>commercial decomposition</td>
</tr>
<tr>
<td>business models</td>
<td>entity relationship models</td>
<td>service decomposition</td>
</tr>
<tr>
<td>suppliers</td>
<td>dynamic models</td>
<td>goods flow decomposition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>function and feature specifications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>performance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>external interfaces</td>
</tr>
<tr>
<td></td>
<td></td>
<td>standards</td>
</tr>
</tbody>
</table>

Submethods in the CAF Views

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TCAFoverview