NORM - Needs Oriented framework for producing Requirements decision Material

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How much requirements analysis and specification is enough for smart pre-project decisions?

• **Market-driven product development**
  – Development organization has financial responsibility
  – Large amount of initial requirements
  – Only a fraction of initial requirements make it in an actual release

• **Questions**
  – How much effort can we allow us to invest in pre-project decisions?
  – Which information should be available prior to each decision?
  – How detailed information should be available?
  – How little information can we get away with?
How much requirements analysis and specification is enough for smart pre-project decisions?

- **NORM provides:**
  - A framework for specifying appropriate decision material (ADM) for pre-project decisions
  - A possibility to define reasonable effort for requirements analysis in pre-project stages

- **How?**
  - (1) Defines what is minimum necessary information in order to take a decision
  - (2) Identifies what is minimum effort of producing this info
  - (3) Localizes where the needs cannot be satisfied by current process
How NORM was created?

• **NORM research and definition steps:**
  - Based on a method of technology transfer between academia and industry developed in research group of BESQ, BTH.
  - The method is well tested and used in number of research projects at BESQ which involve industry partners.

How NORM works? – a general overview

• NORM goals
  – (1) Define what is minimum necessary information in order to take a decision: **Steps 1-4**
  – (2) Identify what is minimum effort of producing this info: **Step 4**
  – (3) Localizes where the needs can not be satisfied by current process and find solution: **Step 4**

• NORM principles
  – One size does not fit all: a customized solution based on the needs of specific company
  – Involvement and active usage of the expert knowledge of practitioners
NORM steps explained: Steps 2-3

**Step 2: Specify Decision Point Characteristics**

<table>
<thead>
<tr>
<th>2.1 Decision Purpose</th>
<th>2.2 Decision Criteria</th>
<th>2.3 Constraints</th>
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</table>
| Decide which of the candidate requirements are interesting enough to consider for further analysis | - Alignment with product strategy  
- Expected benefit of a requirement (value vs. cost) | - Max-Effort: 10% of available yearly budget for pre-project activities  
- **Requirements Volume:** 150-200 Requirements in 6 months  
- **Req. Specification state:** Mostly feature level |

**Sources:** Decision-Makers and Decision Material Providers

**Focus on:**
- Decision Purpose
- Decision Criteria
- Constraints

**Step 3: Define ADM Components**

<table>
<thead>
<tr>
<th>Component type 1: Requirement Description</th>
<th>Component type 2: Requirements associated items</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Example:</strong> The system should provide real-time performance monitoring functionality</td>
<td><strong>Example:</strong> Value analysis result; Cost evaluation result; Analysis of requirements alignment with product strategy</td>
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**ADM component examples:**
- Requirements description
- Value analysis
- Implementation cost
NORM steps explained: Step 4

**Purpose:** Decide level of detail, accuracy and development effort of ADM component

**Focus:** On usage of pre-defined alternatives for information detail and accuracy

<table>
<thead>
<tr>
<th>Cost estimation alternative</th>
<th>Associated technical analysis</th>
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<tbody>
<tr>
<td><strong>Alt1:</strong> Classification between High, Average and Low cost.</td>
<td>High level feasibility analysis</td>
</tr>
<tr>
<td><strong>Alt2:</strong> Intervals defined in person-hours. Example: &lt;1000 hours, &gt;1000 and &lt; 3000 hours &gt;3000 person-hours</td>
<td>Identification of affected system parts and more detailed picture of associated complexity.</td>
</tr>
<tr>
<td><strong>Alt3:</strong> A point estimate (for example 500 person-hours) with 80% accuracy.</td>
<td>List of possible solutions are defined allowing to choose the most suitable solution.</td>
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</tbody>
</table>

### Action 1:
Decide appropriate level of detail & Accuracy of each ADM component

### Action 2:
Estimate ADM component development effort for a requirement

### Action 3:
Decide if selected level of detail & accuracy is feasible

**Needed Effort**

\[
\text{ADM development effort} \times \text{Requirements Volume}
\]

**Maximum allowed effort**

(Max-Effort)

If not feasible

**Consider:**
1) Limiting Requirements Volume
2) Lowering demands on appropriate level of detail
3) Finding a cheaper way to obtain the same information
4) Increasing Maximum allowed effort that can be spent on pre-project activities
5) Decreasing number of decision points
Initiation and usage of NORM

- **How and when?**
  - How many and what kind of resources should be involved to initiate and run NORM?
  - How often NORM steps should be executed?
  - What are long-term benefits of NORM?

- **Long-term benefits**
  - Continues improvement
  - Identification of bottlenecks
  - Allows adjustment and alignment between applied process and the needs of decision makers
Discussion and future work

• Current status
  – Initial feedback from the industry is positive, however further tests are needed

• Open questions
  – Is it feasible to provide a generic estimate of the ADM component development effort?
  – How to make this process more dynamic: specifying ADM for a specific requirements rather than general for requirements within a product?

• Ongoing & Future work
  – Static and dynamic validation of the model in industry