Towards Tool-support for Sustainability Profiling

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Sustainability in Software Engineering

**Individual**
Individual needs should be protected and supported with dignity in a way to improve the quality of human life.

**Social**
Relationships should be equitable, diverse, connected and democratic.

**Technical**
Technology should be able to cope with the changes and evolution efficiently and with respect for natural resources.

**Economic**
A positive economic value and capital growth should be ensured and maintained.

**Environmental**
Natural resources have to be protected from human needs and wastes.
SuSoftPro: Process Model
SuSoftPro: Sustainability Profile

- Sustainability rating
- Sustainability aspects
- Sustainability requirements

For further details and tool demo, please come to Poster Booth on Wed & Tue
Case Study: SCIS

• Skin Cancer Information System (SCIS)
1. Defining stakeholder groups
   - 2 physicians,
   - 2 nurses,
   - 4 receptionists,
   - 3 administrators and Managers, and
   - 3 developers and IT Support.

2. Defining questions
   “Rate the influence of the requirement on the X sustainability”,

3. Defining requirements
   - 23 high-level requirements specification
4. Assigning Stakeholders

<table>
<thead>
<tr>
<th>Group</th>
<th>Individual</th>
<th>Social</th>
<th>Technical</th>
<th>Economic</th>
<th>Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Receptionist</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Administrator &amp; Manager</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Developer &amp; IT Support</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Sustainability Profiling for SCIS (3)

5. Rating Requirements
   - 30 questions for nurses (2 dimensions)
   - 45 questions for physicians (3 dimensions)
   - 24 questions for receptionists (3 dimensions)
   - 52 questions for managers (3 dimensions)
   - 92 questions for IT people (4 dimensions)

6. Analysing sustainability
   - Analysing only submitted and answered questions
7. Generating sustainability profiling

Overall Sustainability
3 Stars ★★★☆☆☆
Comparison: Procedure

• 3 criteria for selecting frameworks:
  – **Scope**: Developed for requirements engineering context
  – **Process**: Involved MCDA and stakeholders
  – **Objective**: Analysed sustainability.

• 9 sub-criteria:
  – Framework focus
  – Tool support
  – Collection method
  – Weight scale
  – Number of criteria for analysis
  – Analysis method
  – Computations
  – Participants
  – Rank update
Comparison: Analysis & Result

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Framework focus</td>
<td>Requirement analysis: resolve conflict</td>
<td>Requirement analysis: prioritisation</td>
<td>Requirement analysis: sustainability</td>
</tr>
<tr>
<td>Collection method</td>
<td>Various methods “natural numbers”</td>
<td>Online questionnaire “natural numbers”</td>
<td>Online questionnaire “rational numbers”</td>
</tr>
<tr>
<td>Weight scale</td>
<td>(several scales are used)</td>
<td>(scale from 1 to 5)</td>
<td>(fuzzy rating scale)</td>
</tr>
<tr>
<td>Analysis method</td>
<td>TOPSIS</td>
<td>WADM</td>
<td>TOPSIS</td>
</tr>
<tr>
<td>Participants</td>
<td>Some stakeholders</td>
<td>All stakeholders</td>
<td>All stakeholders</td>
</tr>
<tr>
<td>Rank update</td>
<td>Not defined</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tool support</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Manual computations involved</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Number of criteria for analysis</td>
<td>Two criteria</td>
<td>Multi-criteria</td>
<td>1st round: Five criteria, and 2nd round: Multi-criteria</td>
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</tbody>
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