R&D Projects: From Proposal to Implementation

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How long from idea to product?

- 1991
- 2006
- 90 200
What is a project?

- Time-limited
- One-time effort
- Concrete goals
- Separate organisation
Björn Gambäck? Who?!

- MSc (civ. ing.) Computer Science & Engineering, KTH, Stockholm
- Linguistics, Computational Linguistics Stockholm U
- PhD (tekn. dr.) Computer & System Sciences, KTH, Stockholm

- SICS, Swedish Institute of Computer Science AB, Stockholm, 1989- (currently: Senior Advisor for European collaborations)
- NTNU, Trondheim, 2008- (Prof. Language Technology)

- proud father
- decent chess player
- lousy football referee...

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Project idea

- From you
- From funders
- Goal(s)
Prestudy

- Feasibility
- State-of-the-art
- 2-5 page report (book?!)
- Attract funding
- Attract partners
Forming a team

- Groups / individuals
- Partner skills
  - Complementary vs competing
- Know each other - or don't
- “Dating” services
Identifying funding sources

- **Internal**
  - company
  - own

- **External**
  - Calls for proposals
  - Approaching directly
  - Funding agencies, venture cap, ...
  - National / international
Project proposal

- Why?
- Who?
- How?
Proposal contents

- Executive summary
- Technical content
- Management and organisation
- Results and impact
Technical content 1: Goals

- Functionality
  - Quality
  - Evaluation criteria
- Time
- Costs
Technical content 2: State-of-the-art

- Competition
- Why are you better?
- Previous contributions
Technical content 3: Methodology

- Milestones
- Deliverables
- Workpackages and tasks
- Timing of components (Gantt)
- Component interrelations (PERT)
Milestones

- What
- Not how
Workpackages

- Which activities?
- In what order?
- By whom? (PMs?)
- Time frame (when? how long?)
- Contingency
  - Effects if delayed
  - Depends on?

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Component timings

### Gantt chart

(Henry Gantt 1861-1919)

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Development of Methodology</td>
<td>1,1 Workshop on user needs</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td></td>
<td>1,2 Draft of methodology</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>1,3 Evaluation of methodology</td>
<td>9 10 11 12 13 14 15 16 17 18</td>
</tr>
<tr>
<td>2 Specification of Integrated System</td>
<td>2,1 Inventory of resources in selected regions</td>
<td>1 2 3 4 5 6 7 8 9 10</td>
</tr>
<tr>
<td></td>
<td>2,2 Review of existing facilities</td>
<td>11 12 13 14 15 16 17 18</td>
</tr>
<tr>
<td></td>
<td>2,3 Specify technical developments required</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18</td>
</tr>
<tr>
<td></td>
<td>2,4 Impact analysis of different scenarios</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18</td>
</tr>
<tr>
<td></td>
<td>2,5 Prepare detailed business plans</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18</td>
</tr>
<tr>
<td>3 Feasibility Studies for each region</td>
<td>Review existing practices</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12</td>
</tr>
<tr>
<td></td>
<td>Review technologies (state of the art)</td>
<td>13 14 15 16 17 18</td>
</tr>
<tr>
<td></td>
<td>Sensitivity analysis of scenarios</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18</td>
</tr>
<tr>
<td></td>
<td>Report on most suitable options</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18</td>
</tr>
<tr>
<td>4 Project Management and Coordination</td>
<td>Dissemination of information: Workshops</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18</td>
</tr>
</tbody>
</table>

**Milestones and Deliverables**
- Guideline for methodology
- Interim Reports
- Business Plans for four regions
- Public Workshop on results
- Final Report

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Component dependencies

- PERT chart
  - Project Evaluation and Review Technique

![PERT Chart]

- WP1: Project Management
- WP2: System Architecture and integration
- WP3: Content analysis and provision
- WP4: Semantic search and multilinguality
- WP5: Simulation and early warning
- WP6: Visualisation
- WP7: Evaluation and user studies
- WP8: Training
- WP9: Dissemination and exploitation

Management and dissemination

Specifications → Development → Testing
Management content 1: Leadership

- Project leader
- Project management board
- Principal investigators
- Workpackage leaders
Management content 2: Budget

- Personel hours / months
  - Holidays, sickness, ...
- Equipment
- Travel expenses
- Subcontracting
- Management vs R&D costs
Result, impact

- For the group
- For society
- For funders
- Evaluation
Contract negotiations 1: External (funders)

- Reporting
- Reviews
- Evaluation
Contract negotiations 2a: Internal (consortium agreement)

- Management structure
  - Responsibilities
- IPR (intellectual property rights)
  - Background
  - Access rights
  - Publications
Contract negotiations 2b: Internal (consortium agreement)

- **Reporting**
  - Frequency / deadlines
  - Templates
  - Internal reviewing

- **Meeting schedule**
  - Type
  - Frequency
  - Participants / sites
## Contingency planning

<table>
<thead>
<tr>
<th>Risk</th>
<th>Contingency</th>
<th>Probability</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience rests with single staff members who can leave project</td>
<td>Critical parts of the project have more than one person involved</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Software components fail or have limited functionality</td>
<td>The main components are software tools that have already demonstrated their utility and efficiency</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Time for development is underestimated</td>
<td>Usability studies can be re-timed and re-scoped to mitigate against delayed software delivery</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

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Staffing the project

- Takes longer than you think…
- (contingency planning! :-) )

- Worked together before?
- Persons / groups

- Leadership

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Running a project

- Collaboration
- Administration
- Planning
- Economy
Collaboration

- The non-contributing partner
- Under-achievers
- Withdrawals
- Conflicts, conflicts and conflicts
Administrative routines

- Software / result documentation
- Time reporting
- Progress
  - Frequency
  - Time spent
  - Quality
- Deviations

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Planning

- Re-planning
- Reactive planning
- Deviations
Economy

- Financial reporting
- Payment routines
- Financial audits
- (follow-up)
Finishing it off

- Final reporting
- Using the results
- Dissemination
  - Publications
  - Demonstrations
- Prototypes
  - (Pre-market prototypes?)
  - (Products?)
Problems

- Unclear goals
- Unclear level of ambition
- Bad coordination
  - Project internal
  - Project vs organisation
- Too tight / optimistic time schedule
  - (or too loose!)
The Project Leader

- Always responsible for bad results
  - (even those outside control...)
- Ability to lead / motivate / delegate!
  - Staffing
- Boringly strict
- Status
  - Support from leadership
  - Allocated enough time
- Planning / risk assessment
Evaluation

- Technical
  - Modules / overall
- User studies
- External
  - Progress / results
  - Financial
User Studies

- Wizard of Oz
- Focus groups
- Subjects
External evaluation, progress

- Main scientific/technological achievements
- Quality of the results
- Objectives and milestones
- Adherence to the workplan
  - deviations (whether justified)
  - remedies (whether acceptable)
- Management
- Collaboration
- Impact
- Dissemination
External evaluation, financial

- Audits
- Resources consumed
  - Personnel
  - Equipment
  - Travel
- Economy, efficiency and effectiveness ("good housekeeping"):  
  - minimising the costs of resources used
  - relationship between output and resources
  - relationship between costs and outcomes
Spoken Language Translation

- Bilingual Conversation Interpreter

- Spoken Language Translator

- Verbmobil
  - Speech-to-speech, Germany, 1991-2000
SLT: Spoken Language Translator

English speech

Speech recognition
SRI US (DECIPHER)

Speech hypotheses

Analysis
SRI UK (CLE)

English QLF(s)

Transfer
SICS

Swedish QLF(s)

Swedish speech

Speech synthesis
Telia (Prophon)

Swedish sentence(s)

Generation
SICS (S-CLE)
Verbmobil: Speech-to-speech translation

- Ca 900 researchers
- 166 million DM
- (ca 1 billion SEK)
- Speaker-independent spontaneous speech
- 43 modules
- German Ministry of Research and Technology (BMBF)
Agent Systems

- **DUMAS (2000-2004)**
  - 8 EU partners, 4 countries
  - adaptive multilingual mobile spoken dialogue

- **EVERGROW (2004-2006)**
  - 29 partners, most of Europe, Israel and Egypt
  - evolution of cooperative behaviour in networks of independent agents

- **COMPANIONS (2006-2010)**
  - 15 partners in Europe and the US
  - embodied conversational agents
PRESEMT: Pattern REcognition-based Statistically Enhanced MT

- EU project (6 partners in 5 countries)
- Applying Machine Learning to Machine Translation
  - Genetic Algorithms
  - Self-Organising Maps
  - Ant Path Optimisation
  - Particle Swarm Optimisation
- Word Translation Disambiguation
- Large monolingual corpora
- Small bilingual corpora
Cultural differences; or: don't you stir your professor's coffee?

We don't do that kind of thing in our culture

We are not amused

Yes, we know what to do. But we wait for you to tell us

Are you stupid? I don't take orders from you!