Tutorial Roadmapping for Strategy Support

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Abstract

Formulating and deploying a strategy requires a combination of vision and analysis. Roadmapping is a tool to explore and articulate future needs and trends for different dimensions, such as the market and customer context, the product portfolio, the technology, competences and supply chain, and processes. Roadmapping helps by relating these different dimensions in time, with a horizon of many years. We will discuss how to create and maintain roadmaps and give practical tips on the format.
Opening Questions

Have you seen roadmaps in your organization?

What do you see in these roadmaps?
1. brainstorm roadmapping

2. Business Processes

3. Key Drivers

4. Roadmapping

5. Market Product Life Cycle

6. Strategy

summary
Tension between processes

- **Strategy**
- **Process**
- **Supplying business**
- **Value**
- **Customer oriented**
- **Feedback**
- **Product creation**
- **People, process and technology**
- **Short term; cashflow!**
- **Mid term; cashflow next year!**
- **Long term know how (soft) assets**
Platform strategy adds one layer

- **Supplying Business Value**
  - **Customer Oriented**
    - **Strategy**
    - **Product Creation**
    - **Component or Platform Creation**
    - **People, Process and Technology**

- **Cashflow**
  - **Short Term:** Know how (soft) assets
  - **Mid Term:** Next year
  - **Long Term:** Assets
Abstract

The notion of "business key drivers" is introduced and a method is described to link these key drivers to the product specification.
Example Motorway Management Analysis

Key-drivers

Safety
- Reduce accident rates
- Enforce law
- Improve emergency response

Effective Flow
- Reduce delay due to accident
- Improve average speed
- Improve total network throughput
- Optimize road surface
- Speed up target groups
- Anticipate on future traffic condition

Smooth Operation
- Ensure traceability
- Ensure proper alarm handling
- Ensure system health and fault indication

Environment
- Reduce emissions

Derived application drivers

Early hazard detection with warning and signaling
Maintain safe road condition

Requirements

- Automatic upstream accident detection
- Weather condition dependent control
- Traffic speed and density measurement
- Cameras
- Deicing
- Traffic condition dependent speed control

Note: the graph is only partially elaborated for application drivers and requirements
Method to create Key Driver Graph

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define the scope specific.</td>
<td>in terms of <strong>stakeholder</strong> or <strong>market segments</strong></td>
</tr>
<tr>
<td>Acquire and analyze facts</td>
<td>extract facts from the <strong>product specification</strong> and ask why questions about the specification of existing products.</td>
</tr>
<tr>
<td>Build a graph of relations between drivers and requirements</td>
<td>where requirements may have <strong>multiple drivers</strong></td>
</tr>
<tr>
<td>by means of brainstorming and discussions</td>
<td></td>
</tr>
<tr>
<td>Obtain feedback</td>
<td>discuss with <strong>customers</strong>, observe their reactions</td>
</tr>
<tr>
<td>Iterate many times</td>
<td>increased understanding often triggers the move of issues from <strong>driver</strong> to <strong>requirement</strong> or vice versa and rephrasing</td>
</tr>
</tbody>
</table>
Recommendation for the Definition of Key Drivers

- 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
Transformation of Key Drivers into Requirements

Key (Customer) Drivers

Customer What
- Customer objectives

Customer How
- Application

Derived Application Drivers
- Functional

Product What
- Functions
- Interfaces
- Performance figures

Goal
- means
- may be skipped or
- articulated by several
- intermediate steps
What are the key drivers of your customers?

Can you quantify these key drivers?
Abstract

This article describes what a roadmap is, how to create and maintain a roadmap, the involvement of the stakeholders, and criteria for the structure of a roadmap.
The Roadmap Integrates Five Views

- **Customer objectives**
- **Application**
- **Functional**
- **Conceptual**
- **Realization**

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**Market**

**Products**

**Technology**

**People**

**Process**

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**Marketing**

**Technology, process manager**

**People manager**

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**Roadmapping**

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October 26, 2018

RSProadmapStructure
<table>
<thead>
<tr>
<th>Type</th>
<th>Format</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top-level roadmap</td>
<td>Single page</td>
<td>Poster part of many presentations</td>
</tr>
<tr>
<td>Supporting roadmaps</td>
<td>Single page per view or per driver</td>
<td>Poster part of many presentations</td>
</tr>
<tr>
<td>Supporting reports</td>
<td>Document per relevant subject</td>
<td></td>
</tr>
</tbody>
</table>
Problems that Occur without Roadmapping

- Frequent changes in product policy
- Late start up of long lead activities, such as people recruitment and process change
- Diverging activities of teams
- Missed market opportunities
Management with a Limited Horizon

2012 2013 2014

now horizon feature

Feature still unknown

Do!

Stop

Do!
Management with a Broader Time Perspective

- **2012**
  - Work with 1.5 persons
  - Preparation by 0.5 person

- **2013**
  - Continue with 0.5 person
  - Work with 1.5 persons

- **2104**
  - Work with 1.5 persons

**Legend**
- Number of people allocated
- Time
Creation or Update of Roadmap in Burst Mode

Collective meeting ca 2 days

Techno-
logy

People

Process

Market

Products

Shared Roadmap

preparation by expert teams

2 weeks to digest and prepare

2 weeks to digest and prepare
Typical Stakeholders of a Roadmap

- business manager
- marketing manager(s)
- people, process, and technology manager(s)
- operational manager(s)
- architect(s)
- overall enterprise responsible
- discipline or line managers
- project or program managers
Target of the First Session

Shared vision on market

First iteration of possible products as an answer to the market

Share technology status, as starting point for technology roadmap

Explore people and technology status, to identify main issues
Obtaining a shared vision on the desired technology roadmap

Sharing the people and process issues required for the products defined in the first iteration

Analyzing a few scenarios for products, technologies, people, and process
The Roadmap Update Visualized in Time

**Market:** What is needed by the customers?

**Products:** How to package technologies into products to fulfill market needs?

**Technology:** What technological trends are relevant? What technologies are needed?

**People:** What kind of and how many people are required to realize the products and technologies?

**Process:** What processes are required to let these people realize the products and technologies?
From Roadmap to Detailed Plans

201X

roadmap n
roadmapping

201Y

roadmap n + 1

Policy and Planning Process

budget

Q1 delta

Q2 delta

Q3 delta

Q1 delta

201X 201Y

business plan:
budget & allocation

detailed planning

market events

tech hurdle

Product Creation Process

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ROADbudgetPlan
## 3-Tier Approach

<table>
<thead>
<tr>
<th></th>
<th>horizon</th>
<th>update</th>
<th>scope</th>
<th>type</th>
</tr>
</thead>
<tbody>
<tr>
<td>roadmap</td>
<td>5 years</td>
<td>1 year</td>
<td>portfolio</td>
<td>vision</td>
</tr>
<tr>
<td>budget</td>
<td>1 year</td>
<td>3 months</td>
<td>program</td>
<td>commitment</td>
</tr>
<tr>
<td>detailed plan</td>
<td>1 mnth-1yr</td>
<td>1 day-1 mnth</td>
<td>program or activity</td>
<td>control means</td>
</tr>
</tbody>
</table>
Selection of most important or relevant issues

Key drivers as a means to structure the roadmap

Nothing is certain; ambiguity is normal

Use facts whenever possible

Don’t panic in case of impossibilities
Requirements for a Good Roadmap

- Recognizable issues for all stakeholders
- Clear positioning in time; uncertainty can be visualized
- The main events (enabling or constraining) must be present
- Limited amount of information to maintain the overview
## Sources of Facts

<table>
<thead>
<tr>
<th>Source</th>
<th>Information Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market analysis reports</td>
<td>Number of customers, market size, competition, trends</td>
</tr>
<tr>
<td>Installed base</td>
<td>Change requests, problem reports, historical data</td>
</tr>
<tr>
<td>Manufacturing (statistical process control)</td>
<td>Statistical process control</td>
</tr>
<tr>
<td>Suppliers (roadmaps, historical data)</td>
<td>Roadmaps, historical data</td>
</tr>
<tr>
<td>Internal reports (technology studies, simulations)</td>
<td>Technology studies, simulations</td>
</tr>
</tbody>
</table>
Causes for Overestimation

- Quantization effects of small activities (the amount of time is rounded to manweeks/months/years)
- Uncertainty is translated into margins at every level (module, subsystem, system)
- Counting activities twice (e.g., in technology development and in product development)
- Quantization effects of persons/roles (full time project leader, architect, product manager, et cetera per product)
- Lack of pragmatism (technical ambition is not too bad during the roadmap process, as long as it does not pre-empt a healthy decision)
- Too many bells and whistles without business or customer value
Figure 3: Oil & Gas production profile, 2008 case base

Brainstorm Trends Oil and Gas Production

Brain storm

Trends in oil and gas production

- social
- demographic
- regulatory
- political
- economical
- geographic
- ecological
- technical
- competing energy sources
- other
Abstract

The lifecycle of a product category in the market determines many aspects of the architecting approach. The lifecycle consists typical of 4 phases: infancy, adolescence, mature and aging.

A discontinuity in market success is seen in the transition from one phase to the next phase. The explanation given is that the phases differ in characteristics and require different approaches. The right approach for one phase is sub optimal for the next phase. A set of characteristics per phase is given and the consequences for architecting are discussed.
Ideal Bathtub Curve

- **Infancy**: Taking shape
- **Adolescence**: Growth
- **Maturity**: Stable
- **Aging**: Decline

**Market Product Life Cycle Consequences for Architecting**

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MPLifecycleGraphideal
Market Product Life Cycle Phases in Practice

Infancy
Adolescence
Maturity
Aging

sales volume
time

ideal "bathtub" curve
observed curve
product unable to make transition

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MPLifecycleGraphPractical
Examples of Product Classes on the Curve

- **Infancy**
  - functional MRI
  - digital TV

- **Adolescence**
  - DVD+RW
  - flat TV

- **Maturity**
  - MRI scanner
  - DVD

- **Aging**
  - X-ray systems
  - VCR
  - TV

Market Product Life Cycle Consequences for Architecting

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MPLifecycleGraphExamples
## Attributes per Phase

<table>
<thead>
<tr>
<th></th>
<th>Infancy</th>
<th>Adolescence</th>
<th>Mature</th>
<th>Ageing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Driving factor</strong></td>
<td>Business vision</td>
<td>Stable business model</td>
<td>Harvesting of assets</td>
<td></td>
</tr>
<tr>
<td><strong>Value from</strong></td>
<td>Responsiveness</td>
<td>Features</td>
<td>Refinements / service</td>
<td></td>
</tr>
<tr>
<td><strong>Requirements</strong></td>
<td>Discovery</td>
<td>Select strategic</td>
<td>Prioritize</td>
<td></td>
</tr>
<tr>
<td><strong>Dominant technical concerns</strong></td>
<td>Feasibility</td>
<td>Scaling</td>
<td>Legacy</td>
<td></td>
</tr>
<tr>
<td><strong>Type of people</strong></td>
<td>Inventors &amp; pioneers</td>
<td>Few inventors &amp; pioneers &quot;designers&quot;</td>
<td>&quot;Engineers&quot;</td>
<td>&quot;Maintainers&quot;</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>Chaotic</td>
<td>Bureaucratic</td>
<td>Budget driven</td>
<td></td>
</tr>
<tr>
<td><strong>Dominant pattern</strong></td>
<td>Overdimensioning</td>
<td>Conservative expansion</td>
<td>Midlife refactoring</td>
<td></td>
</tr>
</tbody>
</table>

Market Product Life Cycle Consequences for Architecting

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From roadmap to planning

roadmap

sharing  
understanding  
exploring  
positioning

vision/ambition
opportunities
broader context
consequences

allocate
prepare
commit
empower

milestones
sales
products
people/skills

plan
Summary of strategy process

- Mission: open and generic, but business specific
- Vision: sharpen committal plan
- Roadmap: input for next roadmap

<table>
<thead>
<tr>
<th>Market</th>
<th>Products</th>
<th>Technology</th>
<th>People</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Forecasted facts
Educated scenarios
Estimates

Gemini sales products

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
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<tbody>
<tr>
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<td>90</td>
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<tr>
<td>software</td>
<td>100</td>
<td>70</td>
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<td>100</td>
<td>105</td>
</tr>
<tr>
<td>electronics</td>
<td>50</td>
<td>70</td>
<td>90</td>
<td>100</td>
<td>105</td>
</tr>
<tr>
<td>mechanics</td>
<td>80</td>
<td>70</td>
<td>90</td>
<td>100</td>
<td>105</td>
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<tr>
<td>optics</td>
<td>40</td>
<td>70</td>
<td>90</td>
<td>100</td>
<td>105</td>
</tr>
</tbody>
</table>

Total: 2002 actual 300
Total: 2003 sales 500

Software: $unit
Products: S1, S2, T1, T2, S3, S4, V6, V7

Published by USN ESI
Summary of role in business

- Strategy process
- Roadmap
- Plan
- Customer oriented (sales, service, production) process
- Product creation process
- People, process and technology management process
- Context, overview, focus
- Reality facts
- Empowerment

Customer