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?
Figure of Contents™

1. brainstorm roadmapping

2. Business Processes

3. Key Drivers

4. Roadmapping

5. Market Product Life Cycle

6. Strategy

summary
Simplified process view

- **Strategy process**
- **Customer oriented process** (sales, service, production)
- **Product creation process**
- **People, process and technology management process**

Value flow:
Tension between processes

- **Strategy**, **Process**, **Supplying Business**
  - **Customer oriented**
    - **Product creation**
      - **Value**
      - **Feedback**
        - **Customer**
    - **People, process and technology**
      - **Know how**
      - **(Soft) assets**
    - **Short term; cashflow!**
    - **Mid term; cashflow next year!**
    - **Long term know how (soft) assets**

Tutorial Roadmapping for Strategy Support

5  Gerrit Muller

version: 0.1
July 31, 2014
RSPprocessDecompositionAnnotated
Platform strategy adds one layer

Supplies business value to the customer-oriented strategy.

People, process, and technology:
- Short term: cashflow!
- Mid term: cashflow next year!
- Long term: assets
  - Component or platform creation
  - Product creation

Value:
- Long term knowledge (soft) 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
- Reduce delay due to accident
  - Improve average speed
  - Improve total network throughput
  - Optimize road surface
  - Speed up target groups
  - Anticipate on future traffic condition
- Ensure traceability
  - Ensure proper alarm handling
  - Ensure system health and fault indication

Effective Flow
- Reduce accident rates
- Enforce law
- Improve emergency response
- 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
- Reduce accident rates
- Enforce law
- Improve emergency response
- Reduce delay due to accident
  - Improve average speed
  - Improve total network throughput
  - Optimize road surface
  - Speed up target groups
  - Anticipate on future traffic condition
- Ensure traceability
  - Ensure proper alarm handling
  - Ensure system health and fault indication

Derived application drivers

Early hazard detection with warning and signaling
Maintain safe road condition
- Classify and track dangerous goods vehicles
- Detect and warn noncompliant vehicles
- Enforce speed compliance
- Enforce red light compliance
- Enforce weight compliance

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

- 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

- Build a graph of relations between drivers and requirements by means of brainstorming and discussions

  - where **requirements** may have **multiple drivers**

- 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**
### 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

Customer
What

Key (Customer) Drivers

Customer
How

Derived Application Drivers

Product
What

Application

Functional

Customer objectives

means
may be skipped or articulated by several intermediate steps

functions interfaces performance figures
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**

**Market**

**Products**

**Technology**

**People**

**Process**

---
time, ca 5 years
Granularity of Roadmap Material

<table>
<thead>
<tr>
<th>Top-level roadmap</th>
<th>Single page</th>
<th>Poster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>part of many presentations</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Supporting roadmaps</th>
<th>Single page per view or per driver</th>
<th>Poster</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>part of many presentations</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supporting reports</th>
<th>Document per relevant subject</th>
</tr>
</thead>
</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

horizon feature

now feature

Feature still unknown

Do!

Stop

Do!

Do!
Management with a Broader Time Perspective

2012 | 2013 | 2104

now | feature | now | feature | now | feature

Preparation by 0.5 person

Work with 1.5 persons

Continue with 0.5 person

Work with 1.5 persons

Legend:
- Number of people allocated
- Time

Roadmapping
Gerrit Muller

version: 2.0
July 31, 2014
ROADanalogManagement
Creation or Update of Roadmap in Burst Mode

- **Market**
- **Products**
- **Technology**
- **People**
- **Process**

Collective meeting ca 2 days

**Roadmap**

- Preparations by expert teams
- 2 weeks to digest and prepare

version: 2.0
July 31, 2014
ROADbursts
Typical Stakeholders of a Roadmap

- Business manager: Overall enterprise responsible
- Marketing manager(s): Discipline or line managers
- People, process, and technology manager(s)
- Operational manager(s): Project or program managers
- Architect(s)
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
Target of the Second Session

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

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

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

**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?

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The Roadmap Update Visualized in Time
From Roadmap to Detailed Plans

Roadmap

201X
Q2 | Q3 | Q4 | Q1
roadmap n
roadmapping

Q1

201Y
Q1 | Q2 | Q3 | Q4
roadmap n + 1

Policy and Planning
Process

budget

Q1
delta

Q2
delta

Q3
delta

budget

Q1
delta

business plan:
budget & allocation

detailed planning

market events
tech hurdle

detailed planning

market events
tech hurdle

detailed planning

market events
tech hurdle
## 3-Tier Approach

<table>
<thead>
<tr>
<th></th>
<th>horizon</th>
<th>update</th>
<th>scope</th>
<th>type</th>
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</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 imposibilities
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

- Market analysis reports: number of customers, market size, competition, trends
- Installed base: change requests, problem reports, historical data
- Manufacturing (statistical process control): statistical process control
- Suppliers (roadmaps, historical data): roadmaps, historical data
- Internal reports (technology studies, simulations): technology studies, simulations
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

<table>
<thead>
<tr>
<th>Brain storm</th>
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<tbody>
<tr>
<td>Trends in oil and gas production</td>
</tr>
<tr>
<td>social</td>
</tr>
<tr>
<td>demographic</td>
</tr>
<tr>
<td>regulatory</td>
</tr>
<tr>
<td>political</td>
</tr>
<tr>
<td>economical</td>
</tr>
<tr>
<td>geographic</td>
</tr>
<tr>
<td>ecological</td>
</tr>
<tr>
<td>technical</td>
</tr>
<tr>
<td>competing energy sources</td>
</tr>
<tr>
<td>other</td>
</tr>
</tbody>
</table>
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, adolesence, 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 characterictics 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

Sales volume

Time

Market Product Life Cycle Consequences for Architecting

version: 1.2
July 31, 2014
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

version: 1.2
July 31, 2014
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**

version: 1.2
July 31, 2014
MPLifecycleGraphExamples
Attributes per Phase

<table>
<thead>
<tr>
<th></th>
<th>Infancy</th>
<th>Adolescence</th>
<th>Mature</th>
<th>Ageing</th>
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</thead>
<tbody>
<tr>
<td><strong>Driving factor</strong></td>
<td>Business vision</td>
<td></td>
<td>Stable business model</td>
<td>Harvesting of assets</td>
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<tr>
<td><strong>Value from</strong></td>
<td>Responsiveness</td>
<td>Features</td>
<td>Refinements / service</td>
<td>Refining existing assets</td>
</tr>
<tr>
<td><strong>Requirements</strong></td>
<td>Discovery</td>
<td>Select strategic</td>
<td>Prioritize</td>
<td>Low effort high value only</td>
</tr>
<tr>
<td><strong>Dominant technical concerns</strong></td>
<td>Feasibility</td>
<td>Scaling</td>
<td>Legacy</td>
<td>Lack of product knowledge Low effort for obsolete technologies</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></td>
<td>Bureaucratic</td>
<td>Budget driven</td>
</tr>
<tr>
<td><strong>Dominant pattern</strong></td>
<td>Overdimensioning</td>
<td>Conservative expansion</td>
<td>Midlife refactoring</td>
<td>UI gadgets</td>
</tr>
</tbody>
</table>
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

vision
business specific, but
open and generic

mission

empowerment

reality facts

input

focus

input

reality facts

empowerment

input for next roadmap

roadmap

context overview

Mission

Gemini

2002

2003

sales

products

kte

unit

system

software

electronics

mechanics

optics

total

100

300

1

2

5

8

4

8

4

42

64

74

52

20

1

5

8

4

S2, S3

T1, T4

S4

V6

S6

2002

2003

fte

actual

Q1

Q2

Q3

Q4

10

30

50

40

8

5

2

1

6

6

5

4

42

64

74

52

20

1

5

8

4

S2, S3

T1, T4

S4

V6

S6

realistic
facts

reality
facts

input for next roadmap
Summary of role in business

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