Roadmapping for strategy and innovation

Rob Phaal & Jim Trueman

13 May 2014
Topics

• Introduction to roadmapping
• Roadmapping case studies
Structured visualisation of strategy supports communication and alignment

Functional perspectives
(Roadmap architecture)

Roadmap framework
(Supports integrated and aligned strategic and innovation planning)

Knowledge types
Information types

When?

Why?

What?

How?

Key questions:
1) Where do we want to go?
2) Where are we now?
3) How can we get there?

Typical viewpoints

commercial & strategic perspectives

Design, development & production perspectives

Technology & research perspectives

IfM MANAGEMENT TECHNOLOGY POLICY

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Roadmaps provide a consistent framework throughout the strategic planning / innovation process.

Process funnel (e.g. strategy, new product development)

Market-Technology, Summary-Detail

Iteration

Effort

Time

Requirements fluid
Concepts fuzzy
Many unknowns
Many options
Many assumptions
Few constraints
Scenarios

Requirements clear, stable
Concepts clear, stable
Fewer unknowns, risks understood
Fewer options, greater constraints

Divergent process → Convergent process

Explore → Shape → Plan → Implement
A platform for integrated strategy toolkits

STEEPI
(Social, Technological, Economic, Environmental, Political, Infrastructural Trends & Drivers)

Porter’s Five Forces

Foresight Technology Intelligence

SWOT
(Strengths, Weaknesses, Opportunities, Threats)

Innovation System Structure (taxonomy) Scaleable (hierarchy)

Market Business

Product Service System

Technology Resources

Linking grids

Portfolio

Scenario

Valuation Balanced scorecard

IfM Management Technology Policy

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Typical roadmapping workshop activities (Breadth & Depth)
Communication roadmap design process

Dr Clive Kerr
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EU Graphene Flagship
Bonaccorso et. al., 2012
Roadmapping: a flexible strategic ‘lens’

- Emerging technologies and clusters
- Front-end strategy and venturing
- Linking R&D to the business

- Sector level coordination and policy
- Business and corporate strategy
- Integrated strategy for new product development

- Strategic workforce planning
- Corporate synergy and coordination
- Strategic alignment with suppliers

Explore → Sector → Target

Company
Roadmapping for strategy and innovation – Case studies

Jim Trueman, Principal Industrial Fellow

13 May 2014
Case Studies

1. The Classic Roadmap:
   - Re-aligning an industrial sector with changing trends and drivers
   - Key characteristics:
     • need to identify specific technology focus areas
     • market trends and business drivers are well understood
   - Major project, sustained commitment

2. Emerging Technology:
   - Aligning multiple stakeholders; prioritising investment
   - Key characteristics:
     • Multiple potential technology applications
     • High levels of uncertainty around market trends, technology direction
   - Structured, highly participative workshops

3. Corporate Strategy and Stress Testing:
   - Many applications
   - IfM Fast-Start Roadmap workshops
The Classic Roadmap

AA2020 Australian Automotive Roadmap
Industrial Strategy for an Industry sector
- AA2020 Australian Automotive Roadmap

Prime Minister of Australia

Media Release

JOINT MEDIA RELEASE WITH
MINISTER FOR INNOVATION, INDUSTRY, SCIENCE AND RESEARCH, KIM CARR
A NEW CAR PLAN FOR A GREENER FUTURE

10 November 2008

Prime Minister Rudd announced the Green Car Innovation Fund to help the automotive industry more economically and environmentally sustainable.

The Green Car Innovation Fund will provide Australian car companies with the opportunity to research technologies to reduce the environmental impact of future cars.

$1.3 billion Green Car Innovation Fund

Urgent need for Roadmap

Identification of Partners

AA2020 Programme
220 Participants from 160 organisations included:
• vehicle producers,
• automotive suppliers,
• research organisations,
• relevant non-automotive companies,
• government officials
• and other stakeholder groups.
There is a potential for this technology to enable the wider adoption of CNG in currently in service. This forms a large and growing potential export market for tanks with increased capacity and flexibility, lower cost and lower weight.

Local development and manufacture of revolutionary CNG tank technology will lead to employment opportunities – especially if an export market can be established.

Potential Benefit – The Triple Bottom Line

- Additional, these tanks are likely to incorporate lightweight metals, exploiting Australian Capability to Deliver Develop high capacity, low cost, on-vehicle CNG storage tanks.

As an enabling technology for the widespread adoption of CNG fuelled vehicles, the technology represents a potential 25% reduction in CO2 emissions when compared to a conventional petrol vehicle.

Non-Auto Supply Base

- There is current capability for the manufacture of CNG equipment.
- Using existing expertise, this capability could be adapted to suit pressure, adsorbent-based CNG storage.
- The science and research industry is already equipped to examine the development of appropriate adsorbents for CNG storage.
- Non-Auto Supply Base

- The global perspective demands harmonisation of (or compliance with) all recognised design standards for installation and techniques can be transferred from expertise gained in other industries.
- There is current capability for the manufacture of LPG tanks in the automotive industry.
- Demand for this technology will be driven by the global perspective.

Auto Supply Base

- There is a potential for this technology to enable the wider adoption of CNG in currently in service.
- CNG is a local resource, so exploiting it in Australia will benefit local people.
- As an enabling technology for the widespread adoption of CNG fuelled vehicles, the technology represents a potential 25% reduction in CO2 emissions when compared to a conventional petrol vehicle.
- Planet

Funding

- There is a potential for this technology to enable the wider adoption of CNG in currently in service.
- CNG is a local resource, so exploiting it in Australia will benefit local people.
- As an enabling technology for the widespread adoption of CNG fuelled vehicles, the technology represents a potential 25% reduction in CO2 emissions when compared to a conventional petrol vehicle.

Knowledge and capability to train the public about the misconceptions of CNG storage is essential. Public education is crucial to increasing public acceptance of CNG as an automotive fuel source.

Likelihood of Success

Cost

Benefits:
- Profit
- People
- Planet

Priorities & Recommendations

Application

38 Applications

4 Themes
What did Stakeholders say afterwards?

“The AA2020 Roadmap has changed the way we perceive the Australian automotive industry. It has provided a vital context in which to understand and pursue opportunities for our technology in the automotive market.” Anthony Kongats – CEO, CAP-XX

“The Automotive Australia 2020 Roadmap charts the industry’s capabilities, needs, commercial potential, and opportunities for expansion over the next decade and beyond. Over 220 people from 160 organisations contributed to creating the roadmap, delivering strong industry support for the directions suggested by the roadmap, and an eagerness to be involved in its implementation - to build competitive advantage wherever we can.” Senator Kim Carr - Minister for Innovation, Industry, Science and Research
Related Case Studies
Emerging Technology

A Synthetic Biology Roadmap for the UK
A Synthetic Biology Roadmap for the UK

Synthetic biology was identified by the Technology Strategy Board as one of the eight emerging technologies to be supported by the UK government.

Synthetic Biology Roadmap Co-ordination Group established to inform government on likely timeframe and actions required to establish a world leading science base and Synthetic Biology Industry in the UK.

Co-ordination Group provided subject matter expertise; IfM ECS provide process and facilitation.

Multiple workshops involving 70 participants across 52 organisations.
**Process**

1. **Identify common vision**
2. **Trends and Drivers**
3. **Identify, Prioritise and Select Opportunities**
4. **Mini-business Plan**
5. **Opportunity Roadmap**
6. **Linkage Grids**
7. **Landscape**

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**Vision**

- Synthetic biology
- Industrial processes
- Products
- Manufacturing
- Accepted approaches
- Technology

**Trends**

- Sustainable energy
- Publicly funded R&D
- Manufacturing

**Landscape**

- Industry Level View
- Data Analysis and Decision Steps
- High Potential Opportunity Deep-dive

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**Recommendations**

- Innovation with academia
- Reduced development time to market
- SMEs & Spin-Outs to drive innovation
- Competitive
- Strengthen UK science base

**Themes**

- Technology
- Material security
- Disruptive products
- Climate change/Green technologies
- Public views and values
- Consumer/User
- Exponential trends
- Managing risk

**Channels to Market**

- Digital
- Existing (Big) Industry
- Technology Co.s & Science base
- Competition

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**Enablers**

- Consumers/Users
- Internet
- Mobile
- Exponential trends
- Political & Legal

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**Drivers**

- Economic
- Environment
- Social and Ethical
- Public acceptance
- Global societal environment
- Innovation with academia
- Managing risk

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**Opportunities**

- Which key industry or educational sector does it help?
- How will it contribute to the regional development of Cordoba?
- Does it match the vision for Cordoba?
- How does it fit with existing ICT, Internet and mobile capabilities?
- What information are we most needed to deliver the opportunity?
- Services – what user needs will be supported? Who will be needed; what application will be developed.
- Application – what user needs will be; what will be needed; what will be required.
- Technology – what will be needed; what will be available; what will be the impact; what will be the pricing.
- Existing (Big) Industry – what will be needed; what will be delivered; what will be the impact; what will be the pricing.
- Technology Co.s & Science base – what will be needed; what will be delivered; what will be the impact; what will be the pricing.
- Competition – what will be needed; what will be delivered; what will be the impact; what will be the pricing.
Synthetic Biology Outcomes

Lionel Clarke, chairman of the UK Synthetic Biology Roadmap Coordinating Group:

“The structure [that IfM ECS] provided stimulated the full engagement of all participants in the discussion and contribution of ideas. As a result, we were able to meet our main objective which was to start building a broad community, sharing ideas and concerns and identifying issues where changes to policy or putting in place supporting structures would help. The team was very effective, enabling progress to be made rapidly.”

David Willetts, Minister for Universities and Science:

“We are making a series of investments in research in synthetic biology. The UK Research Councils and the Technology Strategy Board are spending over £90 million on world leading synthetic biology research and commercialisation including £20 million announced by the Chancellor last November. In December 2012, the government announced that a further £50 million will be invested in synthetic biology to support implementation of key recommendations from the UK Synthetic Biology roadmap.”
Related Case Studies

Algal Industry Roadmap Launch and Algal SPARK Awards

By: Michele Stanley | May 13, 2013 8:29 AM

We are pleased to confirm that the following speakers at the Roadmap Launch event on the 3rd June. Prof Mike Cowling, the Chief Scientific Officer of The Crown Estate will give a brief introduction to the Roadmap followed by a more in-depth analysis by the roadmap authors Dr Beatrix Scharl-Ridley and Dr Brenda Parker from Adapt.
Corporate Strategy and Stress Testing

Vive Digital: Colombia’s Digital Agenda
Vive Digital: National programme to increase adoption of ICT and strengthen the Digital Ecosystem to:

- Increase employment
- Increase competitiveness
- Increase inclusion
- Reduce poverty

Direct Vive Digital Targets

- Expand Infrastructure
- Reduce cost of service
- Develop applications and digital content
- Foster ICT Adoption and Use

But … Regional governments were not buying in
Process and Findings:

IfM Fast-start Roadmapping workshop in Cordoba to draft a roadmap for ICT in the region:

- Extensive briefings pre-workshop
- Local context, trends and drivers
- Opportunities for developing the digital ecosystem in the region
- Regional and Central capabilities and enablers

Findings:

- Lack of regional understanding of central Vive Digital programme; independence from central government
- In the Region:
  - renewed enthusiasm
  - regional collaboration and
  - shared vision
- At the Ministry: Resetting of expectations and renewed planning
  - improve communication and collaboration with regions;
  - invest in delivery capability across regions;
  - need to bridge “aspiration gap”
### Other Less Conventional Outputs

**Strategic roadmap:**
- Young, high-growth company.
- To stress test the existing strategy against uncertainty and risks in trends and drivers.
- Highlighted the risks of doing nothing and the need for a shift in corporate strategy.

**Strategic roadmap:**
- Mid-sized successful corporate, in a complex industry.
- To map Trends, Drivers and commercial strategy in key market sectors to give R&D a longer term insight into market requirements; enable more strategic development.
- Identified a lack of market insight and understanding across many divisions; and the corporate requirement to improve investment in key client relationships.

**Technology roadmap:**
- Major industrial; leader in specialised process industry.
- To give R&D a more strategic understanding of customer requirements; enable prioritisation and consolidation of development programmes.
- Highlighted key risks, uncertainties and competitive threats to their largest revenue stream; and major opportunities in a lower-profile sector.
Common themes

- I found the workshop stimulating
- I enjoyed the workshop
- I found my participation worthwhile
- I feel I have contributed to the workshop
- The workshop provides useful insights

5. Strongly Agree
4. Agree
3. No comment
2. Disagree
1. Strongly Disagree
Further information

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