T-109.5410 Technology Management in the Telecommunications Industry (3 cr)

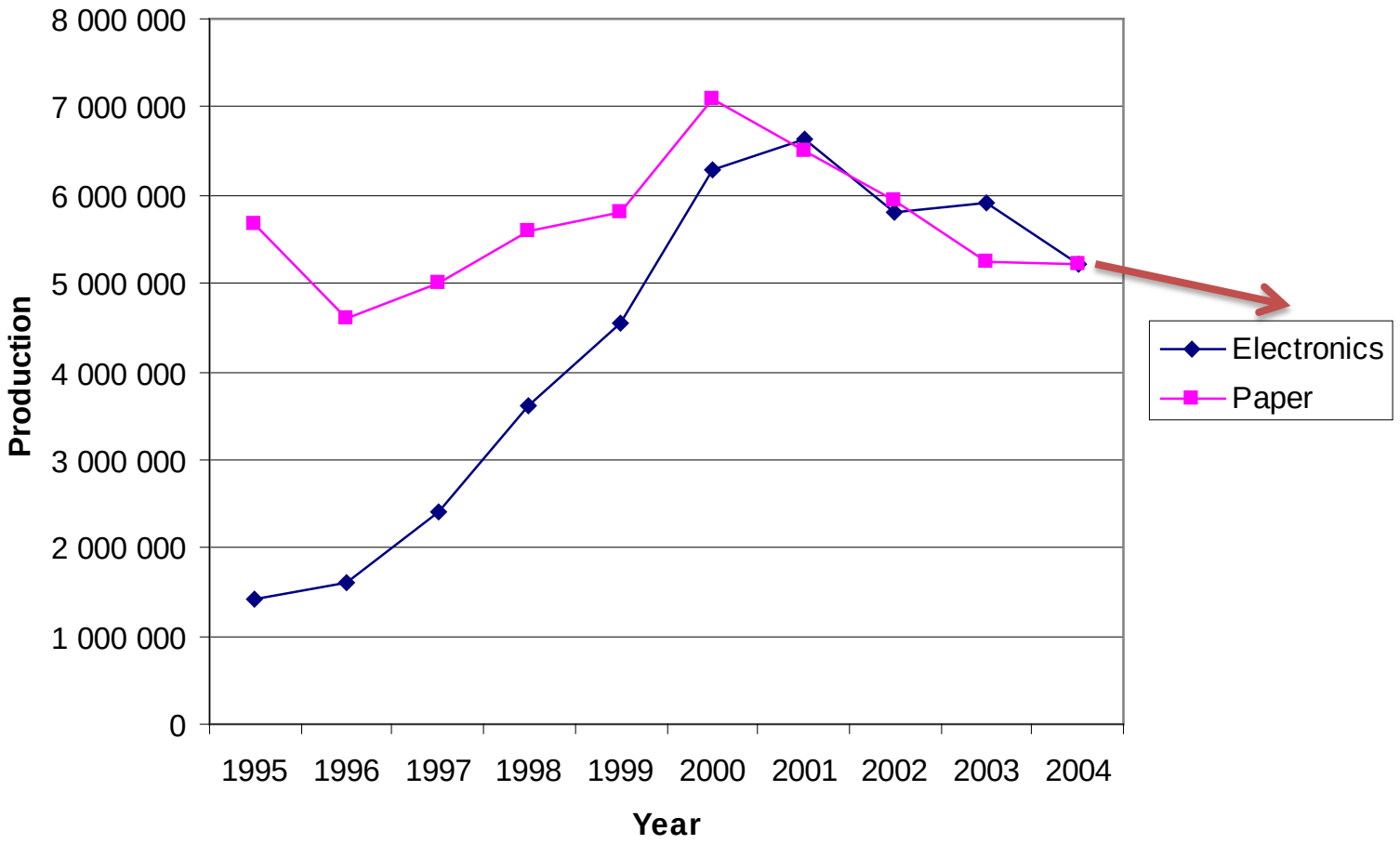
Sakari Luukkainen

Aalto University
Department of Computer Science and Engineering

Background of the course

- technological innovation is the most important determinant of the long-term economic growth of industrialized nations
- to maintain the growth companies ought to have the ability to continuous commercialization of new technologies
- discontinuous technological change in the telecommunications industry during 1990’s
- rapid growth of the Finnish telecommunications industry, production over quadrupled

Development by industrial sector

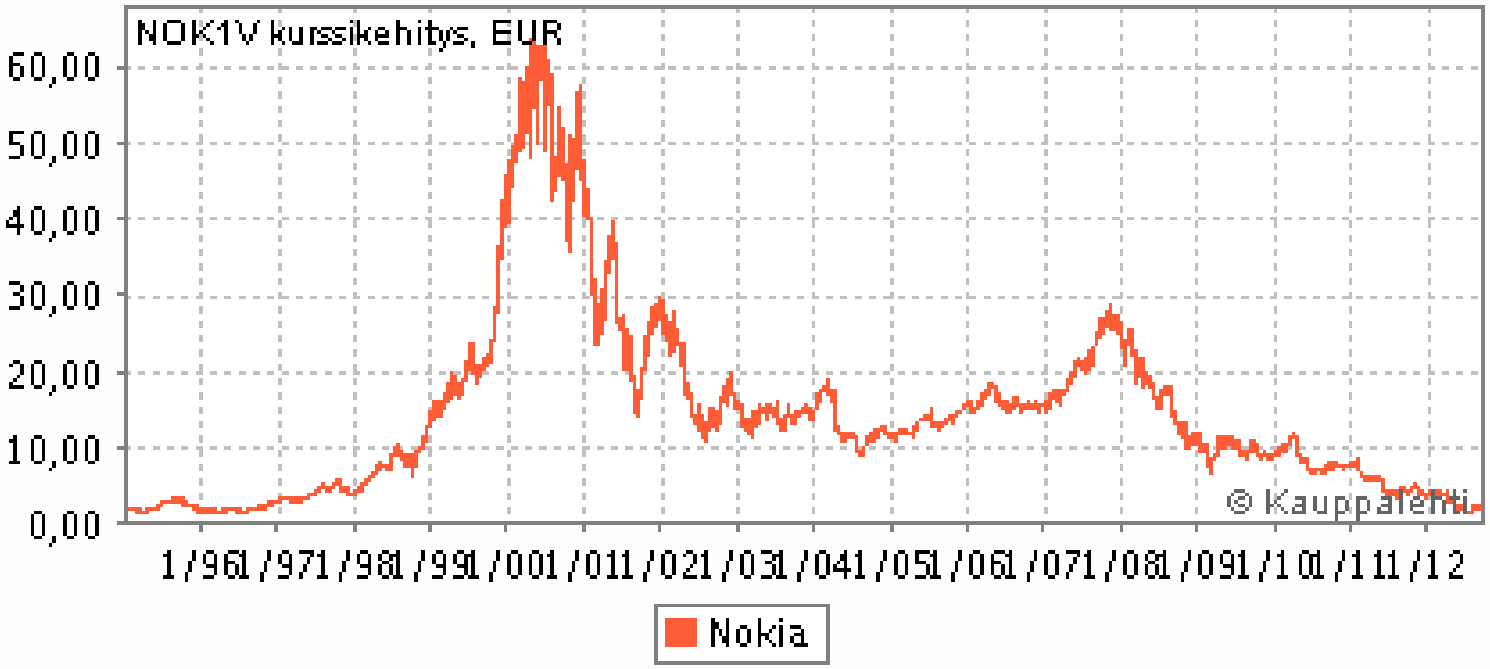


Source: Stat Finland

Background of the course

- exceptional intensive discontinuous technological change, telecommunications 70 % of the R&D of the industry
- R&D expenditures biggest fixed cost, the investments have to be made in an early phase, when the characteristics of the new market are not clear
- the competitive advantage of the companies is increasingly dependent on the management of the external connections of the surrounding industry
- industry sectors have own specific kind of diffusion mechanisms of the new technologies
- the **dynamics of the innovations** behind the macro figures

Background of the course



Source: Kauppalehti

Background of the course

- Overestimated expectations have delayed technological change
- Most of the success is related to GSM technologies, hyper price competition in mobile voice and SMS
- No history data of business – difficult to forecast, unreliable market research
- Only 20 % of R&D performed by companies can be exploited commercially
- **Incumbent** companies face difficulties in managing technological discontinuities - **new entrants** more flexible
- However, VC financing has so far resulted in a very few new success stories in SME sector - asymmetric information in the technology financing market

Background of the course

- Current slowdown moved focus to consolidation and cost reduction
- Telecom manufacturers moving towards service business
- The role of liquidity constraints is negligible in determining R&D investment
- New business possibilities in LTE networks, cloud computing and services
- Market uncertainty is however high - many technical possibilities open up with unclear market need - many failures and unexpected success
- **Telecommunications business is technological innovation management**

Goal of the course

- To describe technology management as a part of the business process of a telecommunications company

- The course handles the structure of the telecommunications industry and its innovation characteristics, technology choices, R & D financing, standardization and product strategy

- The goal is to learn evaluation and decision making related to new technologies from business point of view

Content structure

	Core knowledge	**Supplementary knowledge**	**Special knowledge**
Scientific learning	Innovation in business process Technology cycle Incremental and discontinuous innovation Factors affecting growth of telecom networks	Open innovation R&D organization R&D as investment Technology policy National innovation systems The effects of stardardization Productization and marketing of new technology Role of IPR	Real options Economies of scale Swicthing cost Network externality Acquistions Complementarity Substitution
Professional learning	Historical development of telecom sector The structure and dynamics of telecom sector Decision making in change situation Recognition of change Development of innovation process	Development of R&D organization Profitability and risk evaluation of technology investment R&D financing Design of marketing and product strategy Patenting	Future technologies in telecom and their business possibilities Historical case examples

Graduating the course

- The course is especially designed to students taking Networking Business for their major or minor, but is suitable for all students that are interested in techno-economic issues related to telecommunications
- The preferred but not compulsory prerequisite for this course is TU-91.2005 Strategic Management of Technology and Innovation
- All students have to register to the course via Oodi
- Replaces old courses T-109.410, T-111.050 and TU-91.126

Graduating the course

- 12 lectures, on Wednesdays hall TU5, at 10.15-12

- Exam requirements consist of the lectures and the following books:

Shapiro, Varian: Information Rules, A Strategic Guide to the Network Economy, 1999
Chapters 2-9

Dodgson, Gann, Salter: The Management of Technological Innovation: Strategy and Practice, 2008.
Chapters 3-4, 6-7, 9-10

Graduating the course

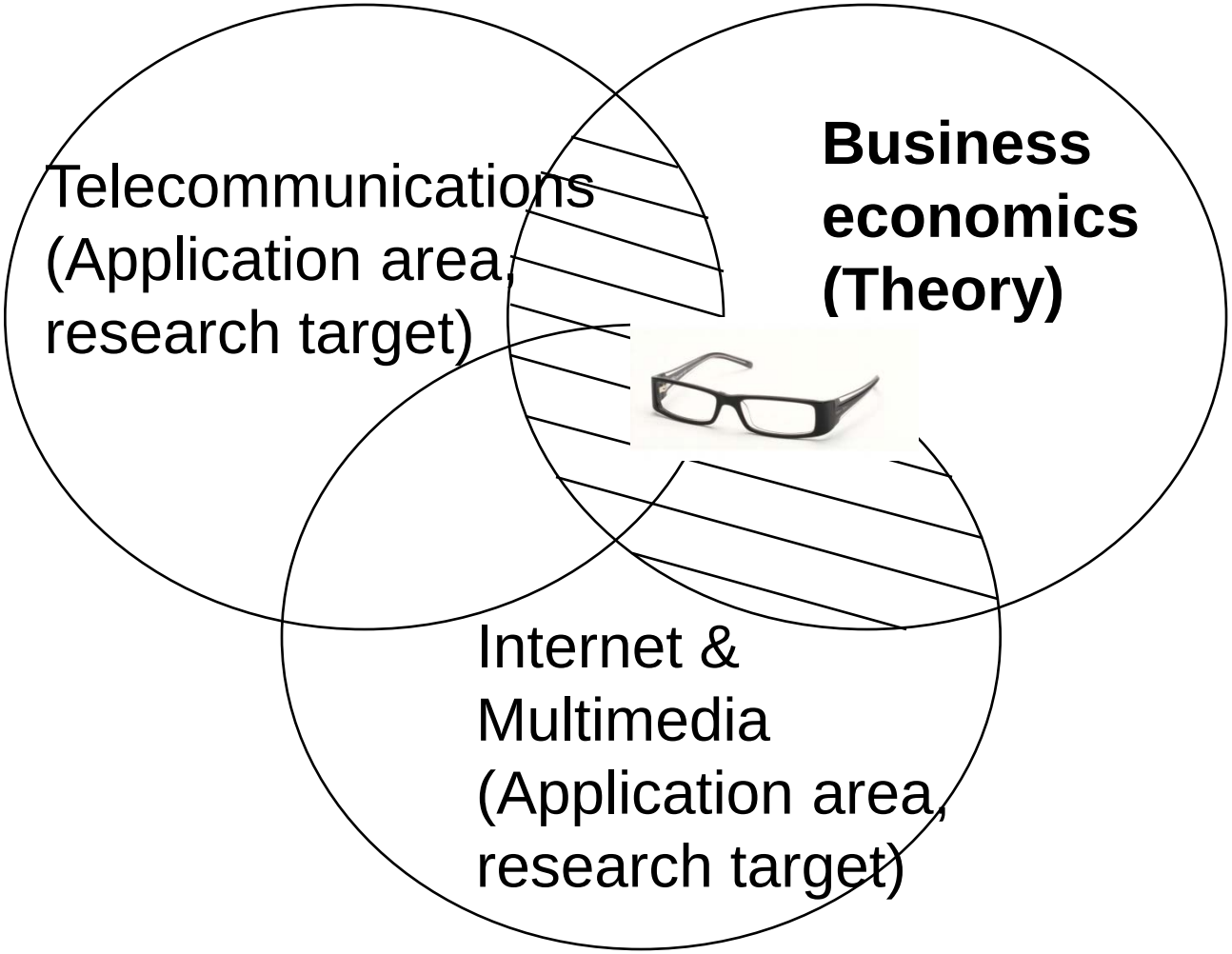
- Attending and listening of the lectures, reading related books
- First examination is 16.12.2014 at 13 - 16 in lecture hall T1
- Exam consists of three essay questions of which two is compulsory, six concept definitions and one applied question concerning some real life business case
- The exam is in finnish and english, course lectured now last time, last exam 8.4.2015

Grading

Typical scale (depending of distribution), 6 p / question

0-11 p gr 0
12-13 p gr 1
14-15 p gr 2
16-18 p gr 3
19-21 p gr 4
22-24 p gr 5

Networking Business



Related courses

T-109.4300 Network Services Business Models

T-110.5121 Mobile Cloud Computing

TU-91.2005 Strategic Management of Technology and Innovation

S-38.3001 Telecommunications Forum

T-110.6000 Internet and Computing Forum

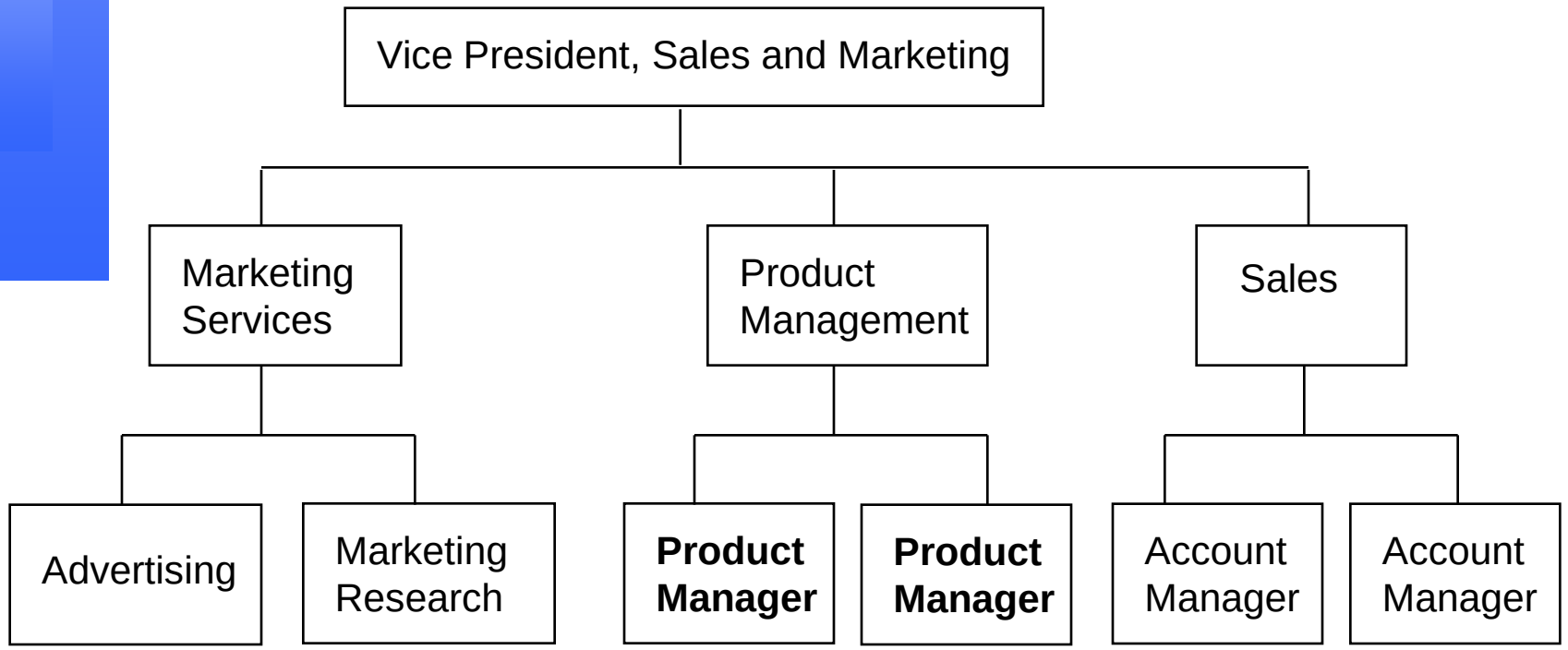
S-38.3041 Operator Business

T-110.5130 Mobile Systems Programming

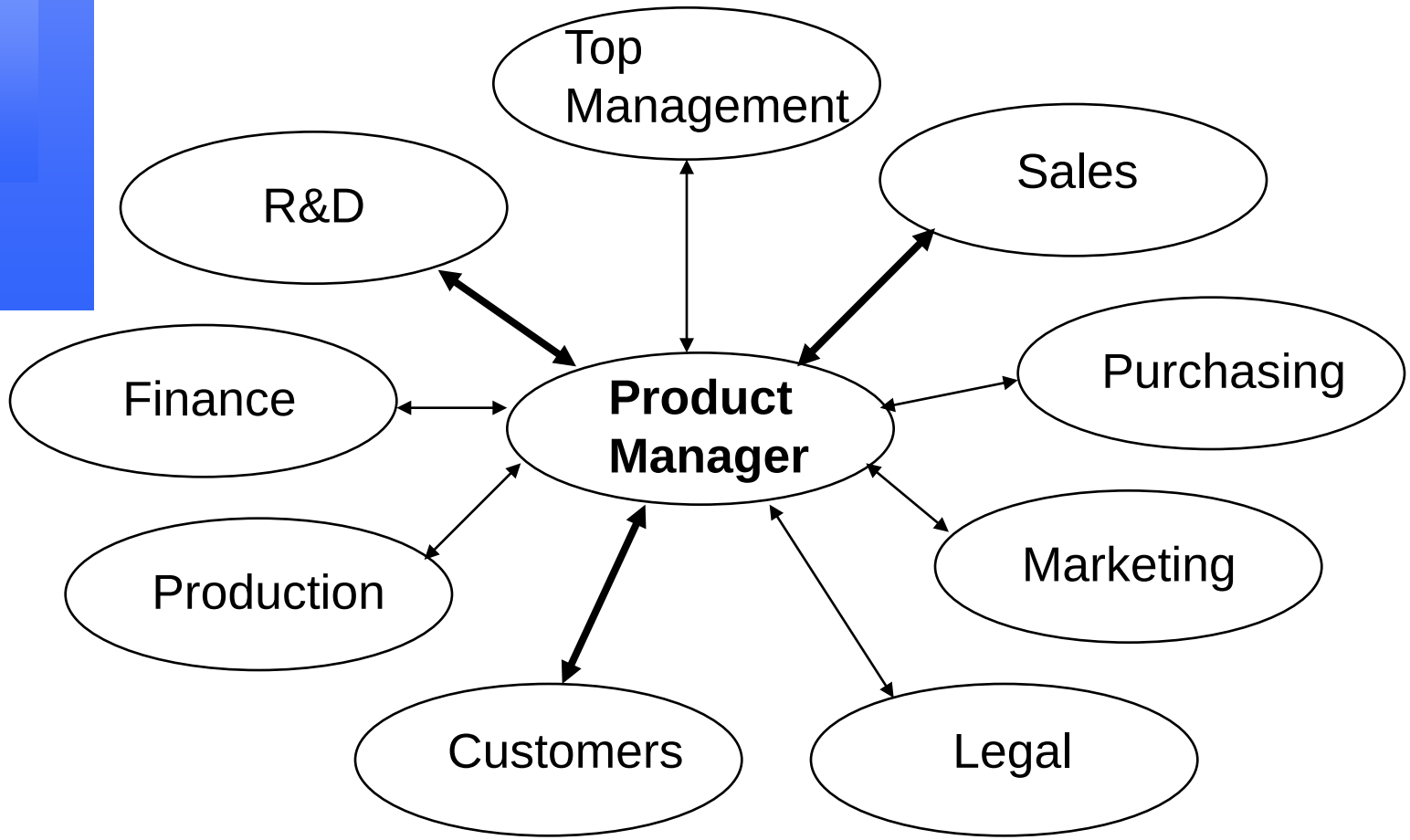
Master's Thesis Scope

- Emerging technology / Product strategy analysis
- New telecom service design
- Integration of ICT & business processes
- Business development of own ICT company

Product Management Organization



Product management is business process management



Business Assessment: Hierarchy of Strategies

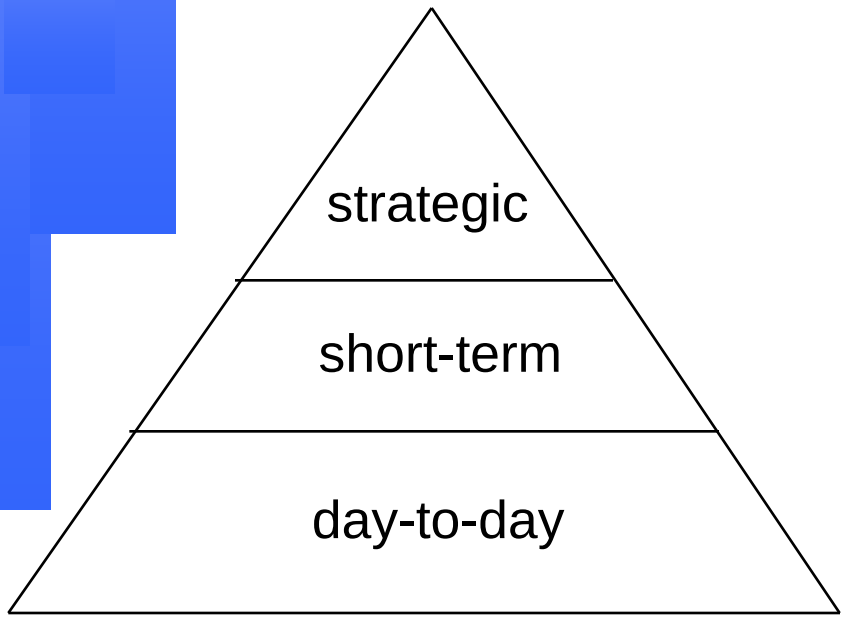
Focus on developing and leveraging core competencies

- Vision
- Corporate Strategy
- Divisional Strategy
- Product/Market Strategy
- Marketing Tactics
- Customer Satisfaction

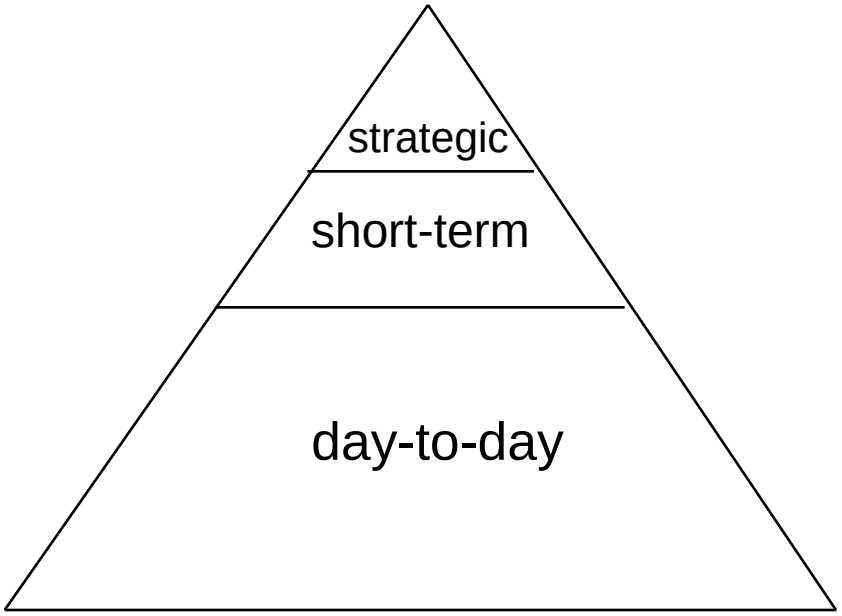
Focus on customer-specific needs

Source: Gorchels

PM´s balance of management activities



the goal



the reality

Source: Gorchels

Timetable

10.9. Introduction
17.9. Innovation process
24.9. R&D management
1.10. Telecom R&D in Finland
8.10. Standardization
15.10. Productization
29.10. Patenting
5.11. Technology marketing
12.11. Case: Mobile network evolution
19.11. Case: Product management
26.11. Case: Mobile cloud computing
3.12. Summary

16.12. Exam