



The Role of Network Management in Reviving the Telecom Industry

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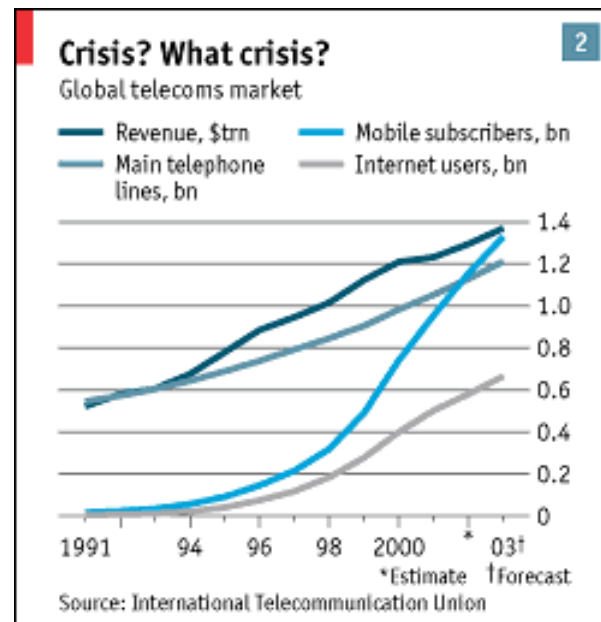
Stockholm, Sweden

Can Universities play a Role Reviving the Telecom Industry?

- No. The industry needs to transform itself.
- Network management will be key in this transformation.
- To succeed, collaboration between universities and industry—though difficult—will be necessary.
- The management research community itself needs a transformation/evolution.

The Paradox of the Telecom Crises

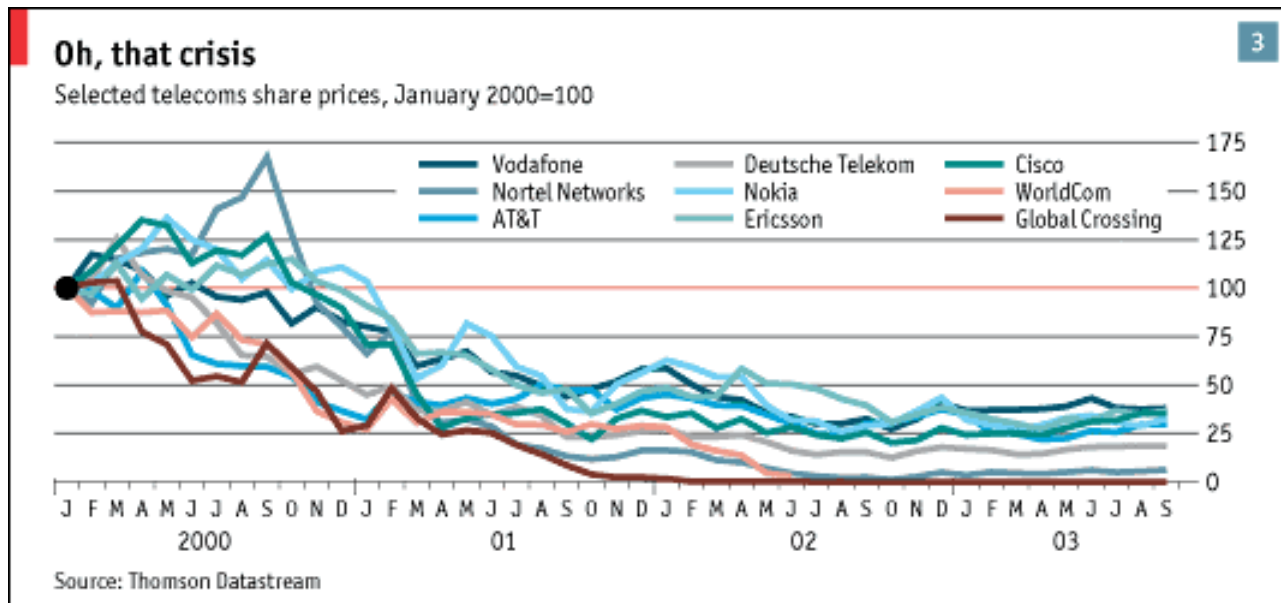
Revenues steadily increased to some \$1.4 trillion in 2003.



The Economist, Print Edition, October 3, 2003.

The Paradox of the Telecom Crises

Destruction of shareholder value is estimated some \$1 trillion.



The Economist, Print Edition, October 3, 2003.

NOMS 2004, Distinguished Experts Panel, Seoul, 22 April 2004

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The Importance of Management in Telecommunications

Key challenges in telecommunications are related to management.

- High cost of ownership.
- Increasing complexity of end-to-end connectivity and services across domains and technologies.
- Increasing number of players, both horizontally and vertically.
- Networks are becoming larger and more dynamic.

Research Collaboration between University and Industry

Difficult, but needed.

- Industry has lost research competence.
- Universities have an increased responsibility in creating knowledge.
- Time and talent, combined with domain knowledge and experience.
- Obstacles to a collaboration:
 - Culture gap, access to data, IPR
- Difficult times create opportunities.

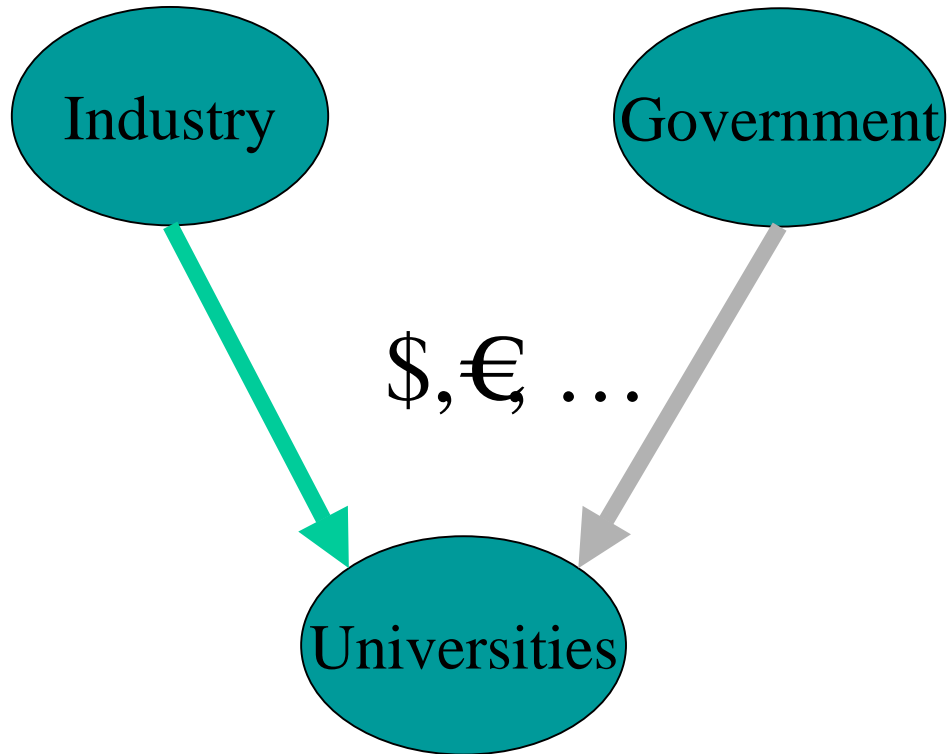
Types of Collaborations

What works and what doesn't.

- Sponsorship of targeted research
 - Presentations, reports, prototype
- Co-sponsorship of a broad research program
 - Presentations, reports
- Exchanges for limited time
 - Summer students, faculty on sabbatical, visiting engineers
- Career moves
 - Ph.D. graduates move to industry
 - Industrial researchers become professors

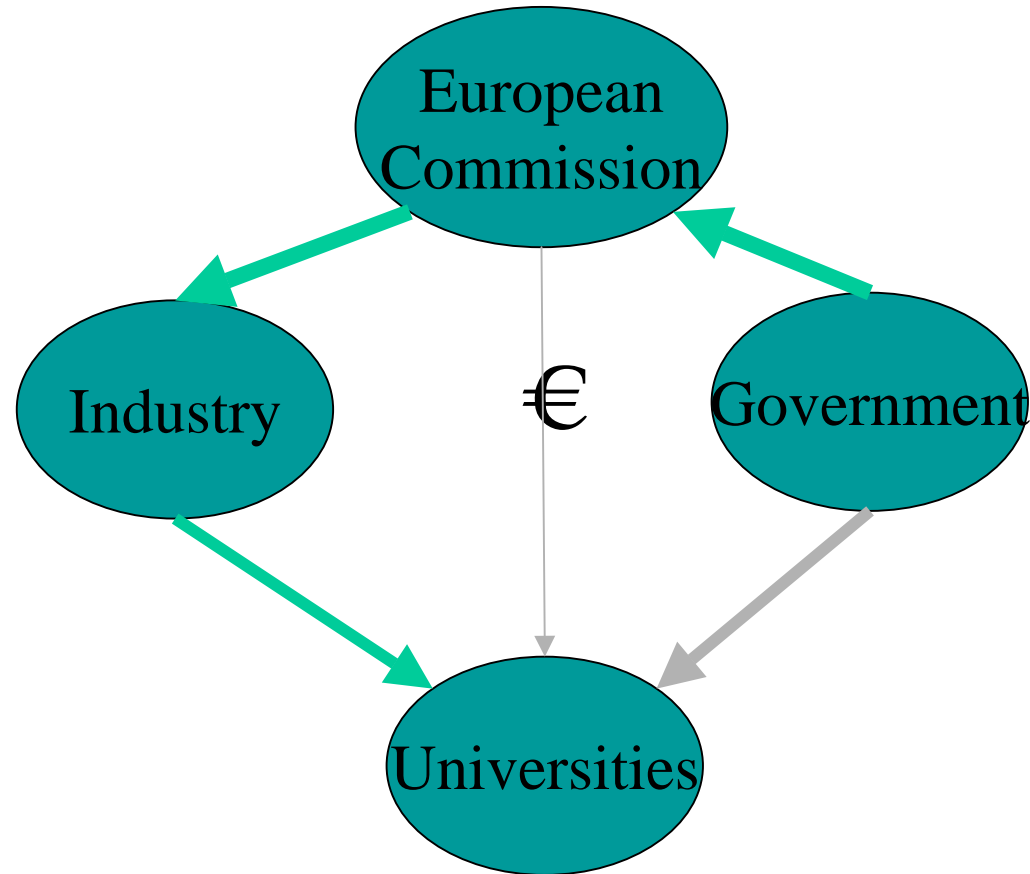
The Flow of Research Money: Are we moving in the right direction?

The good times!
Mid to end of 90s.



The Flow of Research Money: Are we moving in the right direction?

Now!
In Europe.



Transforming the Management Research Community

Where we come from:

- Network Management is a *young discipline*.
 - First IM held in '89.
- Many problems are *hard to formalize*.
 - Design is an art rather than a science.
 - Too few academic groups work on management problems.
- There is *no generally accepted understanding* of network management.
 - Framing in terms of functional areas is unhelpful.

Transforming the Management Research Community

Where we need to go:

- Establish management a strong *academic discipline*.
 - Transaction journal is needed.
- Develop engineering principles based on *formal methods*.
 - To address Scaling, self-organization, dynamic behavior.
- Move focus from traditional telecom services to *pervasive services*.
 - Otherwise, issues will be addressed by other communities.

The Role of Universities in Reviving the Telecom Industry.

- The industry needs to transform itself.
- Network management will be key in this transformation.
- To succeed, collaboration between universities and industry will be necessary.
- The management research community needs evolve as well.

A Modern Definition of Management

“...the management of networked systems comprises all measures necessary to *ensure the effective and efficient operation* of a system and its resources *pursuant to an organization's goal*. The aim of management is to provide the services and applications of a networked system with the desired level of quality and to guarantee availability and a rapid, flexible deployment of networked resources.”

H-G. Hegering et al.: Integrated Management of Networked Systems, Morgan Kaufman, 1998.