

Innovation Management

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What is innovation management?

- The role of innovation
- What is innovation (definitions, typologies of innovation)
- What is innovation management?
- Models of the innovative process



Today's contents

- **The role of innovation**
- **What is innovation?**
- **What is innovation management?**
- **Models of the innovative process**

Key Concepts in Innovation Management



The aim of innovation...

- Depends on the type of firm
- Goal is mostly to survive, to grow, to make profit
- R&D departments generally strive for the best **technical** solution...
- ... but what matters for **innovation** is how it influences survival chances, profit and growth opportunities!



Innovation and the corporate strategy

Innovation management.....

- has to be understood as a **core process** of the organisation -> It is related to what is being produced
- Is a long term race
- Is about continuity
- Has to deal with complexity!!
- Is about being systematic → developing routines around innovation



WHAT IS INNOVATION?

- Invention
- Technology
- Innovation
- Creating new or improved products, processes and services
- Knowledge and learning
- Uncertainty



Schumpeter's distinction between "Invention" and

"innovation"

- An **'invention'** is an idea, a sketch or model for a new or improved device, product, process or system. It has not yet entered to economic system, and most inventions never do so.
- An **'innovation'** is accomplished only with the first commercial transaction involving the new product, process, system or device. ***It is part of the economic system.***

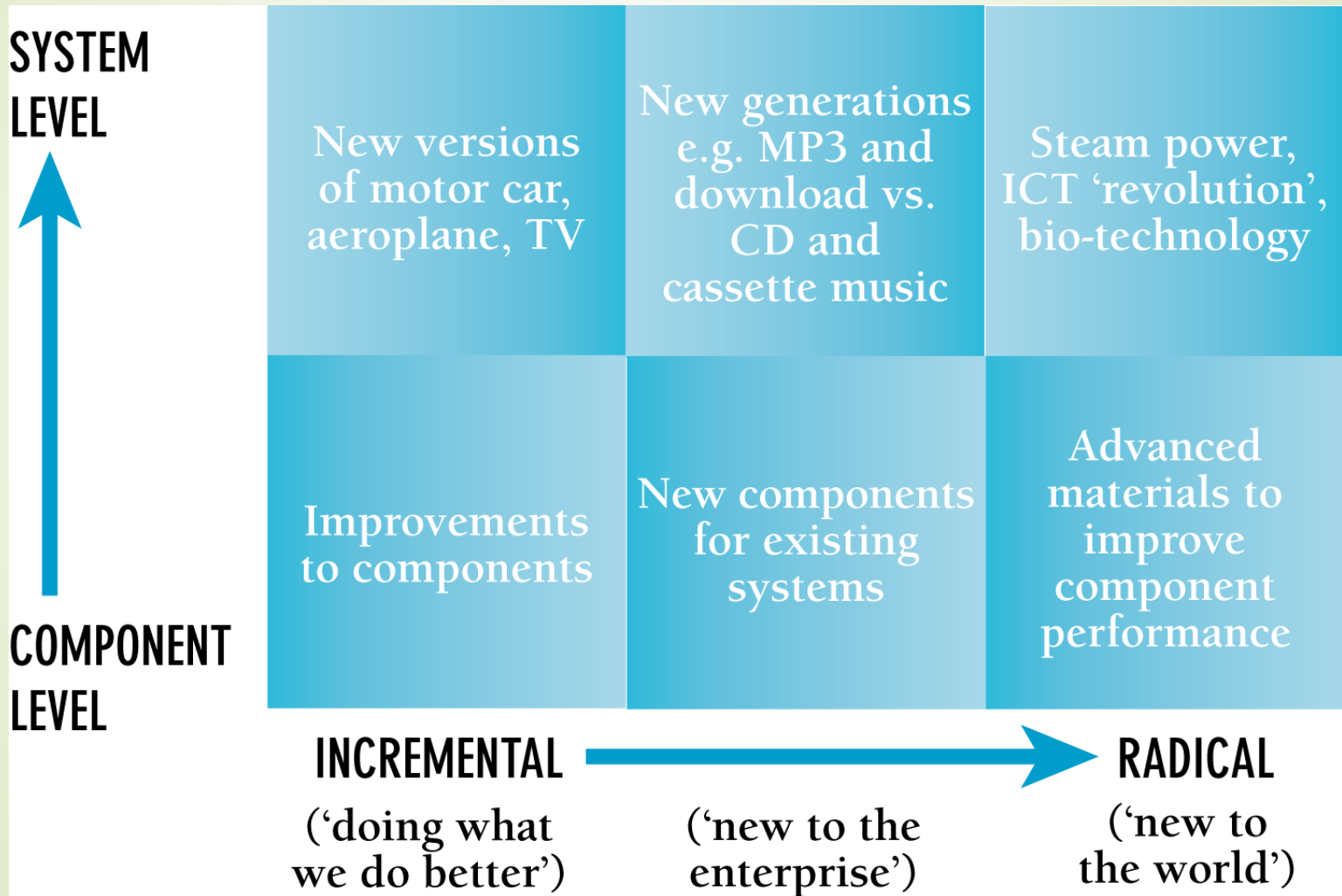
Dimensions of Innovation



the '4Ps' of innovation

- **Product innovation:** changes in the things (products or services) which an organization offers
- **Process innovation:** changes in the ways in which they are created and delivered
- **Position innovation:** changes in the context in which the product or services are introduced
- **Paradigm innovation:** changes in the underlying mental modes which frame what an organization does

Figure 1 Dimensions of innovation





Triggers of discontinuity

- New market emerges
- New technology emerges
- New political rules emerge
- Running out of road
- Change in market sentiment or behaviour
- Deregulation or reregulation
- Fractures along 'fault lines'
- Unthinkable events
- Business model innovation
- Shifts in techno-economic paradigm
- Architectural innovation



Important contextual factors

- Type of sector
- Size of firm
- The country and region
- The stage in the industry life cycle
- Political regulations



Abernathy & Utterback – industry life cycles

- The fluid phase – co-existence of old and new technologies
 - rapid improvement of both → 'the sailing ship effect'
 - Target: What product and what market?
 - Technical: What product who will produce it ?
 - Experimentation



Important contextual factors

- Globalisation
- Sustainability
- Networking organisation

The transitional phase

- ▶ A dominant design
 - ▶ Convergence around one design
 - ▶ Rolling bandwagon → innovation channeled around a core set of possibilities → a technological trajectory
- ▶ Imitation and development
 - ▶ Reliability, cheaply, higher functionality, quality
- ▶ The specific phase
 - ▶ Rationalization & scale economies
 - ▶ Differentiation through customization
 - ▶ Scope for innovation becomes smaller

Table 2 Stages in innovation life cycle

<i>Innovation characteristic</i>	<i>Fluid pattern</i>	<i>Transitional phase</i>	<i>Specific phase</i>
<i>Competitive emphasis placed on . . .</i>	Functional product performance	Product variation	Cost reduction
<i>Innovation stimulated by . . .</i>	Information on user needs, technical inputs	Opportunities created by expanding internal technical capability	Pressure to reduce cost, improve quality, etc.
<i>Predominant type of innovation</i>	Frequent major changes in products	Major process innovations required by rising volume	Incremental product and process innovation
<i>Product line</i>	Diverse, often including custom designs	Includes at least one stable or dominant design	Mostly undifferentiated standard products
<i>Production processes</i>	Flexible and inefficient – aim is to experiment and make frequent changes	Becoming more rigid and defined	Efficient, often capital intensive and relatively rigid



Three key questions

1. How do we structure the innovation process?
2. How do we develop effective routines?
3. How do we adapt or develop parallel routines to deal with incremental vs. discontinuous innovation?



Conclusions

- Different kind of innovations
- Context specific
- Innovation has different stages
- Knowledge is the key

So....

Innovation:

- Depends on the type of firm, sector, industry life cycle, country and so on
- Depends on the "environment"
- Goal is mostly to survive, to grow, to make profit
- Technical solutions vs. societal and organisational aspects
- Different from invention



Innovation management

- Core process
- Production
- Commercialisation – design, marketing, resources, competence
- Long term
- Continuity
- Complexity
- Systematic, routines

First and second generation models

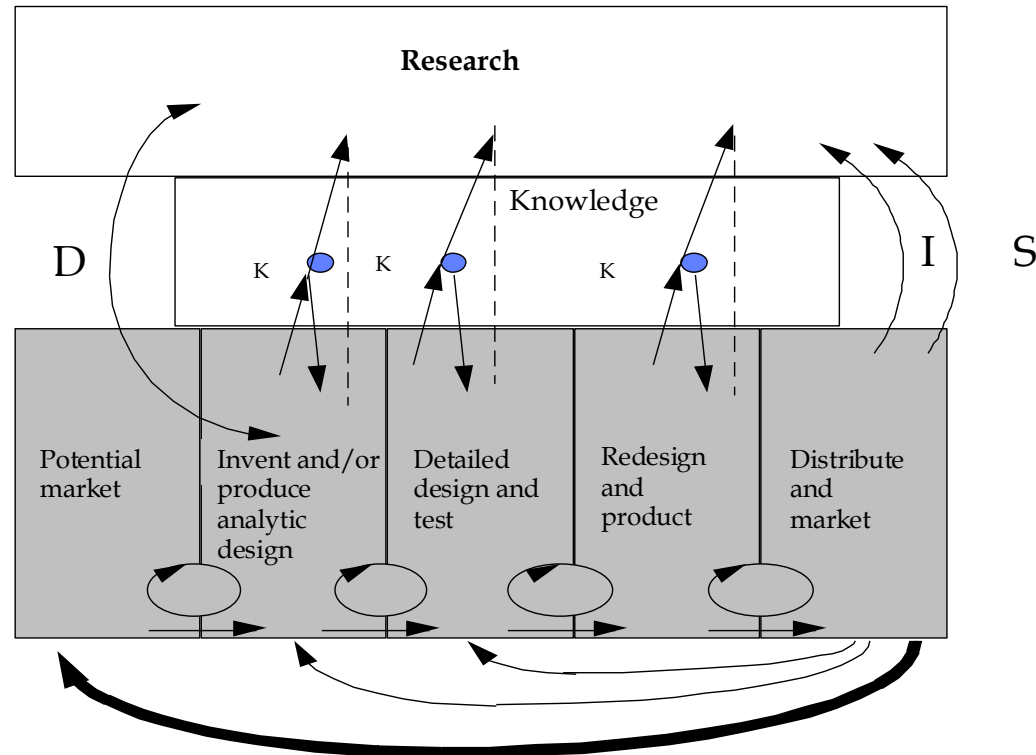
First generation (50's-60's): Technology push "Linear model"



Second generation (mid 60's-70's): Demand pull



3rd generation model



- D: Direct link to and from research from problems in invention and design
- I: Support of scientific research by instruments, machines, tools
- S: Support of research in sciences underlying the product areas



4th generation model

marketing

R&D

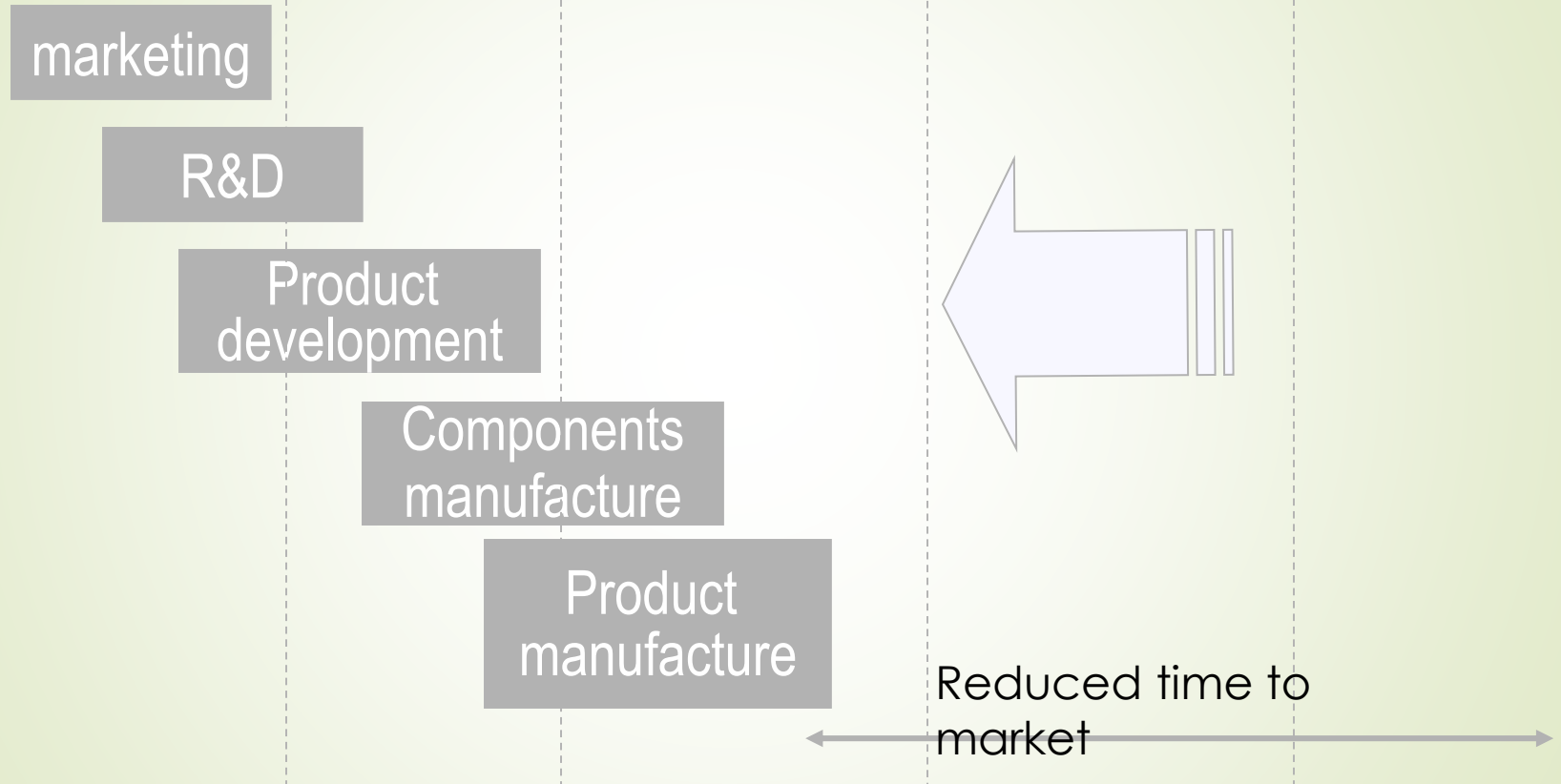
Product
development

Components
manufacture

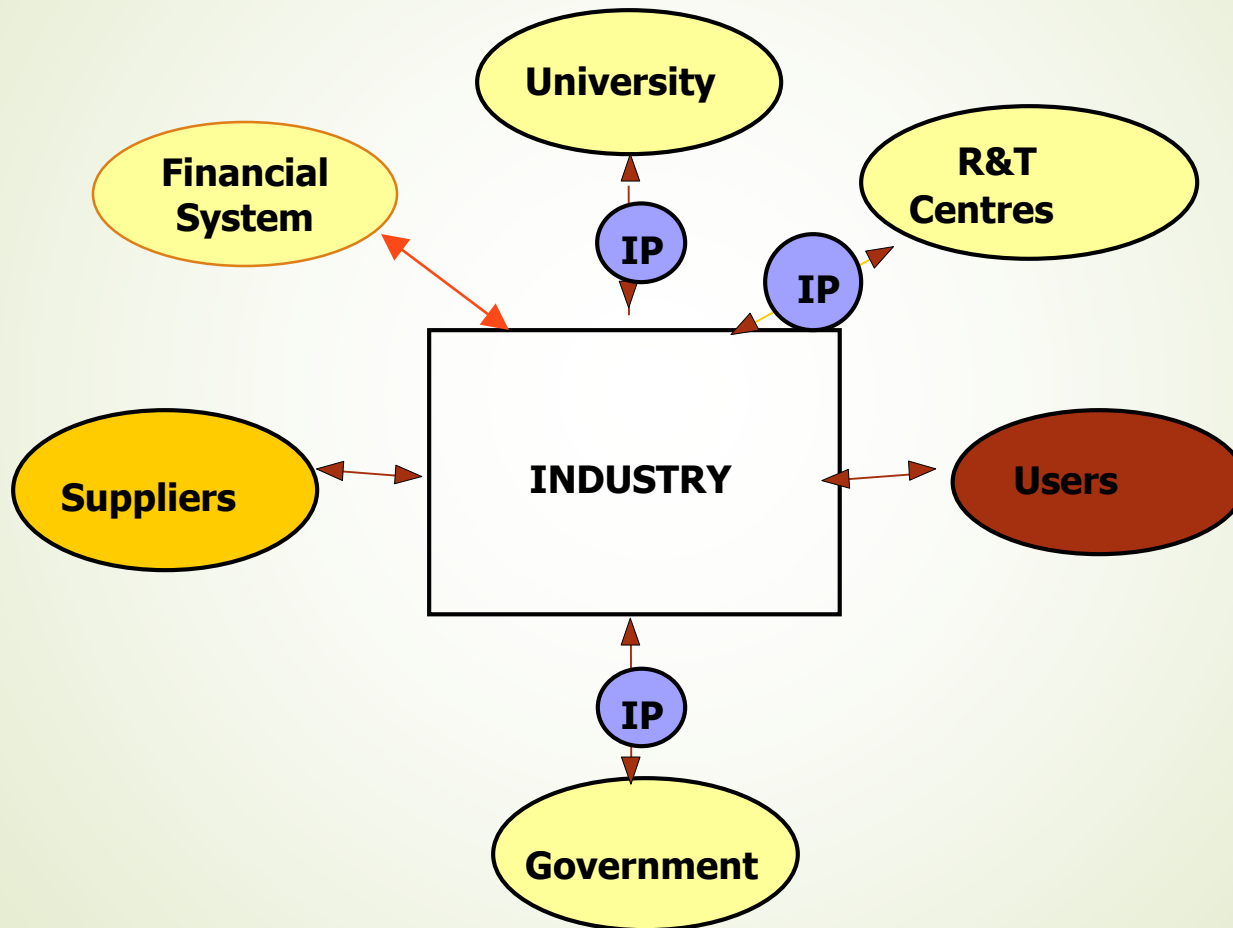
Product
manufacture




4th generation model



5TH generation model





Innovation processes – 5th generation model

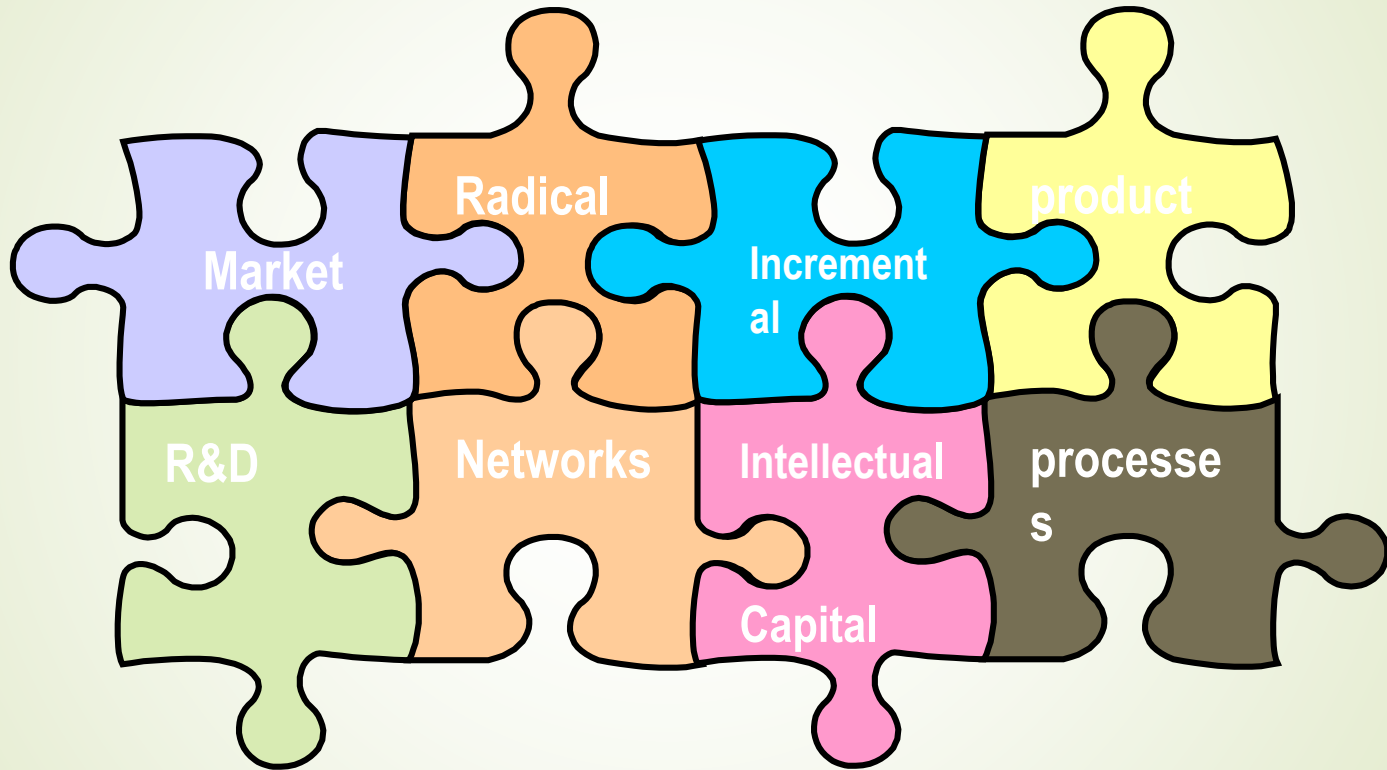
- Relevance of external sources of knowledge
“firms do not innovate in isolation”
- Related to Innovation System concept
- Focus on networking
- Still strong emphasis on R&D and formal knowledge (ICT)

6th generation of innovation processes

“Revolve around knowledge and learning”

- ▶ Networks embrace *all* knowledge types, not only R&D.
- ▶ Most innovative firm is the one that learns *fastest*
- ▶ It is the *use* of knowledge that makes the competitive difference, and creates the advantage

Managing complexity



Innovation can come:

- ▶ From the market (demand pull - 2nd)
- ▶ From the “R&D department” (tech push - 1st)
- ▶ From any department (interactive – 3rd)
- ▶ From process reinvention (integrated – 4th)
- ▶ From external sources of information (networks - 5th)
- ▶ From intangible assets (6th)

Table 2 Rothwell's five generations of innovation models



<i>Generation</i>	<i>Key features</i>
First and second	Simple linear models – need pull, technology push
Third	Coupling model, recognizing interaction between different elements and feedback loops between them
Fourth	Parallel model, integration within the firm, upstream with key suppliers and downstream with demanding and active customers, emphasis on linkages and alliances
Fifth	Systems integration and extensive networking, flexible and customized response, continuous innovation



Innovation models

SO, WHICH ONE IS RIGHT?

- A fast food restaurant chain?
- An electronic test equipment maker?
- A hospital?
- An insurance company?
- A new entrant biotechnology firm?



Can we manage innovation?

- The majority of failures are due to some weakness in the way the innovation process is managed.
- *Technical resources* (people, equipment, knowledge, money, etc.)
- *Capabilities* in the organization to manage them

- *Organizational routines or capabilities* are “the way we do things around here (in this organization)” as a result of repetition and reinforcement
- Routines are firm-specific and must be learned.
- “To manage” innovation means to create an organisation where routines can be learned as to cope with the complexity and uncertainty of the innovation process
- Unlearning is important

TABLE 2.1 How context affects innovation management

<i>Context variable</i>	<i>Modifiers to the basic process</i>	<i>Example references discussing these</i>
Sector	Different sectors have different priorities and characteristics – for example, scale-intensive, science-intensive	2, 12
Size	Small firms differ in terms of access to resources, etc. and so need to develop more linkages	13–17
<i>National systems of innovation</i>	Different countries have more or less supportive contexts in terms of institutions, policies, etc.	5, 18, 19
<i>Life cycle (of technology, industry, etc.)</i>	Different stages in life-cycle emphasize different aspects of innovation – for example, new technology industries versus mature established firms	20–23
<i>Degree of novelty-continuous vs. discontinuous innovation</i>	'More of the same' improvement innovation requires different approaches to organization and management to more radical forms. At the limit firms may deploy 'dual structures' or even split or spin off in order to exploit opportunities	8, 24–26
<i>Role played by external agencies such as regulators</i>	Some sectors – e.g. utilities, telecommunications and some public services – are heavily influenced by external regimes which shape the rate and direction of innovative activity. Others – like food or healthcare – may be highly regulated in certain directions	26, 27

“Innovation is a risky process....but also a mandatory one”. Success depends of a variety of:

➤ Internal factors

- Good management
- Core competencies
- Clear innovation strategy
- Right technology

➤ External factors

- Links with market and suppliers
- Learning from competitors
- Institutional support: financing, human capital, etc

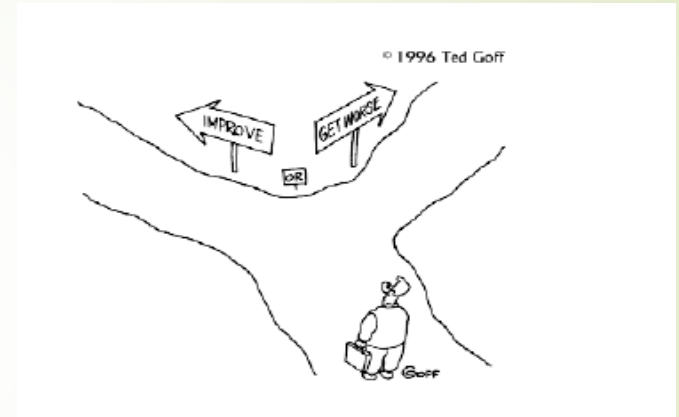


Table 3 Problems of partial views of innovation

*If innovation is only
seen as . . .*

. . . the result can be

Strong R&D capability

Technology which fails to meet user needs and may not be accepted

The province of
specialists

Lack of involvement of others, and a lack of in the R&D laboratory key knowledge and experience input from other perspectives

Understanding and
meeting customer
needs

Lack of technical progression, leading to inability to gain competitive edge

Advances along the
technology frontier

Producing products or services which the market does not want or designing processes which do not meet the needs of the user and whose implementation is resisted

Table 3 Problems of partial views of innovation (continued)

*If innovation is only
seen as . . .*

. . . the result can be

Only about strategically
targeted projects

May miss out on lucky 'accidents' which open up new
possibilities

Only associated with
key individuals

Failure to utilize the creativity of the remainder of employees,
and to secure their inputs and perspectives to improve innovation

Only internally
generated

The 'not invented here' effect, where good ideas from outside are
resisted or rejected

Only externally
generated

Innovation becomes simply a matter of filling a shopping list of
needs from outside and there is little internal learning or
development of technological competence

Only concerning
single firms

Excludes the possibility of various forms of inter-organizational
networking to create new products, streamline shared processes, etc.



Successful innovation

- ▶ New products, processes and services account for an increasing share of sales
 - ▶ Lower prices
 - ▶ Better-performing products
 - ▶ Better features for certain users (niche)
- ▶ 1/2 of resources devoted to the development of new products go to unsuccessful projects
- ▶ 35% of products launched fail commercially



Reference

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