Customer-Centric Innovation

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About me: Frank Piller

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Studying innovation since 1994, but also practicing it by helping large companies to innovate and by being involved in a number of startups

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A magic formula for innovation?

\[ I = f(\text{need}, \text{opportunity}, \text{(frustrated)user}, \text{openness}, \text{creativity}, \text{process\&discipline}, \text{budget}, \text{luck}) \]
The Basic New Product* Process

* The same process applies to service development
The Development Funnel

Front End of Innovation (FEI) → New Product (Service) Development

Opportunity → Ideas → Discovery (ideation and concept development) → Innovative Concepts → Realization → Invention → Nurture → Knowledge

Products / Services (market launch)

Stages of the innovation process / time

FEI activities are less structured and less predictable ("fuzzy")

Development activities can be structured by a formalized and prescribed set of activities

Based on Wheelwright / Clark 1992
The Frontend of Innovation (FEI)

Source: Lercher 2016, 2017
Four main clusters of FEI activities

1) Understanding the external environment of our business units & our customers

2) Identifying gaps between our present state and an envisioned future

3) Creating alternatives for solutions to benefit from opportunities identified in previous stage

4) Combining ideas into concepts which cover primary features and customer benefits of future solution
Methods for generating ideas & concepts

Generating ideas & concepts

Creating concepts internally:
Using a managed process run by the innovation team

Market Research
(Voice of the customer)

Creativity Techniques

Gathering (existing) ready-made concepts from the periphery:
Customer Co-Creation

Collect concepts from others inside the organization

Collect concepts from outside the organization

Innovation is the result of a dedicated firm activity

Innovation is the result of a (frustrated) user
Methods for generating ideas & concepts

Generating Concepts

Creating concepts internally:
Using a managed process run by the innovation team

Market Research
(Voice of the customer)

Creativity Techniques

Gathering (existing) ready-made concepts from the periphery:
Customer Co-Creation

Collect concepts from others inside the organization

Collect concepts from outside the organization
Formulating jobs: Three dimensions

- **Functional**: 
  - Action verb (with direction)
  - Object of action
  - Contextual clarification

The example of a powertool (driller)

**Functional**: “Reduce likelihood of hitting the water pipe when renovating an old house”

**Emotional**: “Provide me with larger satisfaction once I finished the task”

**Social**: “Reduce the disturbance for my neighbors”
Methods for generating product concepts

Creating concepts internally:
Using a managed process run by the innovation team

Market Research (Voice of the customer)
Creativity Techniques

Gathering (existing) ready-made concepts from the periphery:
Customer Co-Creation

Collect concepts from others inside the organization
Collect concepts from outside the organization
Lead users as the source of functional novel innovation

Users as the source of innovation:
User as originators of first-of-type innovations
and major improvements of existing products

Mountain bike
Open Source Software
Scientific Instruments
Petroleum Processing
Conclusions: The Frontend of Innovation

The Frontend of Innovation (FEI) is …

- a customer-centric process of opportunity recognition
  (technological opportunities, but especially open problems (“jobs”) of customers, i.e. customer insights)

- ideation and

- concept development.

The ingredients of the FEI are: Dedicated methods of analysis, creativity, but also lots of evaluation and selection.

It is followed by the (technical) development stage, where technical problem solving, product design & engineering takes place. After a final screen, the new product is then ready for launch.
Implementation and Project Phase

Source: Lercher 2016, 2017
Facets of creativity:
What are abilities of a creative person?
Scientific and technical problem solving

**Problem solving** has two components:

1. **Search process** based on prior experience
2. **Trial-and-error-learning**

**Five-Step-Process of Concept Development**

according to Ulrich & Eppinger

- **Step 1:** Clarify the Problem
- **Step 2:** External Search
- **Step 3:** Internal Search
- **Step 4:** Explore Systematically
- **Step 5:** Reflect on the Results and the Process

The Innovation Funnel

The Front End (FEI)

Opportunity → Ideas → Discovery (ideation and concept development) → Innovative Concepts → Realization → Invention → Nurture

New Product (Service) Development

Products / Services (market launch)

Knowledge

Opportunity

Direction: Where should we look?

Initial Review: Is the idea worth screening?

Full Screen: Should we try to develop it?

Progress Report: Have we developed it?

Market Testing: Should we market it?

The innovation process is also a process of continuous evaluation

Stages of the innovation process / time

Based on Wheelwright / Clark 1992, Source: Crawford, Di Benedetto 2001
A magic formula for innovation?

\[ I = f(n, op, u_f, o, c, pd, $, l) \]

\[ I = f(\text{need, opportunity, (frustrated)user, openness, creativity, process\&discipline, budget, luck}) \]
See you soon!

Please study the syllabus for all important information and organizational detail!
Managing the Innovation Process

Structuring the innovation process: Stage-Gate Thinking
The Development Funnel

Based on Wheelwright / Clark 1992

Front End of Innovation (FEI)  

Opportunity ➔ Ideas ➔ Discovery (ideation and concept development) ➔ Innovative Concepts ➔ Realization ➔ Invention ➔ Nurture ➔ Knowledge

New Product (Service) Development

Products / Services (market launch)

FEI activities are less structured and less predictable (“fuzzy”)

Development activities can be structured by a formalized and prescribed set of activities

Stages of the innovation process / time
Some typical numbers of an innovation process

Original ideas
1919

Initial projects
524

Board projects
369

Launched Products
176

Flops
124

Losses
24

Average profit
17

Success products
11

Innovations of this company

Given this data, what is a core requirement for a successful innovation project?

Source: Schröder (2005)
Robert G. Cooper: The Stage-Gate Model

• “Stage-Gate process “is a conceptual and operational map for moving new product projects from idea to launch and beyond”

• Structuring the innovation process into different stages to master complexity of this process. Each stage defines a set of cross-functional and parallel activities to be undertaken by the project team.

The continuous need to evaluate and make a decision is a **key success factor** of managing the apparently open, complex and unstructured process of innovation.

- **Clear gate criteria** allow to **compare projects** and provide an aggregated overview for top management.

The stage-gate process has been subject of plenty of critique:

- Too determined, too slow for minor improvements
- Not suited for radical innovation (what would be a gate criteria?)
- Sequential thinking, but innovation happens in iterations ("trial and error"): There has to be an option to restart

**What happens before Gate 1?** How are new projects being created? Focus on the “Frontend of Innovation”.

Most firms today use what is called a “Third-Generation process”: a flexible interpretation of the basic process, allowing overlapping phases and fuzzy gates.

Lately, Cooper has further developed his system into a “next gen” stage gate processes.
Managing the Innovation Process

The Big Picture:
A full perspective of innovation
The Big Picture

Source: Lercher 2016, 2017
Meet Dr. Hans Lercher, the „inventor“ of the Big Picture
Hans, can you tell us something about your personal background?
Why and how did you come up with the big picture?
A Deep Dive into the Big Picture
The Big Picture: Stages & Gates

1. Innovation strategy
   - Innovation gaps and search fields
   - Technology intelligence
   - Market intelligence
   - Corporate / company strategy

2. Idea generation
   - Innovation strategy

3. Idea gathering & management
   - Co-Creation

4. Idea concretization & concept development
   - Idea generation

5. Adaption & implementation preparation
   - Idea gathering & -management

6. Business Case Light,
   development, validation
   - Adaption & implementation preparation

7. Maturity gate
   - Business Case

8. Investment gate
   - Maturity gate

9. Go live gate
   - Implementation planning, sales preparation
   - Development & test, validation

10. Project launch
    - Implementation & market launch

11. Project review
    - Project launch

12. Big (Re)view
    - Project review

13. Life-Cycle Management
    - Big (Re)view

Special project:
- Innovation strategy
The Big Picture: Four Project Types

- Incremental Innovation
- Progressive Innovation
- Radical Innovation
- Special Projects
The Big Picture: The different stages
The Frontend of Innovation (FEI)

Source: Lercher 2016, 2017
Idea & Concept Generation

Source: Lercher 2016, 2017
Project Review

Source: Lercher 2016, 2017
Life Cycle Management

Source: Lercher 2016, 2017
The Big Picture

- Innovation strategy
  - Technology intelligence
  - Market intelligence
- Idea generation
  - Co-Creation
- Idea gathering & management
- Idea concretization & concept development
- Adaptation & implementation preparation
- Business Case Light, development, validation
- GO LIVE GATE
- INVESTMENT GATE
- MATURITY GATE
- Implementation planning, sales preparation
- GO LIVE GATE
- Implementation, marketing & sales preparation
- GO LIVE GATE
- Implementation & market launch
- Implementation & market launch
- Implementation & market launch
- Implementation & market launch
- Life-Cycle Management
- Corporate / company strategy
- Vision & flight levels
- START
  - Innovation gaps and search fields
- COMMITMENT GATE
- CHECK-IN GATE
- PITCH GATE
- Business Case
- Special project

- STAGE
- GATE
Agile (highly iterative) project management, design thinking, and the Big Picture
The Big Picture

Source: Lercher 2016, 2017
Hans, what are your experiences with innovators using the Big Picture?
The Big Picture in real life
Managing Innovation: 
An introduction

Frank T. Piller
RWTH Technology and Innovation Management Group
time.rwth-aachen.de/tim
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The objectives of this video module

This is not an innovation management class – but a motivation to study the management of innovation and technology in larger detail.

We will define some important terms and introduce some of the core frameworks and concepts of innovation management.

At the end of the module, you will have more questions than answers – but hopefully more background knowledge, too, when engaging in deeper study – either on your own or in own of our classes or workshops.
What is innovation?

Defining innovation
What is an innovation?
Your Top 10 of Innovation

In 2002, the BBC asked the listeners of its *Today* program on Radio 4 to nominate their top ten inventions of all time. This is what the British public responded (in descending order):

1. **Bicycle** (Pierre Lallement, 1866)
2. **Radio** (Guglielmo Marconi, 1897)
3. **Computer** (Alan Turing, 1945)
4. **Penicillin** (Florey and Heatley, 1940)
5. **Internal Combustion Engine** (Nicolaus C. Otto, 1876)
7. **Light Bulb** (Thomas Edison and Joseph Swan, 1879)
8. **Cat’s Eyes** (Percy Shaw, 1936)
9. **Telephone** (Alexander G. Bell, 1876)
10. **Television** (John Logie Baird, 1923)

An innovation is the creation (invention), introduction (launch) and successful diffusion (adoption) of products, services, systems, processes, or even business models, which are new from the perspective of the particular organization and/or user.
A broader perspective on innovation

Innovation

in a broader understanding

Creation of new technological knowledge

Invention

First usage

Innovation

in a more narrow understanding

Repeated usage

Diffusion
What is special about innovation?

The nature of innovation
Innovation is an open ended problem, characterized by several characteristics.

New

Risky & Complex

Full of conflicts

A Social Process

but full of opportunities, too!!
A typical story of innovation
The story of Barbie reminds us of some key characteristics of innovation:

- Role of outsiders as the source of innovation (innovative users play a central role)
- Not always the result of a structured planning process
- A lot of resistance
- The power of working with prototypes
- The need for being open and un-biased
- So much coincidence & luck

_Innovation Management:_

*Making this a structured, systematic, and repeatable process*
Innovation management is the systematic management of innovation processes. It refers both to product, process, and organizational innovation.

Innovation management includes a set of tools that allow managers and engineers to cooperate with a common understanding of processes and goals.
Are there different kinds of innovation?

Structuring different types of innovation (Part 1)
Different types of innovation (I): Outcome of the innovation process: Products, services, and processes

- **Product Innovation**
  - Embodied in a company's tangible output: a new product offering (*new product development*)
  - Can be new or improved offerings, often variants
  - Example: iPod, Post-it, Pharmaceuticals

- **Service Innovation**
  - Similar to product innovation, but the outcome is a new service offering
  - Rather new perspective that services can be systematically innovated, too
  - Example: New telephone banking process, new logistic service

- **Process Innovation**
  - Concerning the way companies conduct their business – production, marketing techniques, etc.
  - Objective: Improve efficiency of value creation
  - Example: Assembly line production, airlines using e-tickets
The relation of product versus process technology
Object of analysis: industry level

Different types of innovation (II): Degree of innovativeness (uncertainty): **Radical versus incremental innovation**

The **innovativeness of an innovation process** is characterized by the number of elements in a system effected by the innovation and the **resulting uncertainty** in performing the innovation project and diffusing its outcome.

It can be seen as the **RESULT** of an innovation process (output), but also as an **OBJECTIVE** when planning an innovation project (input).

- **Radical, discontinuous innovation**
  - New to the world and fundamentally different to existing products and processes
  - Risky and uncertain concerning technology, market acceptance, demand, regulation, …
  - Example: Satellite phone technology

- **Incremental, continuous innovation**
  - Gradual changes or improvements to existing offerings
  - Leveraging existing skills and knowledge
  - Example: Development of the next MS Office package
Innovativeness as an input measure: Managing innovation based on the expected (desired) result

Why is it important for the manager of an innovation project to "define" the perceived (expected) degree of innovation when setting up the project?

• Information requirements
• Budget & scheduling
• Team composition
• Stakeholder involvement
• Internal communication of project …

Why it is important to evaluate the achieved degree of innovativeness before the invention is being launched? to the market or its internal users?

• Marketing planning
• Communications budget
• Sales and launch execution …
Some typical shares of different innovation types of a large consumer good company

- **New-to-the-world (really-new) products (10% of new products):** Inventions that create a whole new market. Ex.: Polaroid camera, Sony Walkman, Palm Pilot, Rollerblade skates, P&G Febreze and Dryel.

- **New-to-the-firm products (20%):** Products that take a firm into a category new to it. Ex.: P&G brand shampoo or coffee, Hallmark gift items, AT&T Universal credit card, Canon laser printer.

- **Additions to existing product lines (26%):** Line extensions and flankers that flesh out the product line in current markets. Ex.: Tide Liquid, Bud Light, Apple’s iMac, HP LaserJet 7P.

- **Improvements and revisions to existing products (26%):** Current products made better. Ex.: P&G’s continuing improvements to Tide detergent, Ivory soap.

- **Repositionings (7%):** Products that are retargeted for a new use or application. Also includes retargeting to new users or new target markets. Ex.: Arm & Hammer baking soda sold as a refrigerator deodorant; Aspirin repositioned as a safeguard against heart attacks.

- **Cost reductions (11%):** New products that provide the customer similar performance but at a lower cost. Exchanging components, materials, “cost engineering”.

Are there different kinds of innovation?

Structuring different types of innovation (Part 2)
Different types of innovation (III): Degree of change in the product system: Component versus architectural innovation


<table>
<thead>
<tr>
<th>Components / core concepts</th>
<th>Reinforced</th>
<th>Overturned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unchanged</td>
<td>Incremental Innovation</td>
<td>Component Innovation</td>
</tr>
<tr>
<td>Changed</td>
<td>Architectural Innovation</td>
<td>Radical Innovation</td>
</tr>
</tbody>
</table>

Gradual refinement/ improvement of existing components leaving the system unchanged

Complete overhaul of components and system

Using new components within an unchanged system

Reconfiguration of an existing system using unchanged or new components; main changes in design and way how components interact
Different types of innovation (IV): Degree of change from the firm perspective: **Sustaining versus disruptive innovation**

**Performance improving ("sustaining") Innovation (improvements of merit):** Replacement of old model by a next and better version  
*Example: The new Volkswagen Golf.*

**Efficiency improving Innovation (Process innovation)** An offering of the same solution for the same customers at a lower price ("low-end disruptions").  
*Example: Walmart's retail innovations, "just in time" manufacturing by Toyota.*

**Market creating Innovation (disruptive business model innovation):** Transformation of existing (complex or expensive) solutions in such a radical manner that a new market is created (with a new class of customers). Result of combining a cost-reducing technology with a business model.  
*Example: Video streaming “on demand” replacing the video rental store*

Picture Source: Wikipedia Media Commons (CC BY-SA)
A common structure of innovation categories: The “Ansoff Matrix”

There are many shades of innovation – it is important to know what you want to achieve (contingencies of an innovation project)
Why do we have to innovate?

Outcomes and objectives of innovation
Why is innovation important for the company?

**Demand**
- Saturation of basic needs
- Increasing individualization

**Competition**
- Increasing liberalization
- Increasing globalization
  - need for differentiation

**Input efficiency**
- Increasing supply scarcity
- Shifting price relations
- Changing values of employees

**Tech. progress**
- Microelectronics
- Laser technologies
- Biotechnology
- New materials

**Societal demands**
- Environment
- Social needs
- Consumer safety

Innovation pressure
Why is innovation important for the company? Schumpeter’s Theory of Industrial Development

Entrepreneurship = the discovery and exploration of information advances

Innovation of an entrepreneur = “Exploration of new combinations“, the innovator becomes a “creative destroyer“
Why is innovation important for the company?
Michael Dell is a typical example of a Schumpeterian innovator.

Michael Dell’s innovations:
Business Model Innovation, service innovation, plenty of process innovation, using the existing architecture of the PC industry.
Why is innovation important from the perspective of our society and economy at large?

- To increase **economic growth** by producing the same with less factor input or by producing more with the same factor input (**quantitative growth**)
- To get products which **better fit to customer needs** (**qualitative growth**, enhancing consumer welfare)
- To **increase productivity of downstream industries** by supplying better components and machines
- To **support ecological or social sustainability** by producing products and services in a different, more efficient way
- Because knowledge once created can be used by others as well.
That we have to innovate seems to be out of question today.

The question is how.
From why to how

Searching for best practices of managing innovation
Relationship between R&D Input and Output

Financial Success

Investments in R&D
The consequence:
A focus on best practices and “proven” methods for successful innovation
# The World’s Most Innovative Companies

**Forbes**

## Browse the List

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>5-Year Avg. Sales Growth (%)</th>
<th>5-Year Avg. Net Income Growth (%)</th>
<th>Enterprise Value ($bil)</th>
<th>Innovation Premium*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salesforce.com</td>
<td>39.5</td>
<td>78.7</td>
<td>20.7</td>
<td>75.1</td>
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<tr>
<td>2</td>
<td>Amazon.com</td>
<td>32.0</td>
<td>37.6</td>
<td>92.7</td>
<td>58.9</td>
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<tr>
<td>3</td>
<td>Intuitive Surgical</td>
<td>43.4</td>
<td>36.4</td>
<td>13.4</td>
<td>57.6</td>
</tr>
<tr>
<td>4</td>
<td>Tencent Holdings</td>
<td>69.0</td>
<td>75.4</td>
<td>46.5</td>
<td>52.3</td>
</tr>
<tr>
<td>5</td>
<td>Apple</td>
<td>35.1</td>
<td>60.7</td>
<td>303.4</td>
<td>48.2</td>
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<tr>
<td>6</td>
<td>Hindustan Unilever</td>
<td>10.0</td>
<td>4.0</td>
<td>15.5</td>
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<td>7</td>
<td>Google</td>
<td>35.0</td>
<td>37.1</td>
<td>138.1</td>
<td>44.9</td>
</tr>
<tr>
<td>8</td>
<td>Natura Cosméticos</td>
<td>17.0</td>
<td>13.5</td>
<td>10.2</td>
<td>44.5</td>
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<tr>
<td>9</td>
<td>Bharat Heavy Electricals</td>
<td>27.2</td>
<td>25.0</td>
<td>19.5</td>
<td>43.6</td>
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<tr>
<td>10</td>
<td>Monsanto</td>
<td>13.4</td>
<td>44.7</td>
<td>41.3</td>
<td>42.6</td>
</tr>
</tbody>
</table>
TR50 – Companies finding innovative solutions to new challenges

A123 Systems  Nissan
Akamai        Novartis
Amazon.com    Pacific Biosciences
Amyris        Roche
Apple         Siemens
Applied Materials  Suntech
ARM Holdings  Toyota
Complete Genomics  Private Companies
First Solar  American Superconductor
Geron  BIND Biosciences
Goldwind Science and Technology  BrightSource Energy
Google
HTC
IBM
iRobot

Facebook
Groupon
Joule Unlimited
Lattice Power
Layar
Lyric Semiconductor
Novomer
PrimeSense
Serious Materials
Silver Spring Networks
SpaceX
Square
Synthetic Genomics
1366 Technologies
Twitter

Source: http://www.technologyreview.com/tr50/
What do executives think and do about innovation?
Innovation is a top strategic goal of executives

Where does innovation rank among your company’s strategic priorities?

<table>
<thead>
<tr>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top priority 1</td>
</tr>
<tr>
<td>Top-three priority 2</td>
</tr>
<tr>
<td>Top-ten priority</td>
</tr>
<tr>
<td>Not a priority</td>
</tr>
<tr>
<td>26</td>
</tr>
<tr>
<td>45</td>
</tr>
<tr>
<td>23</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

Percentage of respondents who consider innovation a top-three strategic priority

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>2006</td>
<td>72</td>
</tr>
<tr>
<td>2007</td>
<td>66</td>
</tr>
<tr>
<td>2008</td>
<td>66</td>
</tr>
<tr>
<td>2009</td>
<td>64</td>
</tr>
<tr>
<td>2010</td>
<td>72</td>
</tr>
</tbody>
</table>


1The total percentage of respondents who said that innovation is one of their company’s top-three priorities rounds to 72 percent.
Satisfaction with the return on innovation spending has risen for the past three years, but remains rather low.

Are you satisfied with the financial return on your investments in innovation?

Percentage of respondents

<table>
<thead>
<tr>
<th>Year</th>
<th>Yes</th>
<th>No/Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>43</td>
<td>52</td>
</tr>
<tr>
<td>2009</td>
<td>55</td>
<td>48</td>
</tr>
<tr>
<td>2010</td>
<td>57</td>
<td>45</td>
</tr>
</tbody>
</table>

Source: BCG Innovation Survey 2010
How to measure success of innovation: customer satisfaction and revenue growth are dominating metrics.

How does your company measure its success at innovation?

Source: BCG Innovation Survey 2010
A risk-averse culture and lengthy development times are the biggest hurdles to benefit from innovation.

Source: BCG Innovation Survey 2010
Innovation management
(as a discipline of management research):

Identification of success factors and hurdles to achieve a high return on innovation spending. Development of corresponding tools and methods.
How does innovation happen?

Innovation = information processing in a structured process
There are two main understanding how innovation happens

- **Innovation is the result of a (frustrated) user**
- Not a systematic process
- **Invention is happening anyway.** It is the task of the company to build “absorptive capacity” to capture this external input
- Focus on managing this **inflow of external input**
- User innovators *profit from using their invention*

- **Innovation is the result of a dedicated firm activity**
- It is a **systematic process of different stages:** From opportunity recognition towards market launch
- Managing the risk of innovation (uncertainty)
- Focus on internal **creativity and problem solving**
- Manufacturer innovators *profit from selling the innovation*
A typical structure of a systematic innovation process
Every innovation process requires two kinds of information, influencing its efficiency and effectiveness.

- NEED INFORMATION
  - Needs and preferences of users and customers
  - Which benefit shall the innovation provide, which (open) problem shall it solve?
    - Explicit or latent information
  - Getting access to the right need information influences the "fit to market"

=> **Effectiveness** of innovation process
Most new products / services do not flop because of technical failure, but because they do not meet customer requirements – firms did not get sufficient access to need information.
Many companies face the problem of obtaining the right need information – which often is “sticky”
Sticky information is information that is difficult to transfer between two actors.

“The stickiness of a given unit of knowledge or information is defined as the incremental expenditure required to transfer that unit from one place to another, in a form that can be accessed by the recipient. When this expenditure is low, information stickiness is low; when it is high, stickiness is high. By implication, sticky information is harder to move.” (Eric von Hippel, Management Science 1994)

Some reasons:

>> Information needed by developers may be tacit
   Can you tell your child how to ride a bike?

>> A lot of information is often needed by developers
   “You didn’t tell me you were going to use the product that way!”
In development, firms need to get access to solution information

Solution information

- Technical knowledge how a need can be transferred into a product / Service
- What is the principle behind the need?
  - Often information already known (somewhere)
- Getting access to the right solution information determines time-to-market and cost-to-market

=> Efficiency of new products development
When an innovation project does not meet its "time to market" or "cost to market" objectives, the cause often is that the development team did not have access to the right solution information – or was searching at the wrong place.
Innovation (as an activity) = disciplined problem solving
Search (based on prior experience)

Experimentation (trial and error learning)

local search bias
We tend to search only in the “known” – we have a bias for local search (“stuck in a paradigm”, “tunnel perspective”)

Local search: To look only for solution information in your own technical domain based on previous experience

- **Sometimes**, prior experience is helpful – when new problem is closely related to old problem (*continuous improvement*)
- **Sometimes**, Prior experience is not helpful – can impede problem resolution -

*Problem: "stuck in a paradigm", "tunnel perspective"

**Local search bias**: Negative biasing by previous experience may block an innovator to find the "best" solution for a given question

=> "reinventing the wheel"

=> long "time to market", high "cost to market"

Some reasons for local search:

Experience and previous training, Limited access to information available, Methods to evaluate information
Overcoming these two challenges is a central success factor of systematic innovation management.

Solution Information

Nurture (market launch)

Ideation

Realization ("R&D", product development)

Increasing the efficiency

Increasing the effectiveness

Doing things right

Doing the right things

Need Information

sticky information

local search bias
What are methods to reduce the problems of "stickiness of need information" and the "local search bias"?
Some measures to get access to (sticky) need information

Market research / "Voice of the customer" methods
- Qualitative research, e.g. trend scouts, focus groups
- Quantitative research, e.g. surveys
- Combined methods, e.g. "Outcome driven innovation"
- Trend studies, third-party-data

Observing customers
- "Empathic design", e.g. observing customers in real environments
- Clinics and lab research (usability)
- Participative design

Using past-data and iterations
- Exploration of last season's sales data, educated guess of experienced sales person etc.
- Purchasing trend studies, using analysts and consultants
- Study competitors
Some measures to reduce the local search problem

**Change your search style**
- Training to improve cognitive search style, get experience in search
- Creativity techniques like brainstorming, TRIZ, QFD, etc.

**More effective external search**
- Broaden the breath and width of search (**open innovation**)
- Assign gatekeepers and special boundary roles
- Build absorptive capacity: establish bridging strategies

**Partner with organizations with different knowledge**
- Alliances and networks, R&D consortia, supplier integration in R&D
- Mergers & acquisitions
- Informal organizational arrangements

**Find people with different knowledge**
- “Knowledge flows with people moving” => diversity in organizations
- Interdisciplinary teams
- Job rotation

Source: Building on Karim Lakhani (2007)
In our lectures, we will discuss these and other methods and organizational principles in larger detail.
What is the *real* challenge of innovation?

Thinking about innovation shapes the way we manage it
Innovation often follows an established paradigm (basic model)

Ray Ewry (1873-1937)
Olympic Games,
London, 1908

World record: 1.98

Mildred McDaniel (1933)
Olympic Games,
Melbourne, 1956

World Record: 2.15

Richard Fosbury (1947),
Olympic Games,
Mexico, 1968

World Record: 2.24

Source: John Bessant, Exeter University
Picture Source: Wikipedia Media Commons (CC BY-SA)
How we think about something ... shapes the way we manage it.
Frugal innovation: Thinking differently, “stealing with pride” from other industries

Use of near and far analogies

Successful Innovation Management:

**Balancing Short-Term Profitability with Long-Term Sustainability**

The fundamental problem of managing innovation on an aggregated level …
What is the *real* challenge of innovation?

The innovation challenge and the exploitation-exploration paradigm
Successful Innovation Management:

Balancing Short-Term Profitability with Long-Term Sustainability

The fundamental problem of managing innovation on an aggregated level ...
Exploration versus exploitation

• Exploration: “... includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation.” => radical, disruptive innovation

• Exploitation: “... includes such things as refinement, choice, production, efficiency, selection, implementation, execution.” => incremental, performance-improving innovation

Firms need both sets of innovative activities for long time survival. But as their execution demands very different activities, capabilities, processes, and evaluation criteria, firms often focus on exploitation – and fail ...
Firms need to master two distinct challenges at the same time:

Established business (EXPLOITATION):
- Strengthening and extending the core

New business (EXPLORATION):
- Creating the new
Firms need to master two distinct challenges at the same time:

- Strengthening and extending the core business (EXPLOITATION)
- Creating the new business (EXPLORATION)

Pictures: Wikipedia Media Commons (CC BY-SA)
Firms need to master two distinct challenges at the same time:

- **Strengthening and extending the core business**
- **Creating the new business**

This dual focus is crucial for the 21st-century business. The source of inspiration for this approach comes from the work of (name of author) in the (name of publication). This perspective emphasizes the need for companies to adapt and evolve, leveraging both their existing strengths and exploring new opportunities.

Firms need to master two distinct challenges at the same time

**Ambidexterity:** “The test of a first rate intelligence is the ability to hold two opposed ideas in the mind at the same time, and still retain the ability to function.” (Fitzgerald)

**In the context of innovation:** “the capacity to simultaneously achieve alignment and adaptability at a business-unit level”
A risk-averse culture and lengthy development times are the biggest hurdles, finds BCG study

What are the biggest obstacles you face when it comes to generating a return on your investments in innovation?

Source: BCG Innovation Survey 2010
Mastering exploration is important: It is key driver for profit

Source: PDMA Study 2010
Circumstances of innovation: Fit of new opportunities and the nature of customers served

Nature of the Opportunity

- **Poor** fit w/ current organization
- **Good** fit w/ current organization

Nature of the Customer

- **Core Business**
  - **Existing customers** served in traditional ways
- **Adjacency**
  - **New customers** or **existing customers** served in fundamentally different ways

Performance innovation (or “poor dogs”)

White Space (Business Model Innovation)

Source: M.W. Johnson: Seizing the White Space, 2010
The more we move to the “white space” (=engage in exploration), the more we have to build and manage assumptions.

Source: M.W. Johnson: Seizing the White Space, 2010
The recent focus on business model innovation emphasizes an innovation system that allows firms to deal with assumptions about their future – and to create (and test) new business models as systematically as new products (i.e. to engage in exploration)
What did we talk about in all the previous slides?

Summary and conclusions
A few important things to remember

- **Innovation** is the **creation (invention)**, **introduction (launch)** and **successful diffusion** of products, systems, or processes which are **new from the perspective** of the particular organization or user.

- Innovations are **open ended, complex problems** and result from a **social process**.

- They often have their **origin in an user with an open need**, but also are the **result of a structured innovation activity** by a firm.

- **Identifying “best practices”** of firms with high innovation performance is a core activity in innovation research.
A few important things to remember

- **Addressing the two core problems of managing an innovation project:** getting access to the right “sticky” **need information**, and finding **technical solution information** without being limited by “local search”.

- The idea of the **stage-gate process** is to **de-risk** the consequences of making innovation activities under **insufficient information**.

- **Mental models** shape our understanding of innovation and provide the "sandbox where we play" to innovate: Need to **balance** between **exploration (long-term sustainability)** and **exploitation (short-term profitability)**. This is perhaps the largest challenge of managing innovation.
Stay open, start innovating, and to explore innovation

For updated information and new examples, follow us on Twitter: @masscustom, @rwth_tim