

- 1) What is **creativity** and what are **creativity** techniques?
- 2) What is the optimal composition of a creative team?
- 3) Is diversity good or bad for the performance of creative teams?
- 4) Name the types of **creativity** techniques and explain them briefly?
- 5) Give two examples of systematic/analytic **creativity** techniques and briefly describe them?
- 6) Give two examples of intuitive **creativity** techniques and briefly describe them?
- 7) When is brainwriting better than brainstorming?
- 8) Describe the morphologic box **creativity** technique with a brief example.
- 9) Describe the search field **creativity** technique with a brief example.
- 10) Describe the Osborne Checklist with a brief example
- 11) Describe the SCAMPER method with a brief example.
- 12) Name and briefly describe a technique for idea evaluation?

Navigation icons: back, forward, search, etc.

1)

Creativity

Creativity is a phenomenon whereby something new and valuable is created (idea, solution, invention, painting, music, etc.) by groups or individuals.

Creativity techniques

Creativity techniques support directly the human cognitive processes that are subconsciously used for idea generation (Specht, 2002)

2)

Creativity techniques are normally applied by creative **teams**

- creative **team**
 - familiar with the problem
 - 5 – 7 **team** members
 - diversity?
- moderator
 - methodological competence
 - not necessarily (or even no) domain knowledge

3)

- **Time diversity** is bad in case of time pressure – no time for exchange and use of positive potentials

4)

intuitive/associative approaches

Free association for idea generation, only the collection and documentation process are determined.

- brainstorming
- brainwriting
- brainwalking
- card moderation

systematical/analytical approaches

Structured solution process for systematical idea generation are forced by step-by-step techniques.

- general approaches
 - morphological box
 - synectic (bionic, headstand)
- product development specific approaches
 - TRIZ, conceptual principles
 - search field approach
 - checklist approaches

Brainstorming



Most commonly known creativity technique based on free association.

Approach:

- define problem
- creative team members propose brief solutions they associate with the problem formulation
- no feedback or comments
- no explanations or discussion
- ideas are collected (by moderator on flipchart, video, etc.)

Pros and cons:

- normally a large amount of ideas (pro and con – need to be evaluated)
- early influence by others (existing thinking routes)
- introversion of team members might be problematic

Brainwriting

Also known as 6-3-5 approach (6 people, 3 ideas, 5 minutes) but can be adapted

Approach:

- sheet of paper with ideas per (3) columns in first row and space for additions by others in (1+5) rows
- after a certain period of time (5 minutes) sheet of paper is passed to the next team member
- round 2 to n: Reflection of the ideas and additions by others and own further development
- stay focused no (nonconstructive) criticism

Pros and cons:

- redundancy (worst case only three ideas)
- hard to stay focused if limited to three own ideas and otherwise those of others
- better for introverted team members
- fewer but more elaborate ideas
- one round of feedback and idea exchange

8)

Morphological box

- identify key attributes of a product or service
- identify elements
- systematically combine elements for new solutions

payment	ordering	food transfer	clean up
before eating	at waiter	by waiter	by waiter
after eating	at desk	self service	self service
	not at all	automatically	

Restaurant: order at waiter, food by waiter, payment after eating, clean up by waiter

Mensa: order at desk, food self service, payment before eating, clean up self service

Fast food: order at desk, food transfer self service, payment before eating, clean up by waiter

Running sushi: no ordering, automatical food transfer, payment after eating, clean up by waiter

etc.

9)

search field approach

Identify existing (own and competitor) product groups, customer groups, etc. in the market and evaluate them systematically for product characteristics and qualities (morphological matrix), wholes?

area function	face	skin	hair	feet	genital area	...
clean	✓	✓	✓	✓	✓	
care nurish	✓	✓	✓	?	✓	
parfume	✓	✓	✓	✓	✓	
refresh	✓	✓	?	✓	?	
change look	✓	✓	✓	?	?	
...						

10)

Osborne checklist

Many new products are different from existing one in just minor aspects which often are ... and covered in the **Osborne** checklist of 62 questions to ask about a product.

- different use (e.g. Q1: Is there an alternative use of the product as it is?)
- adaptation (e.g. Q5: Are there parallels in the past?)
- enlarge (e.g. Q15-Q17: Higher, longer, thicker?)
- shrink (e.g. Q27-Q28: Flater, shorter?)
- replace (e.g. Q37: other material? Q40: other place?)
- rearrange (e.g. Q46-47: other order, replace cause and effect?)
- reverse (e.g. Q50,Q52: negative to positive, start from end)
- combine (e.g. Q62: combine Ideas)

11)

SCAMPER checklist

- Take the existing product and place it in the middle of a sheet of paper (drawing, photo)
- Think of possibilities to ... this product, collect the ideas visually around the start product
 - Substitute
 - Cobmine
 - Aadapt
 - Modify, Magnify, Minify
 - Put to other uses
 - Eliminate
 - Reverse or Rearrange

12)

Idea **evaluation**

The determination of assessment criteria for and accordingly **evaluation** of ideas.

number of cards (and additional **evaluation** e.g. borda criterium) reveals importance

- 1 Briefly explain the meaning of the term innovation.
- 2 Distinguish innovation from invention, diffusion and imitation and explain each of these terms briefly.
- 3 Why are innovations important for companies – explain briefly.
- 4 What is the Austrian School of Economics?
- 5 What was Joseph Schumpeter's contribution to innovation research?
- 6 What are types of innovation according to Schumpeter, briefly explain and provide an example for each?
- 7 What is creative destruction, give an example?
- 8 What are the differences and commonalities of entrepreneurship and intrapreneurship?
- 9 By which criteria can innovations be classified – explain them briefly.
- 10 What are technology push and market pull – explain with an example?

1)

Innovation literally means 'improvement' or 'modernization'. The word is derived from the Latin *novus* 'new' and *innovatio* 'something newly created'.

Course working definition:

Innovation is the goal-oriented implementation of new technological, economic or organizational problem solutions.

2)

Invention

The development of some new technology, method or idea – not necessarily implemented in marketable products and services (science and technology)

Innovation

Innovation is the goal-oriented implementation of new technological, economic or organizational problem solutions.

Diffusion

The acceptance and proliferation of an introduced innovation with its aspired users (internal and external)

Imitation

The introduction of (potentially further developed) substitutes to the innovation by competitors

3)

For **companies**:

- scientific and technological progress
- diverse and changing customer requirements
- competitive dynamic
- globalization

4)

School of economic thought in the 19th and 20th century in Vienna. The Austrian **School** argues that choices of heterogeneous individuals underlie all economic phenomena.

- Friedrich von Wieser: differences in value, 'marginal utility' and 'opportunity costs'
- Eugen von Böhm-Bawerk: marginalism, work on capital and interests
- Friedrich von Hayek (Nobel prize laureate): different information, how prices signal information
- Joseph Schumpeter: different risk attitudes, expectation lead to innovation by entrepreneurs

5)

'Theory of economic development' (1911):

- Changed use of inputs, new outputs improved organizational arrangements or more efficient processes destroy an equilibrium and prevent stagnation
- markets are not in equilibrium but in constant transformation and change caused by innovations of entrepreneurs
- creative entrepreneurs pro-actively search new products and services or new combinations of economic conditions
- creative *entrepreneurs* are the driver of economic development and growth
- discontinuous process of *creative destruction*

6)

Exploitation of inventions and reorganization of economic conditions

- product innovation
- input innovation
- process innovation
- market innovation
- organizational innovation (structures, processes, strategies)

7)

Some examples of different innovations that led to creative destruction.
Creation of new markets and severe irritation or destruction of established ones:

- smartphone industry: Samsung (formerly merely unknown in mobile phones) – Nokia (former mobile phone market leader virtually non existing)
- refrigerator vs. ice transport system
- corn for bio fuel ▷ increasing food prices in Central and Latin America

8)

Schumpeter (1911) – Entrepreneurship

- Innovation requires entrepreneurs
- many opportunities for innovations, low concentration of innovative activities
- many new firm entries
- small firm size
- *empirical example: partly IT and mechanical engineering industries*

Schumpeter (1955) – Intrapreneurship

- Large companies research departments mechanize innovation
- few new firm entries
- large firm size
- *empirical example: electrical engineering, chemical or pharmaceutical industries*

9)

critierion	question
content	what is the core of the innovation?
degree of change	what changes are released by the innovation?
trigger	by what was the innovation triggered?

10)

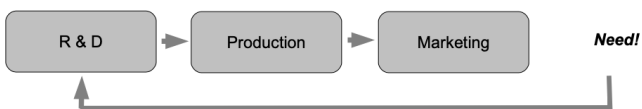
Basically two different innovation paradigm (von Hippel, 1978):

- manufacturer-active paradigm – *technology push*: producer develops based on technology design and products
- customer-active paradigm – *market pull*: customer explains demand or develops ideas
- push-**pull** – connected models (Rothwell, 1994)

Technology push



Market **pull**



- 1) What are pros and cons of market pull as trigger of innovations?
- 2) What are pros and cons of technology push as trigger of innovations?
- 3) What are Kondratjew cycles give some examples?
- 4) What is technology management?
- 5) What is research and development?
- 6) Name and briefly describe three types of technologies.
- 7) What is a disruptive technology, explain with an example.
- 8) Explain the technology s-curve concept.
- 9) Explain the technology management portfolio.
- 10) What is technology assessment – discuss the concept with an example technology?
- 11) Give some examples of organizational processes that can cause innovations.

1,2)

Technology Push

Pros

- large innovation steps
- high profit potential

Cons

- high risk (potentially no demand, etc.)
- implementation is time consuming

Market Pull

Pros

- low risks (existing demand, etc.)
- fast implementation

Cons

- rather small innovation steps
- small profit potential if not regularly applied

3)

Past Kondratjews

technologically induced economic cycles of around 30 years

1. Kondratjew: steam engine and cotton (~ 1800)
2. Kondratjew: railway and steel (~ 1850)
3. Kondratjew: electrical engineering, automobiles and petrochemistry (~ 1900)
4. Kondratjew: television, air and space sector (~ 1950)
5. Kondratjew: information and communication technology (~ 2000)

Next Kondratjew?

(naturally) differing opinions about this

- biotechnology
- nanotechnology
- nuclear fusion
- renewable energy and energy efficiency

4)

Technology management

Technology **management** is the (internal and external) exploration and exploitation of scientific and technical knowledge and by systematical analysis, planning and control manages the companies technological capabilities. (Brockhoff, 1999)

5)

Research and development – R & D

Internal exploration of scientific and technical knowledge, by means of basic and applied **research** and experimental development to solve practical problems. (OECD, 1963)

6)

- fiber optics
- LED
- WLAN

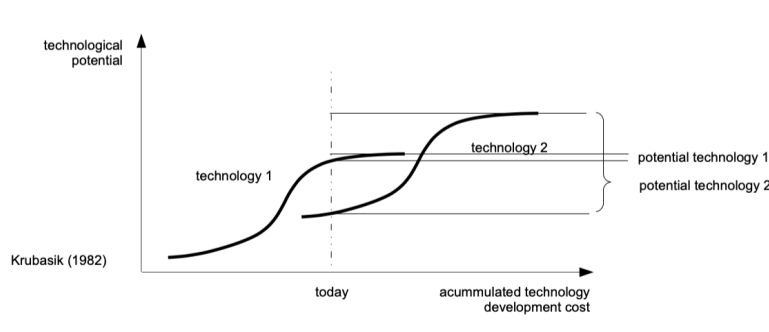
7)

A disruptive technology is **one that displaces an established technology and shakes up the industry or a ground-breaking product that creates a completely new industry.** Harvard Business School professor Clayton M.

Examples:

- encyclopedia – wikipedia
- letter – e-mail
- telegraphy – telephone – mobile telephony
- gas lights – light bulb

8)



9)

Technology attractiveness (external)

- potential for further development
- scope of applicability
- compatibility with demands, existing system, etc.

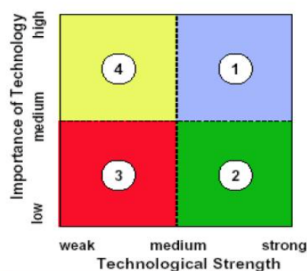
Technology strength (internal)

- level of proficiency
- internal potential (know-how, resources, etc.)
- (re)action speed

VATECH Technology Strategy



Standard Strategies Technology Portfolio



Standard, Strategies

1	"Defend Lead"	• Technology Improvement Projects to Secure Technological Leadership
2	"Keep Position"	• Lean R&D Resources Dedicated • Consider Giving Licensing
3	"Withdraw"	• Dedicated No R&D Resources • Buy Technology (as needed)
4	"Keep up"	• Build up Own Technology, if Differentiation to Technology Leader is possible • Consider Taking Licensees



TBI+holist/evolutionmgmt/Technology_Strategy.ppt - 31/08

10)

Technology Assessment

Holistic evaluation of the risks, drawbacks and threats of a specific technology from various perspectives, economic, socio-cultural, environmental, etc.

In contrast to technology choice. E.g.: ultimate waste disposal of nuclear power plant fuel rods, myopia due to smartphones and computers

11)

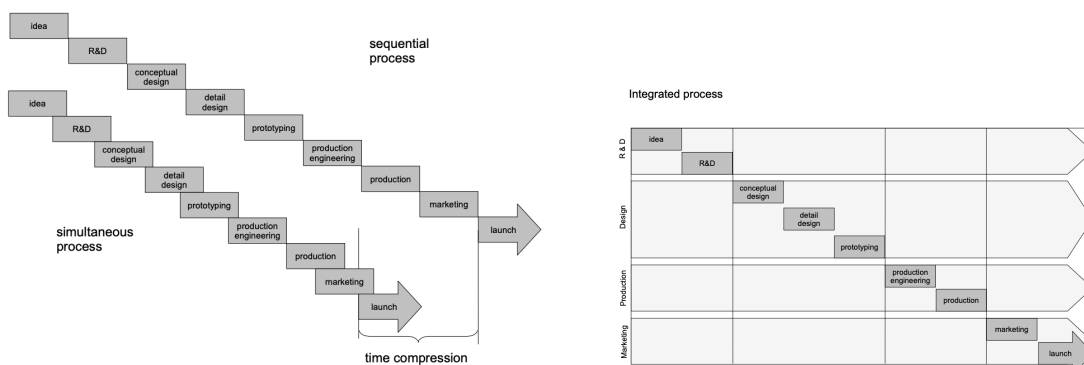
Some examples of **organizational** processes and functions that may contribute inventions:

- market research and market monitoring (new potential markets and customer groups – market innovation)
- sales (special wishes of customers – product innovation)
- internal suggestion systems (process and product innovation)
- process and **organization** management (**organizational** innovation)
- continuous improvement processes (process, **organizational** innovation)
- procurement (input innovation)
- knowledge management, lessons learned, etc. (all)
- etc.

- 1 Explain the difference between sequential and simultaneous innovation processes
- 2 Explain the difference between simultaneous and integrated innovation processes
- 3 What type of innovation process is the stage gate process and why?
- 4 What type of innovation process is SCRUM and why?
- 5 What is rapid and virtual prototyping
- 6 What is open innovation?
- 7 What forms can open innovation assume?
- 8 What caused the shift from sequential to simultaneous to integrated development procedures?
- 9 What kind of interdependencies between departments of an organization could exist, explain briefly?
- 10 What are the key success factors for the new product development process?

1, 2)

- **Sequential processes** (1970s)
Technology-push or market pull stepwise processes
- **Simultaneous processes** (1980s)
Overlapping phases for better coordination and shorter time to market
- **Integrated processes** (1990s)
Cross functional teams and open innovation extend the projects horizons



3)

Developed by Cooper. Used widely in many disciplines (manufacturing, architecture, formerly also in software engineering)

- **Stage**

- set of tasks
- e.g. discovery, scoping, business case, development, testing, launch
- normally each stage is assigned to one group or department of the company
- different models with different numbers of stages developed over time

- **Gate**

- stop or go decisions for next stage
- mile stones with routine checks (check lists)
- help to assure quality and control costs
- in case of shortcomings of the project return to previous stage for revision

Fazit: very transparent and easy to control but also very slow.



4)

Innovation Process -> froma waterfal to scrum

5)

Rapid prototyping	Virtual prototyping
<p>Make (variants of) prototypes for further evaluation (tests, market studies, process engineering) in short time to support simultaneous or integrated innovation processes.</p> <ul style="list-style-type: none">● graphical sketches (story boards)● click throughs● 3D printer● etc.	<p>Virtual prototyping uses computer modeling and simulation (e.g. with MatLab, Simulink SciLAB, Modelica, etc.) to generate (different versions of) prototypes fast and at low cost. Applied for example in:</p> <ul style="list-style-type: none">● mechanical engineering● mechatronic (robotics)● electrical engineering● automotive engineering● airplain engineering● etc.

6)

Open Innovation (Chesbrough 2003)

"Open innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology."

7)

- Specific forms (Grassmann & Engel, 2006):
 - outside in: new ideas
 - inside out: information about the innovation activities to externals
 - coupled: joint innovation projects with suppliers, key users, competitors

8)

Sequential ▷ Simultaneous ▷ Integrated

- **Task complexity:** shift from **sequential** to reciprocal interdependencies
- **Innovation competition:** shift from cost control to shorter time to market

9)

- **pooled:**
Units contribute to common output
- **sequential:**
Output of one unit is input for next (one direction)
- **reciprocal :**
Simultaneous dependence in both directions

10)

quality

Accordance of the output of the process with the requirements of the customers (for topics other than costs and time)

time

Speed of the production or service provision process and adherence to schedules

costs

Monetarily valuated consumption of resources for the production or service provision process

- 1) What are pros and cons of central innovation management?
- 2) What are pros and cons of decentral innovation management?
- 3) What is the difference between an innovation management as line and staff department?
- 4) What is a strong (thick) and a weak (thin) organizational culture?
- 5) Name some positive and negative aspects of a strong organizational culture (each 4 at least).
- 6) Explain briefly Schein's cultural level model.
- 7) Briefly explain the cultural change model of Dyer.
- 8) Name and briefly explain at least five arguments for resistance to innovation within a company.
- 9) Briefly explain Hauschildt's promotor model.
- 10) What is bootlegging and what forms of it could occur?

1, 2)
central

Pros	Cons
<ul style="list-style-type: none"> • efficient usage of resources (no parallel works) • specialization • focus on important aspects (products, markets, etc.) • easier coordination 	<ul style="list-style-type: none"> • isolation of the innovation function • innovation management could become independent (as own department) • inflexibility (long ways of information and communication)

decentral

Pros	Cons
<ul style="list-style-type: none"> • fast reaction and close to the market • low bureaucracy • lower complexity due to clearly defined responsibilities • clear relations between innovation management and other functions 	<ul style="list-style-type: none"> • lower benefits of specialization • higher coordination requirements for the multiple innovation units • problematic information and slower communication • no economies of scale (smaller projects)

3)
 4)

Thick (strong) cultures

- pervasive
- strong
- high commitment
- potentially less flexible

Thin (weak) cultures

- not pervasive
- weaker
- low commitment
- potentially more flexible

5)

Positive effects

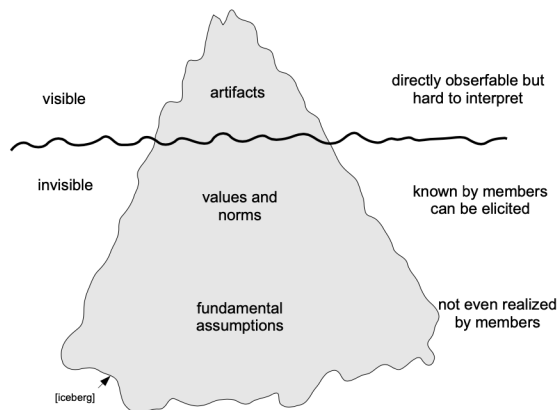
- action oriented
- efficient communication and coordination
- fast decision and implementation
- lower needs for control
- motivation, loyalty and team spirit
- stability

Negative effects

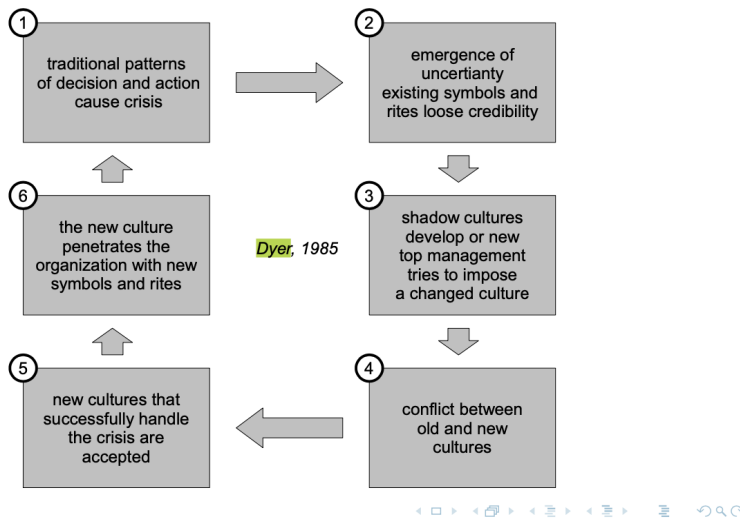
- resistance to change
- barriers to implementation of innovations
- collective avoidance
- cultural conformity (don't raise the hand)
- inflexibility

(Vahs, 2012)

6)



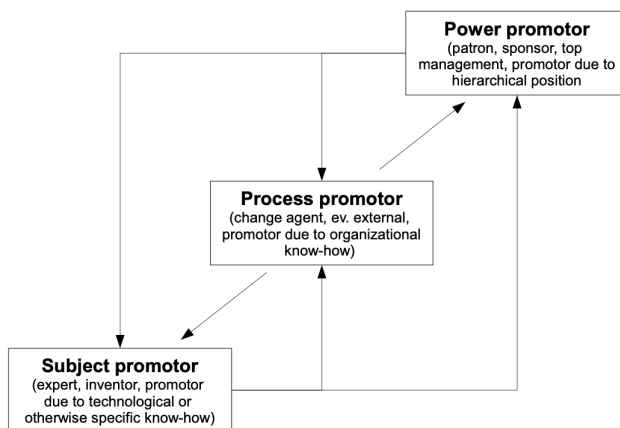
7)



8)

- Arguments for resistance to innovation:
- 1 'It's not our business' or 'it's not a business'
 - 2 'It's not big enough for us'
 - 3 'Not invented here' or 'Invented here'
 - 4 'We are not cannibals' (impact on current products or depts.)
 - 5 'Nice idea but does not fit'
 - 6 'It ain't broke so why fix it' (reactive)
 - 7 '(Existing) customers won't/don't want it'
 - 8 'We've never done it before' (uncertainty avoidance)
 - 9 'We're doing ok as we are' (face saving)
 - 10 'Let's set up a pilot' (insufficient commitment – could prolong time-to-market)

9)



Hauschildt & Salomon 2011

10)

bootlegging

Motivated members of the organization – besides their actual tasks – at own projects (submarine projects, friday afternoon projects)

- **real bootlegging**
 - only single involved person knows
 - no authorization
- **conspirative bootlegging**
 - involved person and its superior knows
 - active or passive support
- **hardcore bootlegging**
 - involved person(s) and superior know
 - explicitly prohibited by R & D, top management etc.
- **approved bootlegging**
 - all know
 - fixed time slots or even incentive systems (Google)

- ① What is vision, mission and strategy and explain their relations?
- ② What is corporate strategy, what is competitive strategy?
- ③ What are core competencies of a company?
- ④ Explain Porter's five forces model.
- ⑤ What are resources, capabilities and dynamic capabilities?
- ⑥ What are the characteristics of strategic resources and capabilities?
- ⑦ What are economic rents and which types exist?
- ⑧ What is value innovation, give an example.
- ⑨ Briefly explain Osterwalder's Business Model Innovation (Business Model Canvas).
- ⑩ Briefly explain the concepts of exploration, exploitation and ambidexterity.

1)

The **vision** of a company is its **envisioned** future, i.e. the imagination of the future position and development of the company. A BHAG (Big, Hairy, Ambitious Goal) a huge daunting challenge clear and compelling like climbing the Mount Everest. *Collins & Porras, 1996*

E.g.: Ford Motor Company (Henry Ford) – *'build a motor car for the great multitude . . . It will be so low in price that no man making good wages will be unable to own one and to enjoy with his family the blessing of hours of pleasure in God's great open spaces . . . When I'm through, everyone will be able to afford one, and everyone will have one.'*

Multiple areas of usage:

- military: as a means of politics (**strategy**, tactic, operation)
- game theory: a concrete plan of action for all possible situations
- business: various definitions, some common:
 - ① bundle of decisions and actions that follow a consistent pattern
 - ② orientation at some general long-term goals and anticipation of future developments
 - ③ balancing of internal and external conditions and flexible adaptation to changes

The mission states the core purposes of the company and therefore provides reasons for its existence. It defines a company's ideology and character and is the glue that holds it together. The unchangeable core of the company.
E.g.: Walt Disney – make people happy (not to produce films or operate a theme park)

Profits are a necessary but not sufficient precondition for the existence of a specific company:

Profits are to business as breathing is to life. Breathing is essential to life, but is not the purpose of living. Similarly, profits are essential for the existence of the corporation, but they are not the reason for its existence. Grant, 2009

2)

Corporate Strategy

Actions to choose an industry and competitors among different alternatives

Competitive Strategy

Actions to outperform competitors in a given industry

3)

A competence . . .

A core competence is an integrated complex of technology, know-how, processes, human and physical resources that is coordinated by organizational learning and culture

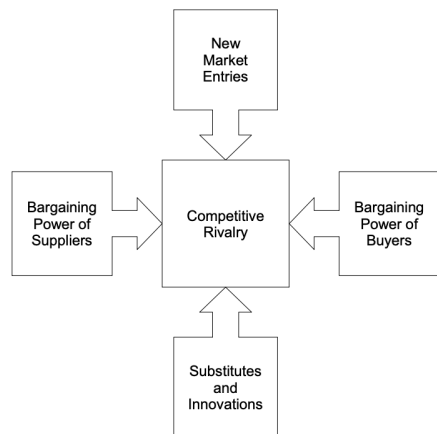
i.e. a bundle of strategic assets

That is core to the competition and business of the firm

, which are:

- recognized as valuable by customers
- unique compared to those of the competitors, hard to imitate or substitute, and
- (potentially) providing access to a variety of markets

4)



5)

Resource (Amit & Schoemaker, 1993)

"Stocks of available factors that are owned or controlled by the firm."

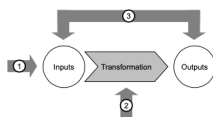
Capability (Amit & Schoemaker, 1993)

"A firm's capacity to deploy resources, usually in combination, using organizational processes to effect a desired end."

Dynamic Capability (Teece et al, 1997)

"The firm's ability to integrate, build and reconfigure competencies to address changing environments."

6) !??!?



- 1 Factors not available to competitors
- 2 More productive factors
- 3 More efficient transformation

7)

What Is Economic Rent? Economic rent is **an amount of money earned that exceeds that which is economically or socially necessary**. This can occur, for example, when a buyer working to attain a good or service that is considered exclusive makes an offer prior to hearing what a seller considers an acceptable price.

(t-) Rents Definition (Schoemaker, 1990)

"All returns above the minimum payment required to make the input available for use, especially if these inputs are (temporarily) scarce."

Ricardian rent

Difference in (transformation) efficiency of factors – factors and technology as resource

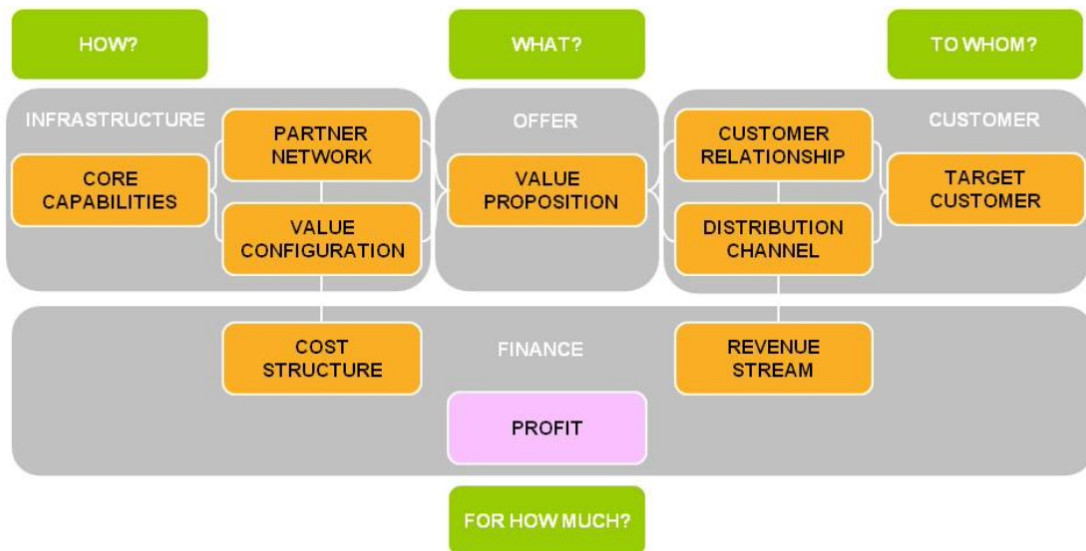
Monopoly rent

Difference in products/position – market access as a resource

8)

- Technology-Leader or market pioneers (First-mover) are often imitated fast (Early-Follower)
- Innovations for sustainable advantage must lead to recognizable **value** added for the customer (Kim & Mauborgne 1997, 1999)
- Firms should aim for a 'blue ocean'-strategy (without competitors) instead of high competitive rivalry (win-win)
- **Value** Innovations are new, valuable and hard to imitate

9)



- Core Capabilities – An organization's key activities in relation to its products and services.
- Partner Network – The business alliances and collaborations that an organization establishes.
- Value Configuration – The resources the organization requires to deliver value to the customer.
- Value Proposition – The differentiated offer of products and services that an organization provides to its target customers to deliver value.
- Target Customer – The group of customers targeted within a market segment.
- Customer Relationship – The links and relationships established between an organization and its customers.
- Distribution Channel – The means by which an organization delivers its products and services to the target market segment.
- Cost Structure – The costs associated with delivering products and services.
- Revenue Stream – The way an organization generates a variety of income flows.

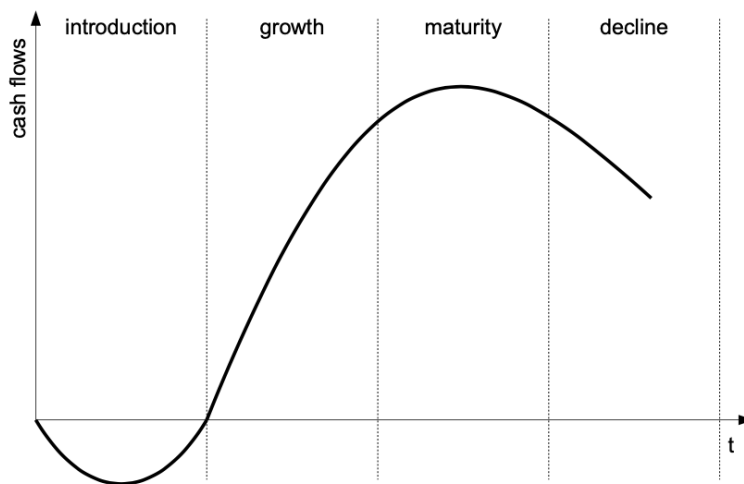
10)

Ambidexterity (being able to use both hands) for long-term success a balance between exploration and exploitation is necessary (Tushman & O'Reilly, 1997)

- **Exploration:** new inputs, new products, new capabilities – radically new solutions, experimentation
- **Exploitation:** existing inputs, existing products, making use and improving existing capabilities – solving problems based on existing know-how, optimizing processes increasing efficiency, further-developments – incremental changes

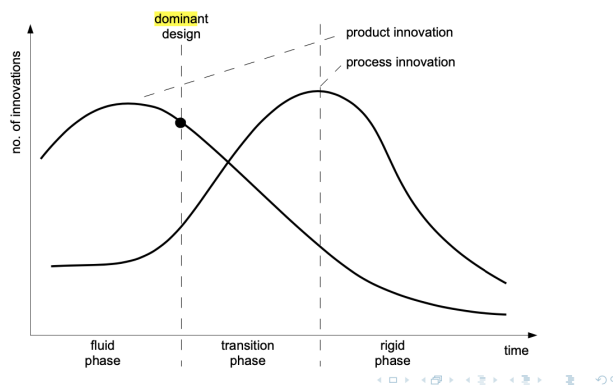
- 1 Describe the product life cycle.
- 2 Explain the dominant design principle in diffusion of innovation.
- 3 What factor enable successful diffusion of innovation in markets?
- 4 What are pros and cons of the first-mover strategy?
- 5 What are pros and cons of the early-follower strategy?
- 6 What is the cost leadership strategy – give an example.
- 7 What is the differentiation strategy – give an example.
- 8 What is the niche strategy – give an example.
- 9 Explain the concepts of exploitation and exploration in innovation strategy.
- 10 What does ambidexterity mean in the context of innovation management?

1)



2)

Dominant Design



3)

Influencing factors:

- subjective benefit of the innovation
- compatibility with existing values (green wave, etc.)
- complexity (inverse) i.e. the easier the better (KISS)
- possibility to experiment and test
- visibility of the innovation

4)

Pros

- early set-up of market position
- set-up of customer relations
- establishment of product standards
- early learning curve effects
- 'innovator image'
- establishment of market entry barriers (reputation, switching costs, etc.)

Cons

- high R & D costs
- high market development costs (create demand)
- uncertainty of demand
- lack of experience (customer requirements, etc.)
- image loss due to non-mature products or designs

5)

Pros

- Usage of actions of first movers (product development, market development etc.)
- reduced uncertainty (technology, market demand, etc.)

Cons

- Overcome entry barriers
- time and cost pressure (to compete with first mover and learning curve advantages)
- dependence on others to innovate (passive, no or fewer own competencies)

6)

Cost Leadership

Price setting around the market price and superior profits due to **lower costs than those of the rivals**

touch smartphone -> huawei

7)

Differentiation

Higher quality generates value added for the customers which therefore pay a **premium price** for the distinctiveness and fit of the firm's product or service

8)

specific segment

9, 10)

March (1991) – Exploration and **Exploitation**:

- **Exploration**: find new inputs, new products and novel capabilities – radically new solutions, experimentation
- **Exploitation**: further develop existing inputs, products and capabilities – solution of problems based on existing know-how, incremental

Problem onsided – both not either

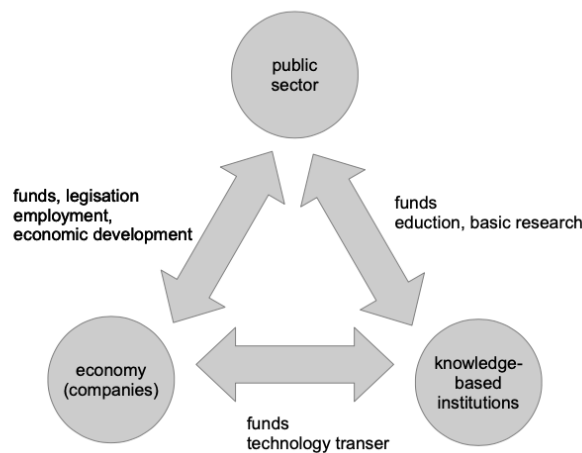
- **Exploration only** permanent first-mover advantage but never the full benefits of developments, problems with the vision and mission of the company, core competencies?
- **Exploitation only**: problems in cases of technological change (s-curve), and maturity and decline stages of existing products' life cycle (insufficient product portfolio management)

Ambidexterity (ability to use both hands) for long-term performance requires a balance of exploration and **exploitation** (Tushman & O'Reilly, 1997)

- ① Explain the National System of Innovation model
- ② Name and describe at least three innovation policy instruments.
- ③ What is the R & D quote of a country and why is it more informative than absolute monetary values?
- ④ What is the Europe 2020 strategy of the EU?
- ⑤ How can intellectual property be legally protected?
- ⑥ What is a utility patent and a design patent
- ⑦ What is a trade mark and a copyright?
- ⑧ What are the pros and cons of patenting?

1)

A NSI is the network of institutions in the public and private sectors whose activities and interactions initiate, import, modify and diffuse new technologies (Freeman, 1995)



2)

- financial – grants, funds
- procurement & public services – government purchases, R & D contracts
- commercial – trade agreements, tariffs, currency regulation (export competitiveness)
- taxation – tax allowances, tax free investments
- scientific research – research labs, support for research associations, professional associations, research grants
- education – general and technical education, higher education, universities
- information – information networks and centers, technology transfer, consulting services
- regulation – property right protection, legislation, monopoly regulation, environmental and health regulation (high demands necessitate innovation)

4)

- replacement of Lissabon strategy (approved June 2010)
- sustainable, intelligent and integrated economic growth in the EU
- support of higher education, private R & D and environment friendly technologies
- R & D quote of min. 3%
- reduction of carbon-dioxid emissions
- increase of the portion of renewable energy
- reduction of the portion of school dropouts and increase of the percentage of university graduates

5)

- patents
- utility patent (Gebrauchsmuster)
- design patent (Geschmacksmuster)
- trade mark TM
- copyright ©

6)

- Utility patent
 - fewer requirements on extend of innovation (short research report)
 - max. 10 years after application
- Design patent
 - for design of commercial products (color, form, material, etc.) – to prevent replica
 - 5 years (can be prolonged to a max of 15 years)
- Trade mark TM
 - protection of distinctive signs (words, logos, any distinctive feature) to distinguish goods and services from those of other companies – to prevent fraud
 - 10 years valid (can be prolonged)
- Copyright ©
 - The exclusive right of the creator to utilize her work. For literature, music, movies, software, etc. (easy to copy immaterial goods)
 - Valid until max 70 years after the death of the creator

8)

Pros of patenting

- Motivation to take the risk and costs of innovation
 - Creates individual incentives for innovation
 - Determines monopoly situation and first-mover advantages (prevents imitation and competition)
 - Allows for rewards for innovation activities (monopoly rent, licensing)

Cons of patenting

- Negative for society (higher prices, slower further development)
- High costs and efforts (for application, control, legal steps)
- Limits of patent protection (bad for process, publication leads to inventing around patent, speed of development, better approaches: lead time and learning curves, sales and service efforts, secrecy) (Levin et al 1987)