TECHNISCHE UNIVERSITÄT WIEN
Vienna University of Technology

VO Unternehmensgründung - Entrepreneurship

SS 17, Unit „Innovation“

Prof. Dr. Karl-Heinz Leitner

Content

- Schumpeter and Innovation
- Types and Nature of Entrepreneurship
- Corporate Entrepreneurship
- Who becomes an Entrepreneur?

Schumpeter, Innovation & Entrepreneurship

Josef Alois Schumpeter and Innovation

"Schon frueh hatte ich drei Ziele: der größte Ökonom der Welt, der größte Reiter Österreichs und der beste Liebhaber Wiens zu werden. Nun, bei einer dieser Ambitionen habe ich versagt."
J.A. Schumpeter

- Economic development is characterised by a permanent disturbance of the equilibrium (no steady-state)
- Disturbance is caused by
  - Technological change
  - New organisational forms of production
- According to Schumpeter manufacturers trigger technological change and innovation
- He defined innovation as „implementation of a new combination“
- Innovation requires the “entrepreneur”
- This “combinatory” activity he labeled “the entrepreneurial function” and the social agents fulfilling this function “entrepreneurs”
- The financing of innovations is task of the “capitalist”

Types of innovations

The implementation of new combinations means:

1. The introduction of a new product - that is one with which consumers are not yet familiar - or of a new quality of a product.
2. The introduction of a new method of production, which need by no means be founded upon a discovery scientifically new, and can also exist in a new way of handling a commodity commercially.
3. The opening of a new market, that is a market into which the particular branch of manufacture of the country in question has not previously entered, whether or not this market has existed before.
4. The conquest of a new source of supply of raw materials or half-manufactured goods, again irrespective of whether this source already exists or whether it has first to be created.
5. The carrying out of the new organization of any industry, like the creation of a monopoly position.

Schumpeter and Innovation

- the “combinatory” activity is labeled as “the entrepreneurial function”, the social agents fulfilling this function are the “entrepreneurs”.
- the innovation process is characterised by sudden and abrupt occurrence of innovations, he is not smooth, slow or incremental
- innovations result in imitations by competitors
- innovation is thus a process of “creative destruction”, new industries emerge and substitute existing industries
- an entrepreneur is only once in his life really innovative

- Richard Cantillion, 17th century: entrepreneur is … *„to buy at a certain price and to sell at an uncertain price“.*

Characteristics of the entrepreneur…

„How different a thing this is becomes clearer if one bear in mind the impossibility of surveying exhaustively all the effect and counter-effects of the projected enterprises. Even as many of them as could in theory be ascertained if one had unlimited time and means must practically remain in the dark. ... also in economic life action must be taken without working out all the details of what is to be done. Here the success of everything depends of intuition, the capacity of seeing things in a way which afterwards proves to be true, even though it cannot be established at the moment, and of grasping the essential fact, discarding the unessential, even though one can give no account to the principles by which this is one. Thorough preparatory work, and special knowledge, breath of intellectual understanding, talent of logical analysis, may under certain circumstances be sources of failure.“ (Schumpeter 1911, 85)

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Schumpeter Mark I and Mark II

- Innovation requires entrepreneurs, Schumpeter (1911), **Mark I**
  - => high level of opportunities for innovations, low concentration of innovation activities, many new entries, many small firms
- In the later work Schumpeter favours big companies, he assumes that „… research departments mechanise the progress", Schumpeter (1950), **Mark II**
  - => high level of accumulation and *approbiability* on the organisational level, concentration of innovation activities, low market entries

Who is more innovative/entrepreneurial?
Large established firms (Incumbents) or new start firms

- Large and small firms have different advantages and disadvantages
- Sector is relevant
- Technology
- Industry Life Cycle

OECD definition

- Product Innovation: This involves a good or service that is new or significantly improved. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.
- Process innovation involves a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.
- Marketing Innovation: Marketing innovation involves a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing.
- Organisational Innovation: Organisational innovation involves introducing a new organisational method in the firm's business practices, workplace organisation or external relations.

→ These innovations can be new to the firm, new to the market/sector or new to the world

→ radical and incremental innovation

Further definitions

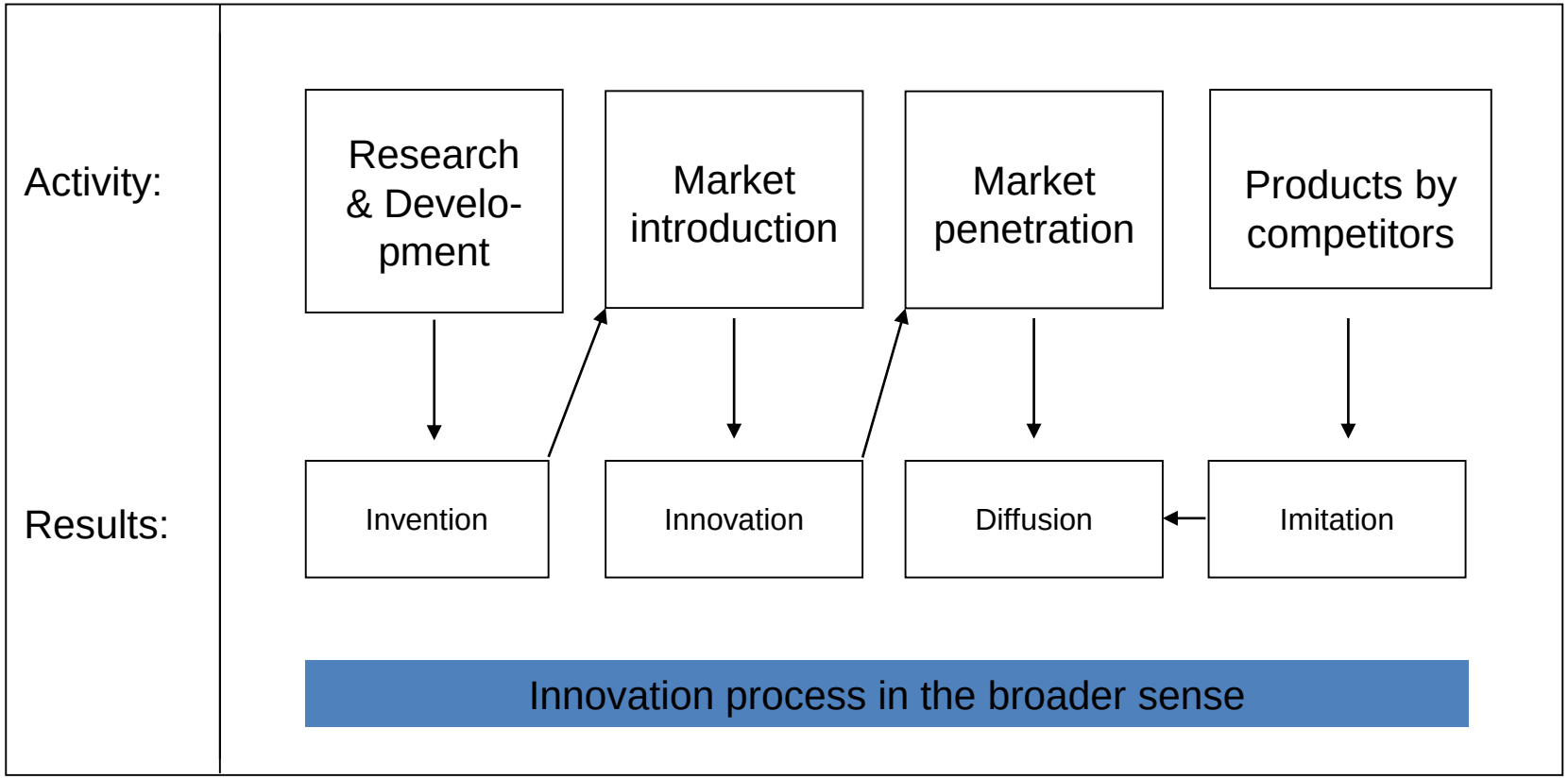
Freeman (1982): *„An invention is an idea, a sketch or model for a new or improved device, product, process or system. An innovation in the economic sense is accompanied with the first commercial transaction involving the new product, process, system or device, although the word is used to describe the whole process.“*

Luecke and Katz (2003): “*Innovation . . . is generally understood as the successful introduction of a new thing or method . . . Innovation is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services.“*

Typical innovations

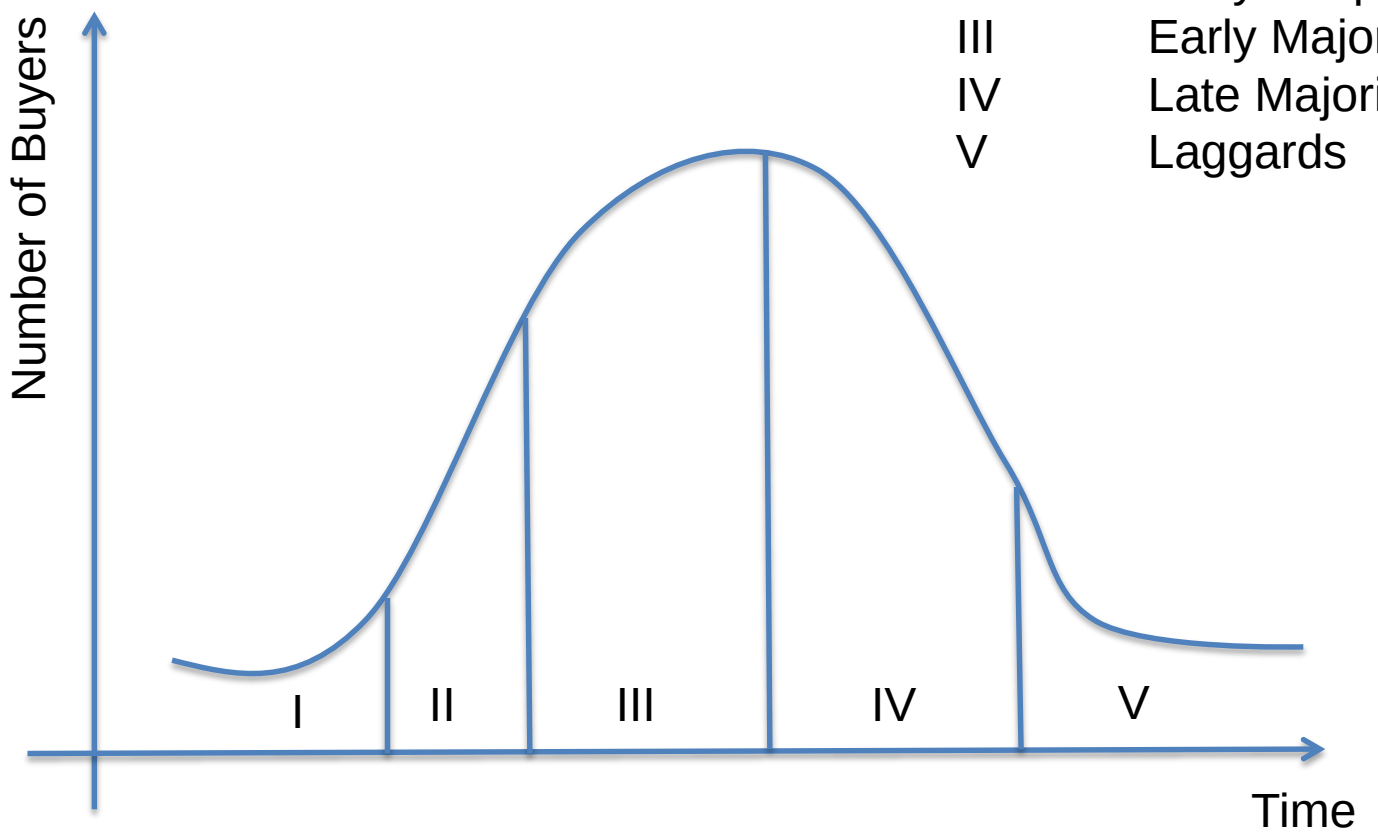
- iPod (incl. iTunes)
- Amazon
- Linux
- Microsoft Vista
- Antibiotics
- Toyota Production Systems
- Ford T Model
- Electric Car
- Red Bull Energy Drink
- Skype
- PC

Invention, Innovation and Diffusion



Source: Brockhoff (1997)

The Diffusion Process



I	Innovators
II	Early Adopters
III	Early Majority
IV	Late Majority
V	Laggards

Types and Nature of Entrepreneurship

Characteristics and Nature of Entrepreneurship

- Being active
  - *"Entrepreneurship requires action – entrepreneurial action through the creation of new products/processes and/or the entry into new markets, which may occur through a newly created organization or within an established organization" (Hisrich et al. 2013, 6)*
  - *„Entrepreneurs are individuals who recognize opportunities where others see chaos or confusion. They are aggressive catalyst for change within the marketplace."*
- Making decisions in uncertain environments
  - *„Entrepreneurs act on what they belief is an opportunity. Because opportunities exist in high uncertainty, entrepreneurs must use their judgment about whether or not to act."* (Hisrich et al. 2013, 6)
- Accepting risk of failing
- Think structurally
  - *"By thinking structurally and not being distracted by superficial features, entrepreneurs are able to identify opportunities by making connections between a technology and a market that may not be obvious." (Hisrich et al.)*

Perspectives

- Positive theory about entrepreneurship:
  definition of attributes and characteristics, and empirical verification

- Functional view on entrepreneurship:
  not personal characteristics but what people are doing describe the entrepreneur; Casson (1984, 22): "… *an entrepreneur is what an entrepreneur does"*

Entrepreneurship

Common to most definitions in classical textbooks are:

1. Innovation
2. Risk-taking
3. Being proactive

Types of Entrepreneurship

- Original Entrepreneurship
- Constructive Entrepreneurship

You don‘t have to found a new venture to become an entrepreneur!

Original Entrepreneurship

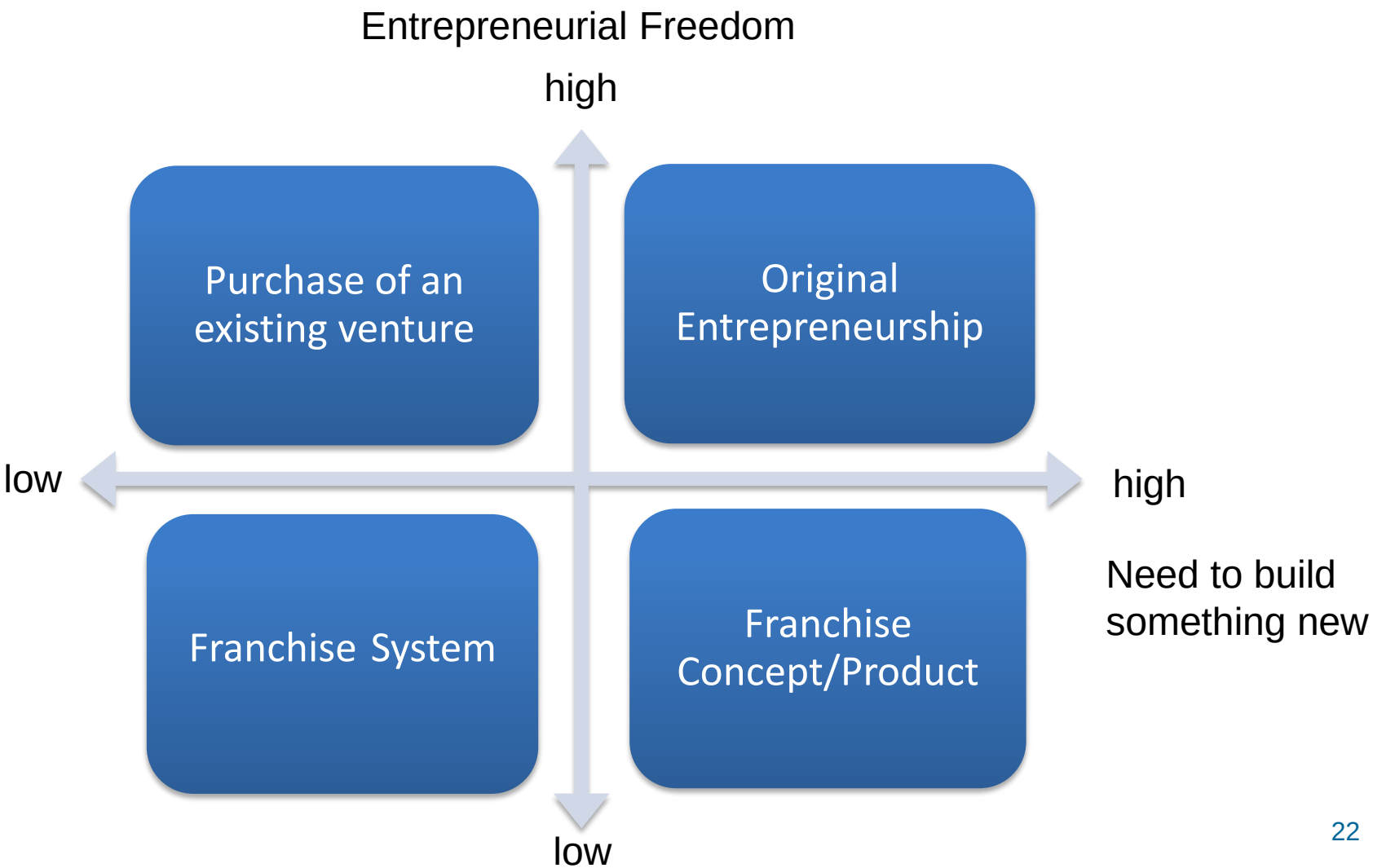
- **Traditional Entrepreneurship:** results in a company with a product/service, which is already established at the market

- **Innovative Entrepreneurship:** results in a company with a new product/service

Constructive Entrepreneurship

- Heritage
- Purchase of an existing venture
- Management-Buy-Outs
- Franchise

Differentiators of Types of Entrepreneurship



Planned vs. Unplanned Entrepreneurship

Planned Entrepreneurship: based on an intentional decision

Unplanned Entrepreneurship: not based on an elaborated plan, are the result of external circumstances

Corporate Entrepreneurship

Corporate Venturing (Intrapreneurship)

- Important for large, established firms in order to realise radical innovations which do not fit to the existing corporate strategy/core business
- Allows diversification, development of totally new technology, growth
- Often internal venture capital is provided

Organisational options and structures for corporate ventures:

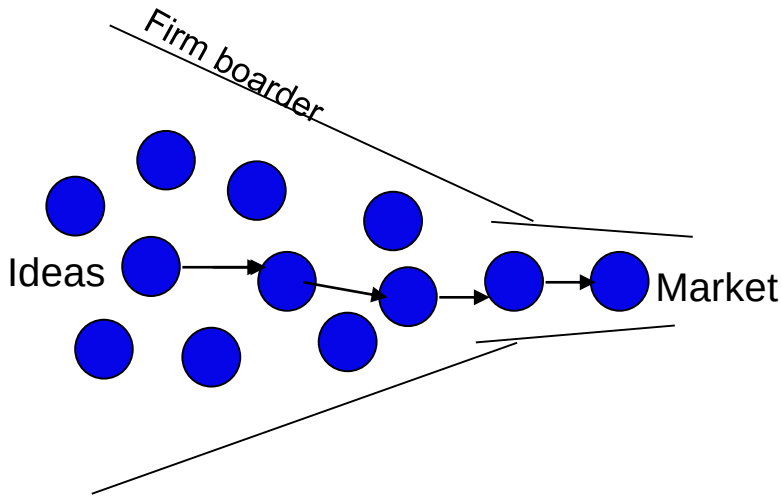
- Integrated venture teams
- New venture department/division
- Independent subsidiary
- Spin-off

Chesbrough (2003)

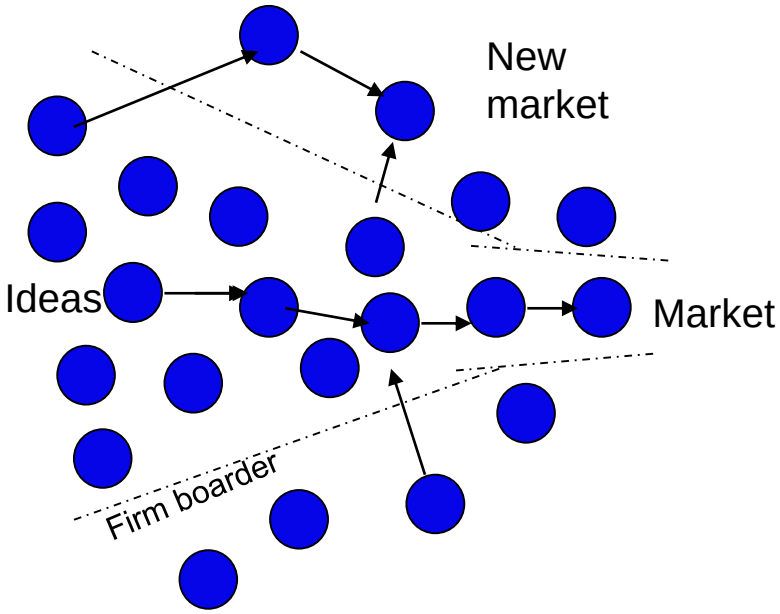
- *„Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology"* (Chesbrough 2003, xxiv).
- Innovation process is a increasingly open, networked process with co-operation a long the entire innovation chain
- Commercialisation of new ideas by:
  - Joint Ventures
  - Spin-offs
  - Licensing
- Aim: Increase of R&D productivity

Open Innovation Model (Chesbrough 2003)

Closed Innovation Model



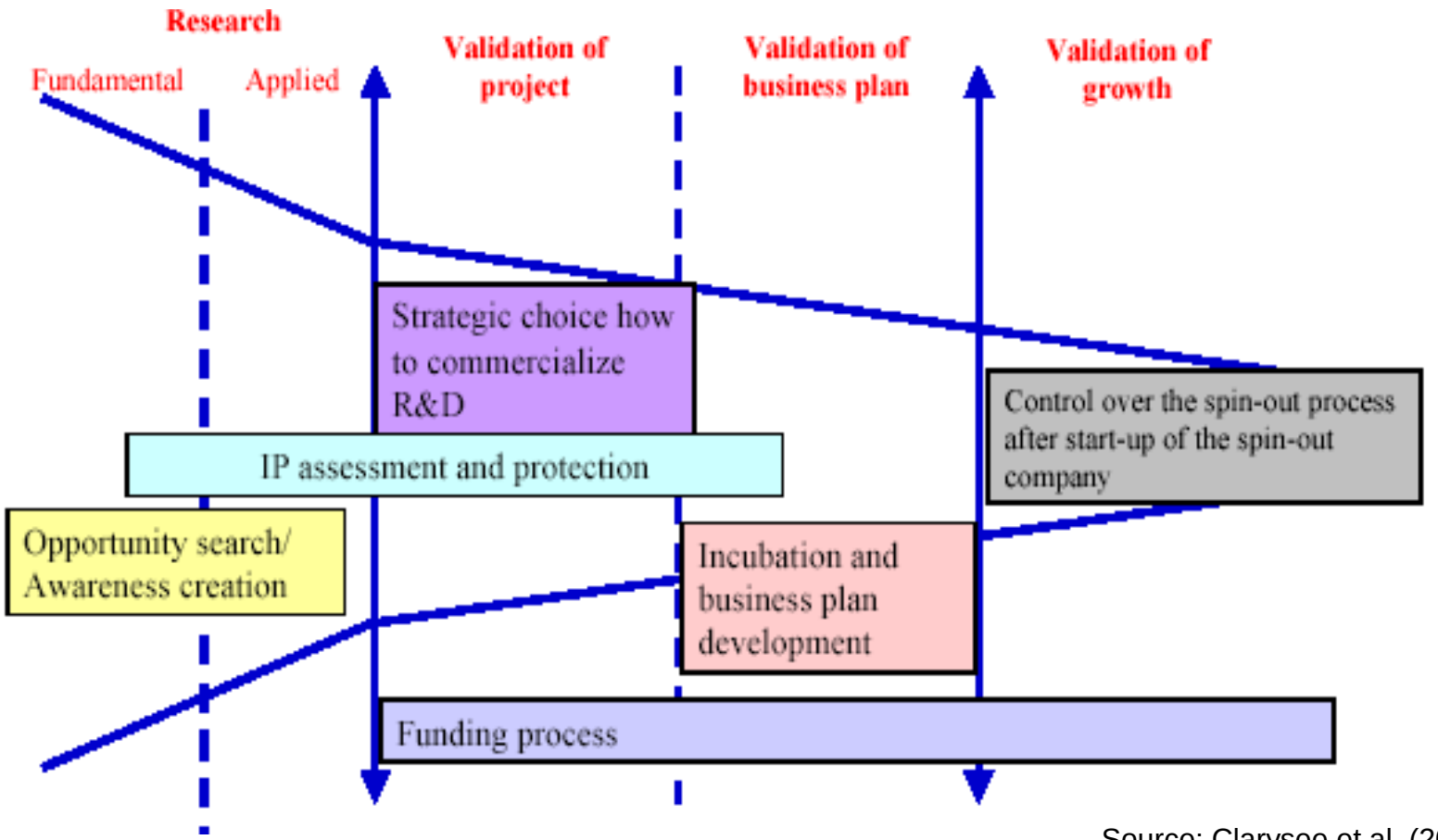
Open Innovation Model



Corporate New Venture/Spin-out: Case SEZ and AMS

- Founded as a spin-off of the newly established semiconductor company AMS (austriamikrosystems) in 1989.
- Within AMS Mr. Franz Sumnitsch was responsible for building up the production line and was faced with many problems caused by the strict Austrian environmental legislation.
- He started to develop a new idea for a machinery which should improve the etching process of the wafer production. He had no order from the production director worked on the idea in his private garage partly in his leisure time.
- Quickly a team emerged within the company consisting of members of different departments. After 3-year lasting development process, only partly supported by the top management of AMS, the established team founded a spin-off company.
- Listed in the Zürich Stock Exchange, since 2010 part of Lam Research.

Process model of an incubator (universities)



Source: Clarysee et al. (2004)

Social Entrepreneurship

- Social entrepreneurship describes an entrepreneurial venture that aims to achieve a particular social goal through positive externalities (in addition to profit)
- Social entrepreneurs are willing to take on the risk and effort to create positive changes in society through their initiatives.
- Many examples all over the world in the area of farming, education, financing (micro credits), health care, sustainable products (Sustainable Entrepreneurship) …
- See for instance the Ashoka Network: www.ashoka.org

Who becomes an Entrepreneur?

Rationales explaining who becomes an entrepreneur

- Opportunity costs:
  - An individual compares the expected benefits from becoming entrepreneur with both the expected costs for setting up a firm (e.g. costs of capital and costs of labor) and the opportunity costs of being self-employed (fixed salary in paid employment)
- Human capital theory
  - Investments in education and experience pay off when they produce an accumulation of competencies (human capital): the more education and the more experience (business, functional, industry, start-up) the more likely to establish a new company
- Jack-of-all-trades theory
  - The JAT theory predicts that entrepreneurs should be generalists, while those who are planning to work for others (paid employees) should be specialists

Experience

- The following types of career experience increase the likelihood of becoming entrepreneur:
  - general business experience
  - functional experience (e.g. marketing)
  - industry experience
  - start-up experience (novice and habitual entrepreneurs)
  - learning by „imitation“ in the workplace (role models)

Psychological determinants

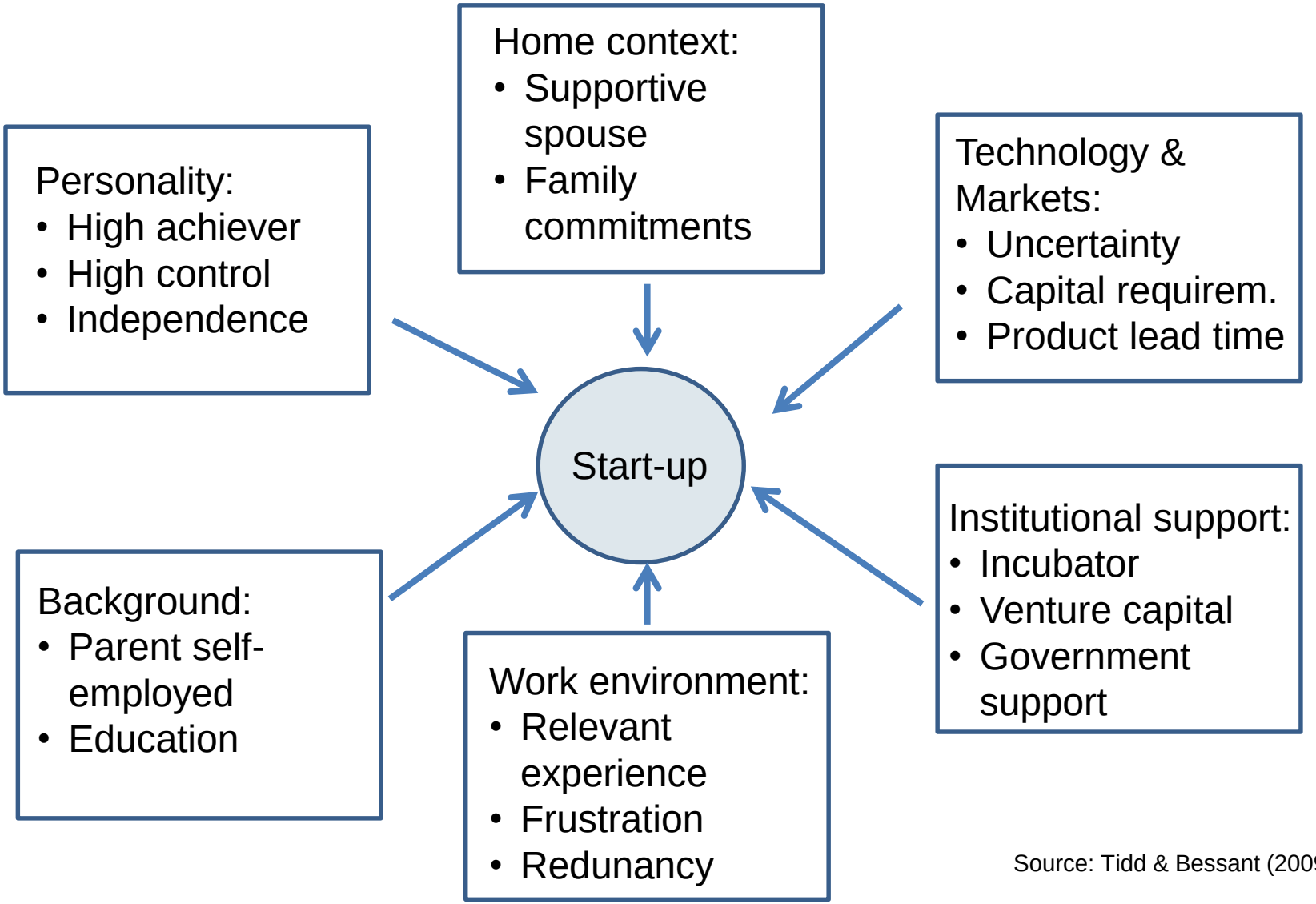
- Personality and motives
  - extraversion (activeness and ambition)
  - agreeableness (flexibility and tolerance)
  - need for achievement (taking responsibility for outcomes)
  - risk-taking propensity
  - independence
- Self-evaluation
  - internal locus of control (one can influence the environment)
  - self-efficacy (conviction that one can successfully execute a task)
- Cognitive properties
  - overconfidence
  - representativeness (e.g. rule of thumb)
  - intuition

Source: Shane (2003)

Effectuation and Cognitive adaptability

- Entrepreneurs sometimes use an effectuation process, meaning that they take what they have (knowledge, relationships) and select among possible outcomes, thinking effectually helps them to make decisions in uncertain environments
- this is in contrast to a causal process where one starts with a desired outcome and focuses on the means to generate that outcome
- Cognitive adaptability, the ability to reflect, upon, understand, and control one’s thinking and learning, enables the entrepreneur to flexibly generate multiple decision frameworks with respect to changes in the environment and their responses

Factors influencing the decision to establish a firm



Source: Tidd & Bessant (2009)

Case: Spin-off of the TU Wien: TTTech (www.tttech.com)

- Founded in 1998 as TTTech Computertechnik GmbH (“Time-Triggered Technology”) by a team of scientist from the TU Wien. Background of the team is research at the University in time-triggered technology since 1979 (Prof. H. Kopetz, Institute of Computer Engineering, Inventor of the Time-Triggered Protocol)
- Founding members had also industrial experience (Prof. H. Kopetz, G. Kopetz, Doz. Poledna)
- Participation in a number of EU-funded research projects in co-operation with key industrial firms of the automotive and aerospace industry, standardisation was key for the success
- TTTech develops embedded software solution for the control networks for cars and airplanes
- 2000: Change of ownership from limited liability company into stock corporation, capital increase and first financial investors
- Honeywell and TTTech form a partnership for applications in aerospace industry
- 2001: Several concept cars developed with drive-by-wire system based on TTTech technology: Audi, Saab Novanta, GM’s AUTOnomy, PSA Peugeot Citroën
- 2006: Strategic financial investor aeris Capital AG invests 20 million Euros in TTTech; AUDI AG acquires a minority participation in TTTech
- Business locations in Austria, Germany, Italy, Romania, the United States, Japan, and Korea
- Focus on solutions for safe and reliable networks for the transportation and automation industries
- 2015: > 400 employees