Digital Transformation in the Automotive Industry

Digitale Transformation in der Automobilindustrie

Dr. Michael Nolting

Lecture 4

Tutorials

- Homework will be reading the book from Gene Kim „The Phoenix Project“

The homeworks are optional and not relevant for the exam

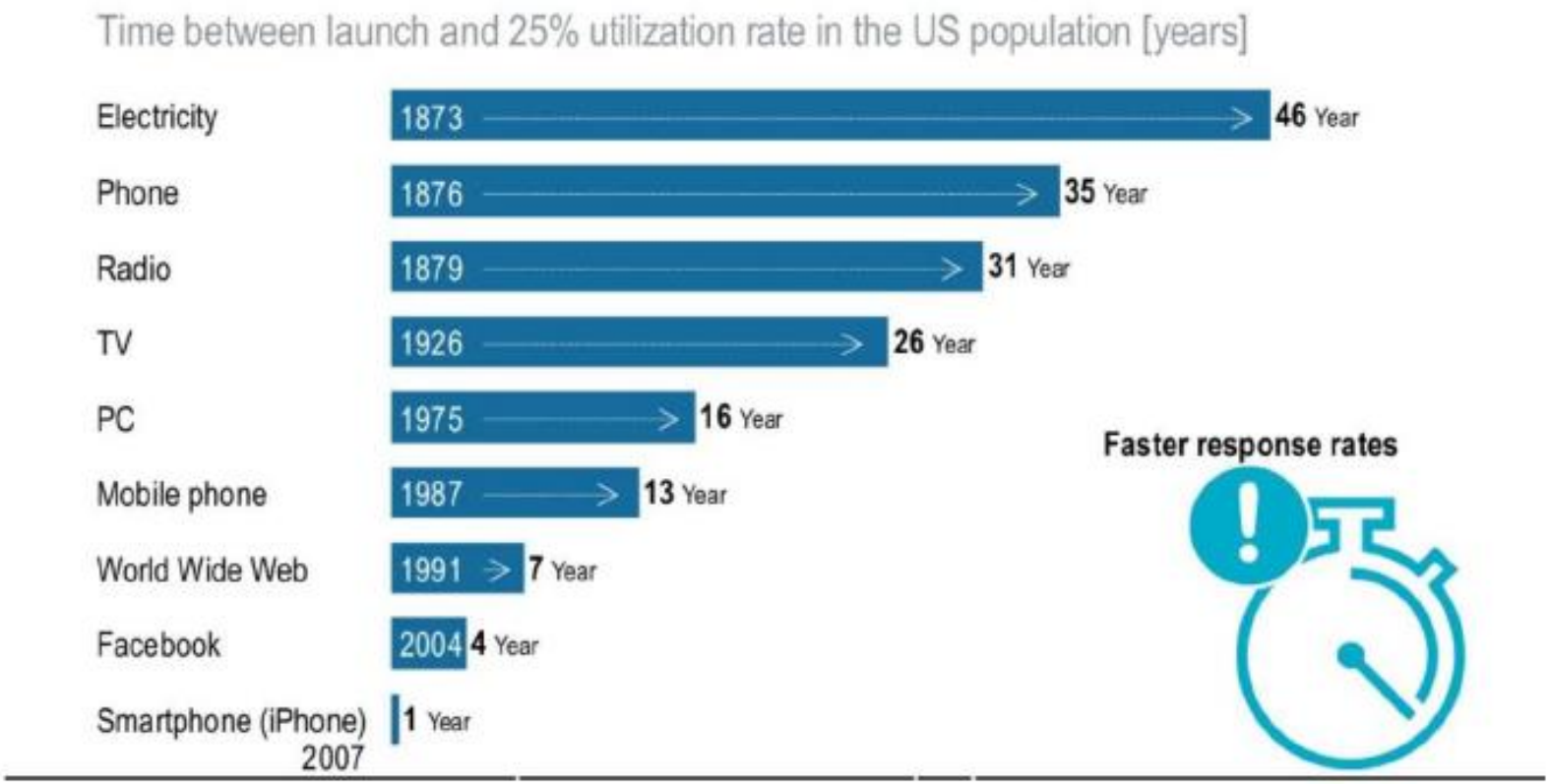
Lecture Overview

1. Introduction: Why Digital & Data Transformation	7. Culture & Organization
Homework 1: Reading 60 mins the Phoenix Project	Homework 7: Reading 60 mins the Phoenix Project
2. The World is Changing: ACES & VUCA	8. Examples of Digitalization Projects I
Homework 2: Reading 60 mins the Phoenix Project	Homework 8: Reading 60 mins the Phoenix Project
3. The Technological Disruption	9. Examples of Digitalization Projects II
Homework 3: Reading 60 mins the Phoenix Project	Homework 9: Reading 60 mins the Phoenix Project
4. Challenges for the Transformation - Innovation	10. TESLA as THE Digital Player
Homework 4: Reading 60 mins the Phoenix Project	Homework 10: Reading 60 mins the Phoenix Project
5. Challenges for the Transformation - Legacy	11. Q & A – Exam
Homework 5: Reading 60 mins the Phoenix Project	
6. How to Transform Into a Techgiant	
Homework 6: Reading 60 mins the Phoenix Project	

“65 years was the life expectancy of a company on the S&P index in 1920; today it’s just 10 years.”

(Sascha Haghani, CEO Germany and DACH region, Roland Berger)

Time to Market (Penetration Rate US)



*Sources: Roland Berger.

Liquidity of Markets

27.000.000.000 USD*

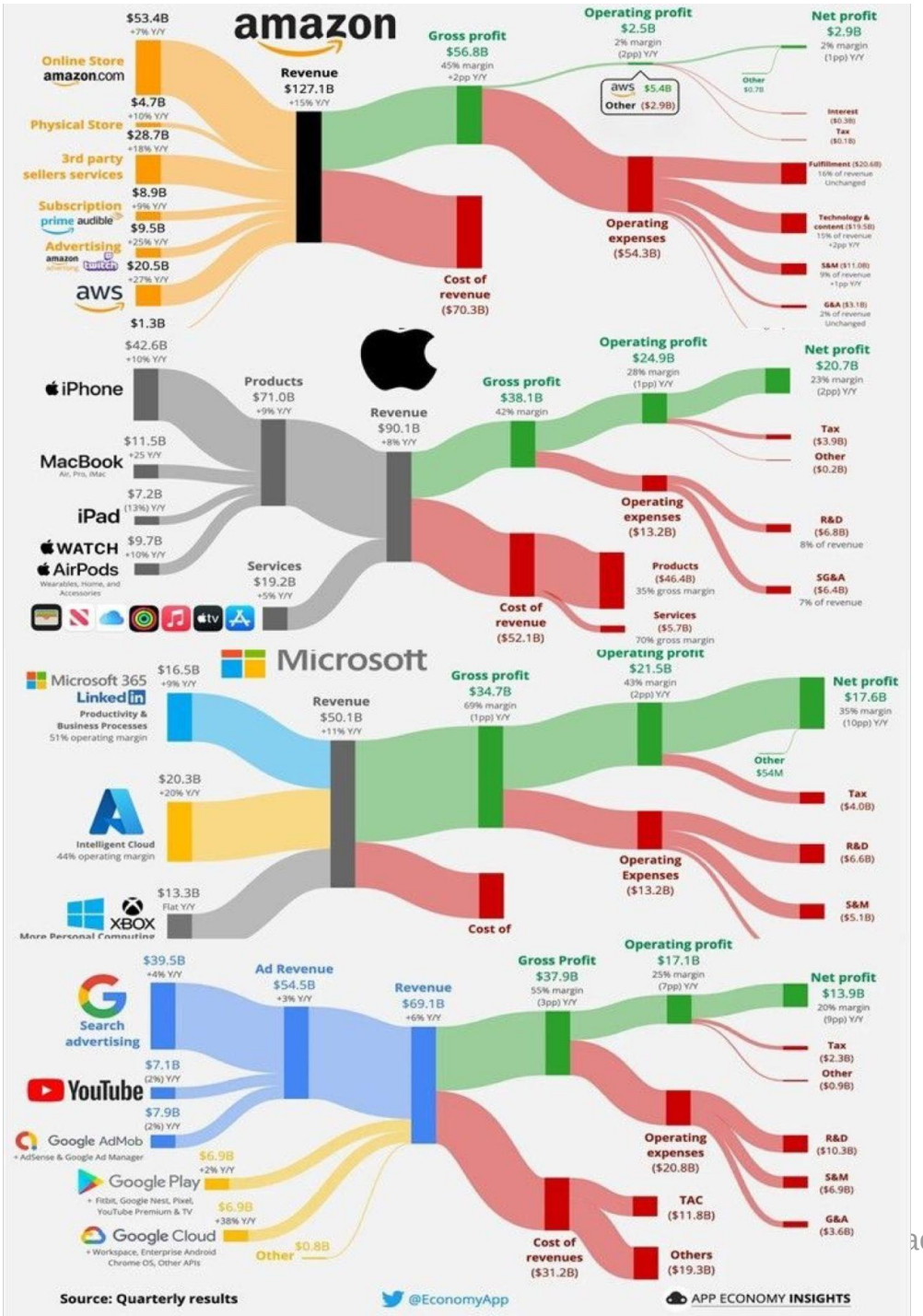
**…in venture capital collected by Uber until 2020.
(i.e., more than the accumulated venture capital that German startups received between 2010 and 2020)**

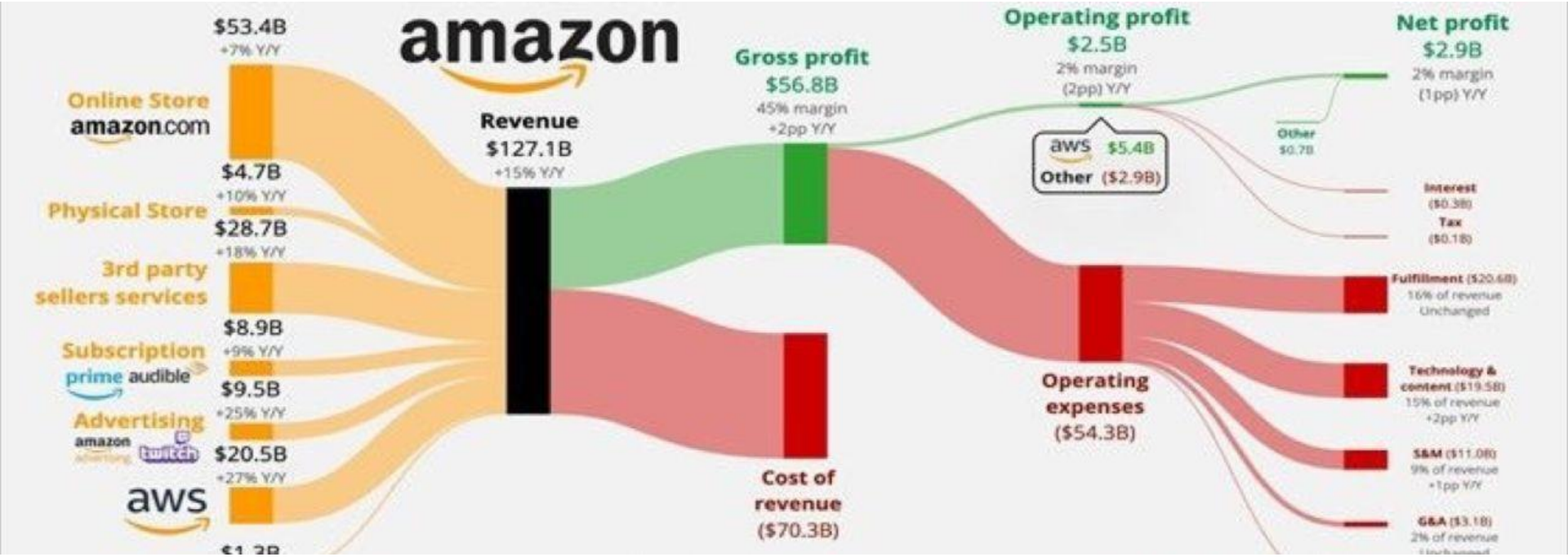
*Sources: EY (2018) Fast growth in Germany: Tech start-ups and investors setting new benchmarks; Crunchbase.com; Spiegel 11/2020.

Assets Do Not Count Any More

Company	Established	Sales revenue 2020	Net income 2020	Market capitalization
Amazon	1994	386,000,000,000	21,330,000,000	1,662,000,000,000
Alphabet	1998	182,500,000,000	40,270,000,000	1,392,000,000,000
Alibaba	1999	72,000,000,000	19,820,000,000	571,000,000,000
Tesla	2003	31,500,000,000	862,000,000	640,000,000,000
Facebook	2004	86,000,000,000	29,150,000,000	759,000,000,000
Uber	2009	11,100,000,000	-6,770,000,000	106,000,000,000
Volkswagen	1937	233,000,000,000	8,820,000,000	102,000,000,000

Source: Companies' annual reports and statista.com (accessed Feb 2021).


amazon
$53.4B
+7% Y/Y
Online Store
amazon.com
$4.7B
+10% Y/Y
Physical Store
$28.7B
+18% Y/Y
3rd party sellers services
$8.9B
+9% Y/Y
Subscription
prime audible
$9.5B
+25% Y/Y
Advertising
amazon twitch
$20.5B
+27% Y/Y
aws
$1.3B
Revenue
$127.1B
+15% Y/Y
Gross profit
$56.8B
45% margin
+2pp Y/Y
Cost of revenue
($70.3B)
Operating profit
$2.5B
2% margin
(2pp) Y/Y
aws $5.4B
Other ($2.9B)
Operating expenses
($54.3B)
Net profit
$2.9B
2% margin
(1pp) Y/Y
Other
$0.7B
Interest
($0.3B)
Tax
($0.1B)
Fulfillment ($20.6B)
16% of revenue
Unchanged
Technology & content ($19.5B)
15% of revenue
+2pp Y/Y
S&M ($11.0B)
9% of revenue
+1pp Y/Y
G&A ($3.1B)
2% of revenue
Unchanged
$42.6B
+10% Y/Y
iPhone
MacBook
Air, Pro, iMac
$11.5B
+25 Y/Y
iPad
$7.2B
(13%) Y/Y
WATCH
AirPods
Wearables, Home, and Accessories
$9.7B
+10% Y/Y
Products
$71.0B
+9% Y/Y
Services
$19.2B
+5% Y/Y
Revenue
$90.1B
+8% Y/Y
Gross profit
$38.1B
42% margin
Cost of revenue
($52.1B)
Operating profit
$24.9B
28% margin
(1pp) Y/Y
Operating expenses
($13.2B)
Products
($46.4B)
35% gross margin
Services
($5.7B)
70% gross margin
Net profit
$20.7B
23% margin
(2pp) Y/Y
Tax
($3.9B)
Other
($0.2B)
R&D
($6.8B)
8% of revenue
SG&A
($6.4B)
7% of revenue
Microsoft
Microsoft 365
LinkedIn
Productivity & Business Processes
51% operating margin
$16.5B
+9% Y/Y
Intelligent Cloud
44% operating margin
$20.3B
+20% Y/Y
XBOX
More Personal Computing
$13.3B
Flat Y/Y
Revenue
$50.1B
+11% Y/Y
Gross profit
$34.7B
69% margin
(1pp) Y/Y
Cost of
Operating profit
$21.5B
43% margin
(2pp) Y/Y
Operating Expenses
($13.2B)
Net profit
$17.6B
35% margin
(10pp) Y/Y
Other
$54M
Tax
($4.0B)
R&D
($6.6B)
S&M
($5.1B)
Search advertising
$39.5B
+4% Y/Y
YouTube
$7.1B
(2%) Y/Y
Google AdMob
+ AdSense & Google Ad Manager
$7.9B
(2%) Y/Y
Google Play
+ Fitbit, Google Nest, Pixel, YouTube Premium & TV
$6.9B
+2% Y/Y
Google Cloud
+ Workspace, Enterprise Android Chrome OS, Other APIs
$6.9B
+38% Y/Y
Other
$0.8B
Ad Revenue
$54.5B
+3% Y/Y
Revenue
$69.1B
+6% Y/Y
Gross Profit
$37.9B
55% margin
(3pp) Y/Y
Cost of revenues
($31.2B)
Operating profit
$17.1B
25% margin
(7pp) Y/Y
Operating expenses
($20.8B)
TAC
($11.8B)
Others
($19.3B)
Net profit
$13.9B
20% margin
(9pp) Y/Y
Tax
($2.3B)
Other
($0.9B)
R&D
($10.3B)
S&M
($6.9B)
G&A
($3.6B)
Source: Quarterly results
@EconomyApp
APP ECONOMY INSIGHTS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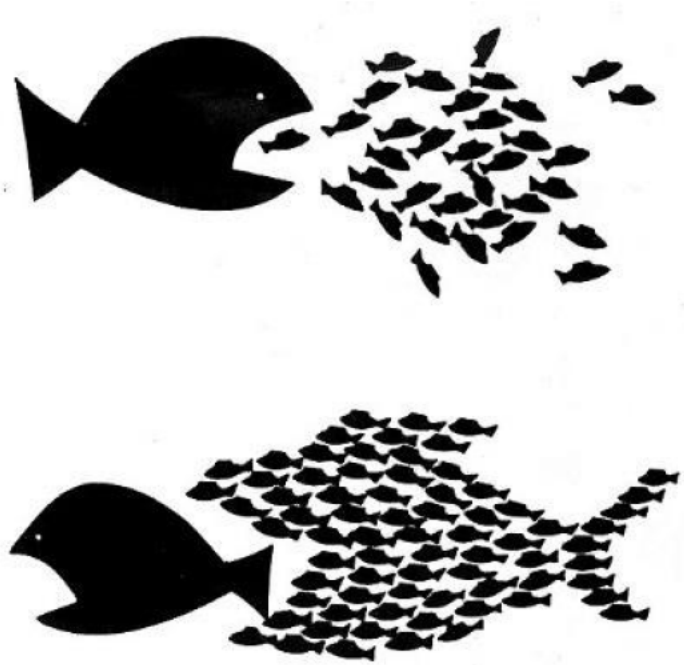
2% of revenue

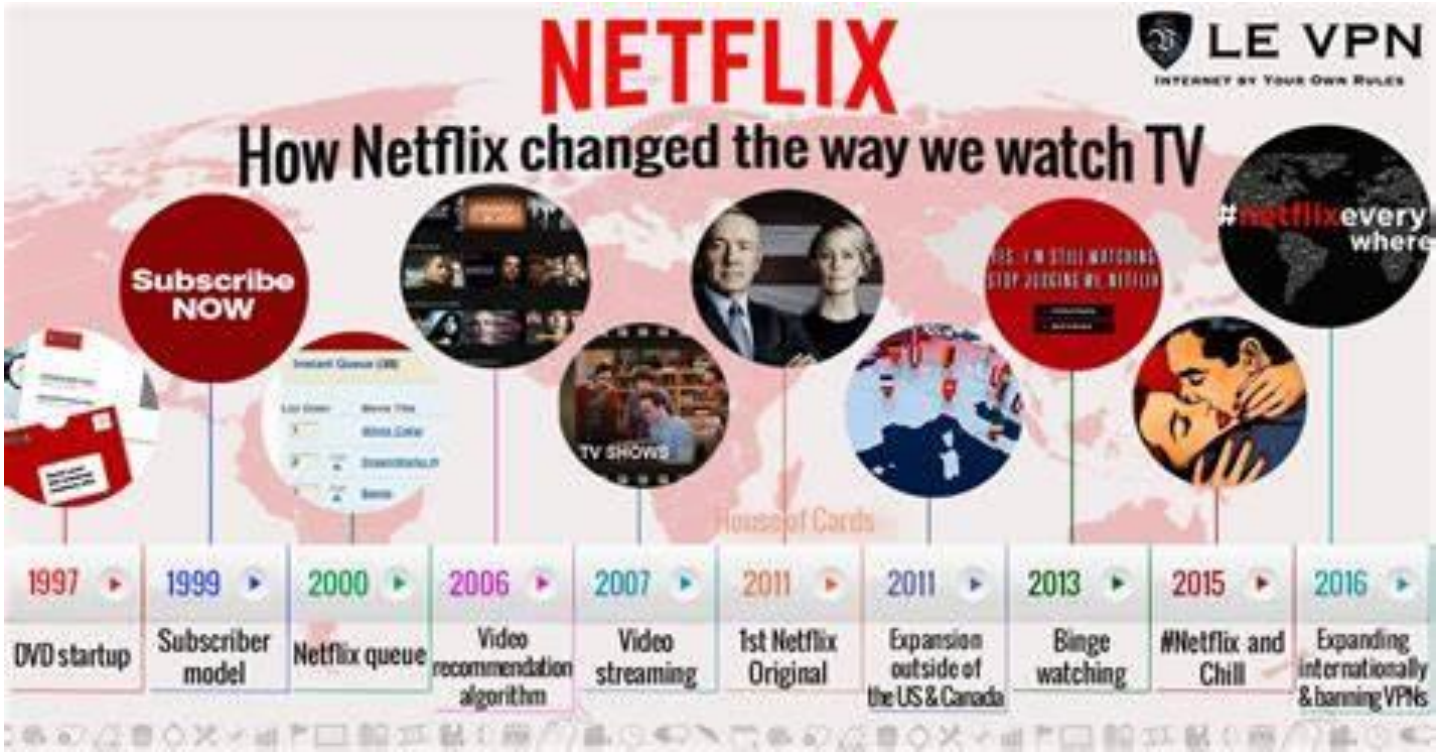
Mindset



„It is sometimes difficult in a big successful organization to have the sense of urgency and hunger. (...) However, if you have a high market share and you are a market leader, if you start defending, you cannot sustain."
(O.-P. Kallasvuo, former CEO Nokia)

The Right Timing

Netflix



https://www.le-vpn.com/wp-content/uploads/2016/05/netflixinf1200x628x-2.jpg

Take Aways

- **“Innovation is (…) the life blood of corporate survival and growth”** (Zahra & Covin, 1994, p. 183)
- **Speed and the right timing are very important components for today‘s innovation processes**
- **“There are three stages of innovation: innovation as a process, innovation as a discrete item including, products, programs or services; and innovation as an attribute of organizations.”** (Kimberly, 1981, p. 108)

Agenda

01 **Challenges for Innovation in Corporations**

02 Innovating in Corporations

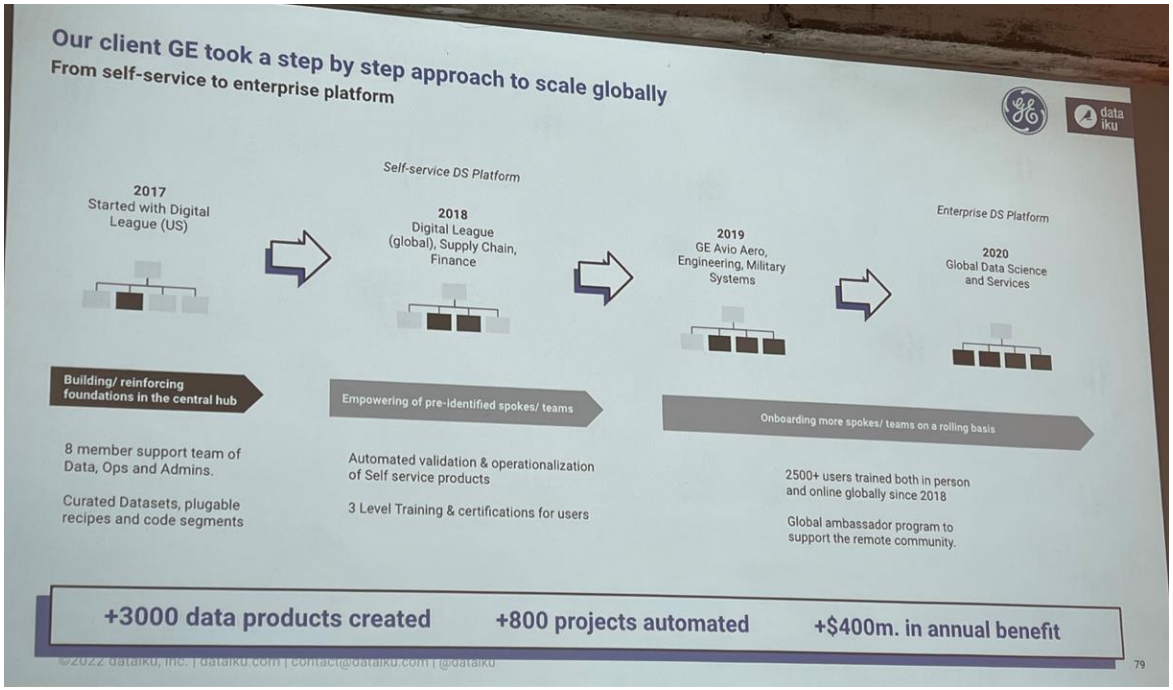
03 Measuring Innovation

04 Summary

Innovation Myth

1. **Business is business = Innovation is the result of the daily business.**

2. **We must invest <u>big amounts</u> of money into a <u>small number</u> of good ideas to realize powerful innovation projects.**



Exploitation (daily business) vs. Exploration (innovation)

„Daily business“

- Reduce costs
- Increase efficiency
- Process-oriented (bureaucratic)
- Zero mistakes
- Aim: Make profits

≠

„Innovation engine“

But? What is context? What is core?

Daily Business vs. Innovation Engine

Dimensions	Daily business	Innovation engine
Context	(Relatively) stable	Dynamic
Customer needs	Known / empirics exist	Unclear / no previous evidence available
Management style	Strategic planning	MVP-based
Leadership style	Top-down / centralised	Bottom-up or network
Way of working	Multitasking	Agile
Deadlines	Permanent („fire fighter“)	Flexible
Objectives	Zero mistakes and making profits	Experiment and learn

Organizational Design: Example 1 – Separation of Innovation and Daily Business (VW DigiLab)

The Lab

Our Story

Volkswagen is on a mission: to change mobility for future generations.

In 2015, the Volkswagen Digital:Lab Berlin has been set out to make great software products. It is the place where talented people are empowered to put their best work into products of the Volkswagen Group.

Source: https://vw-dilab.com/

Organizational Designs: Example 2 – Integrating Innovation into the Core Business Processes

On Eye-Level with the Business

Almost 100 people sharing the same mindset of modern software development!
We develop customer-centric, scalable and robust mobile online services for thousands of commercial customers; and transform VWCV into a data-driven company.

I. Design & Development

We work very close with the business departments and are co-located. We develop digital services for B2C- and B2B-markets.

Cross-functional

We work in cross-functional teams and leverage modern agile frameworks such as SCRUM, SAFe, LEAN etc.

However, what really matters is output.

III. Think like a Start-Up, act like a Grown-Up

We act fast. If we make failures, we learn from them. We are not afraid of making failures. We share and do not hide failures. We comply to the corporate processes.

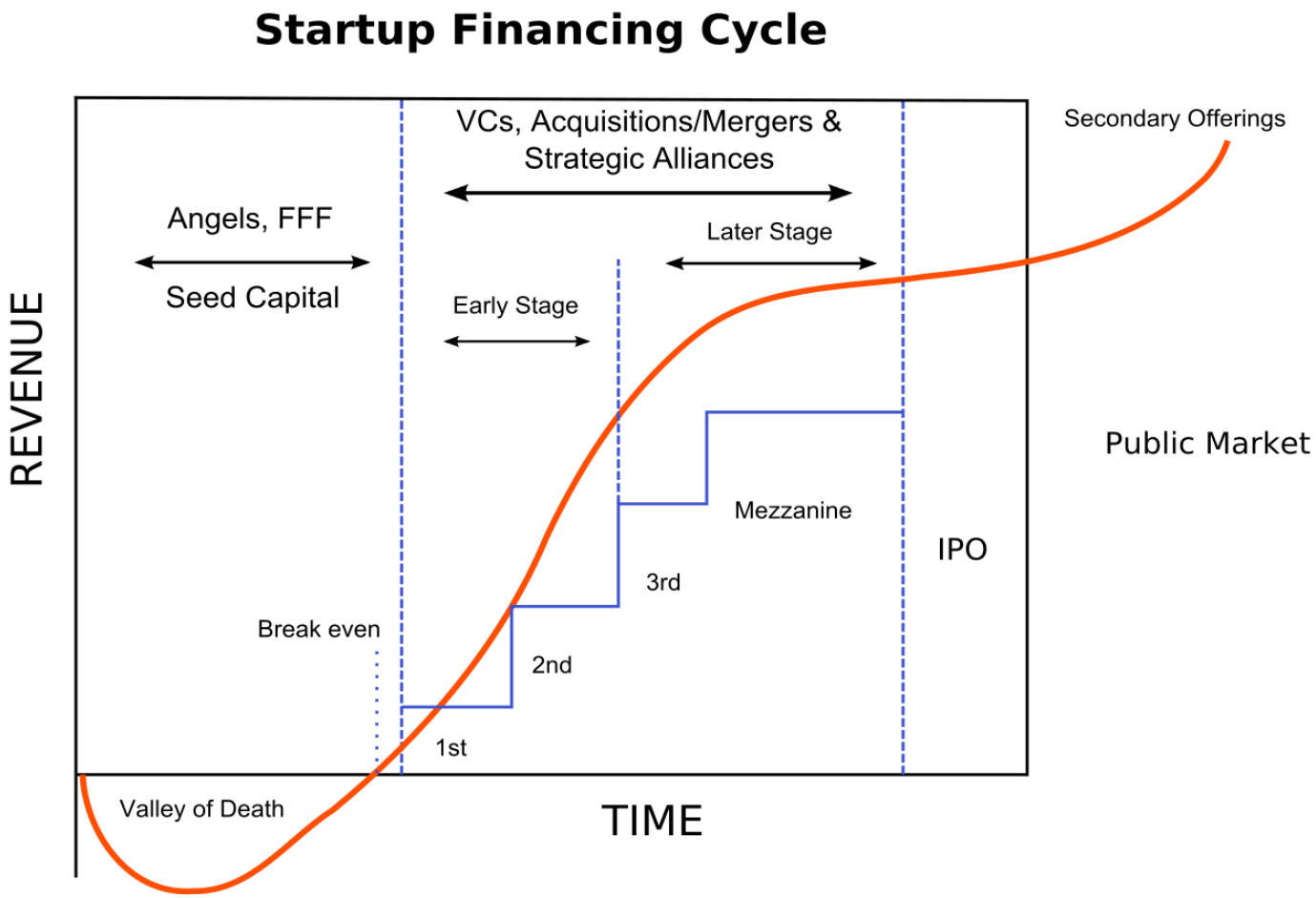
IV. Continuous improvement & customer obsession

Continuous improvement is in our DNA. We are customer obsessed and are a core-cell of the ongoing transformation of Volkswagen.

Innovation Projects in Corporation vs. Startups

Corporations	Startups
• There is a portfolio of ideas to be tested for different markets	• There is one idea that needs to survive on a market
• Budget logic (investment committees)	• Constant survival mode and pivoting
• Convenience team based on existing personnel	• Team with entrepreneurial mindset formed by founder
• Internal idea evaluation by a team of managers (or a jury; seldom investors)	• External idea evaluation by professional investors
• Usually respect of company bureaucracy	• Usually no bureaucracy
• Wide range of possible markets	• Limited market access

Start-Ups need constant Pressure to Grow



Startup financing cycle - Startkapital – Wikipedia

Take Aways

- **Daily business and innovation engine are two fundamentally different things:**
  - In terms of mindset
  - In terms of strategies to be implemented
- **There are different organizational designs with advantages and drawbacks to build an innovation engine**
- **Innovation in startups versus big corporations is not necessarily the same process BUT we can learn from the applied startup methods / mindsets**

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“Volkswagen’s future lies in becoming a digital technology company”.

Source: H. Diess, speech at the global board meeting 2020.

CARIAD – the New Volkswagen or a Bottleneck?

Group Functions e.g. IT

CARIAD

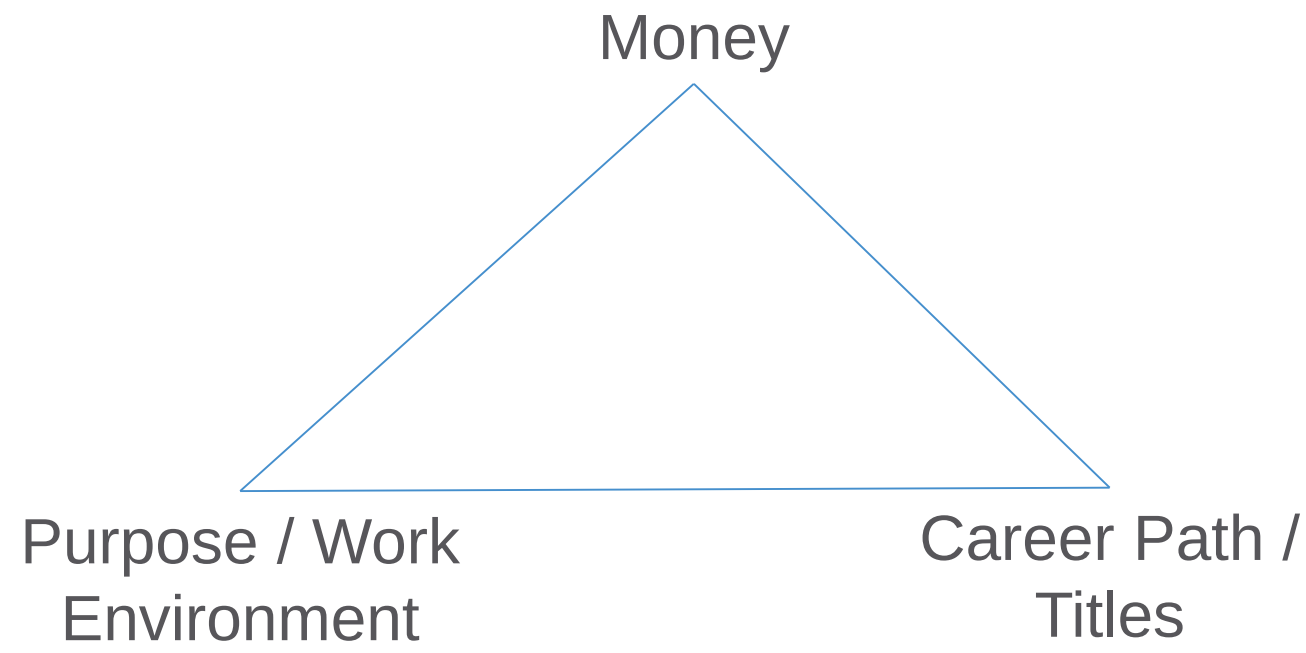
Commercial Vehicles

SEAT

ŠKODA AUTO

Components

How to Attract Talents?



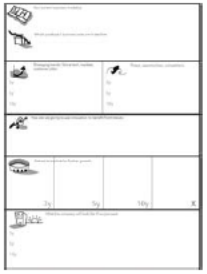
Innovation Theatre in Corporations

- **Organizational theatre:** Reorganization of the company with external help as an ineffective response for rapid innovation
- **Innovation theatre:** Innovation activity activism without a clear strategy. *"These activities don't win wars, and they rarely deliver shippable/ deployable product."*
- **Process theatre:** Efforts to reform processes which lead to even more processes remain obstacles for innovation. Overall innovation strategy needed.

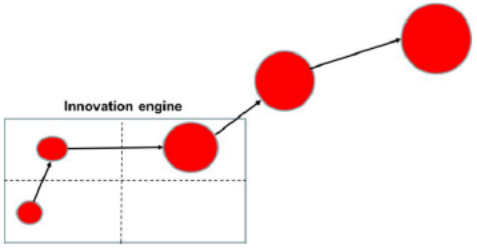
Organizational redesign, innovation activities, and process reform need to be part of an overall plan

Innovation Thesis and Portfolio Approach to Counteract

- Innovation thesis as starting point to set the boundaries for a structured approach to innovation and to avoid theatres



- Portfolio of innovation projects with continuous assessment of innovation stages based on juries to re-invest into or kill an innovation project are necessary



Simulating a Start-Up Environment

„Daily business“

- Reduce costs
- Increase efficiency
- Process-oriented
- Zero mistakes
- Aim: Make profits

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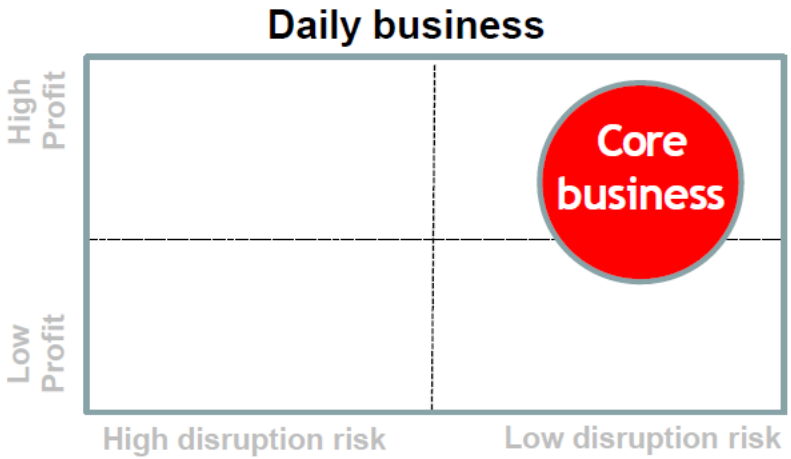
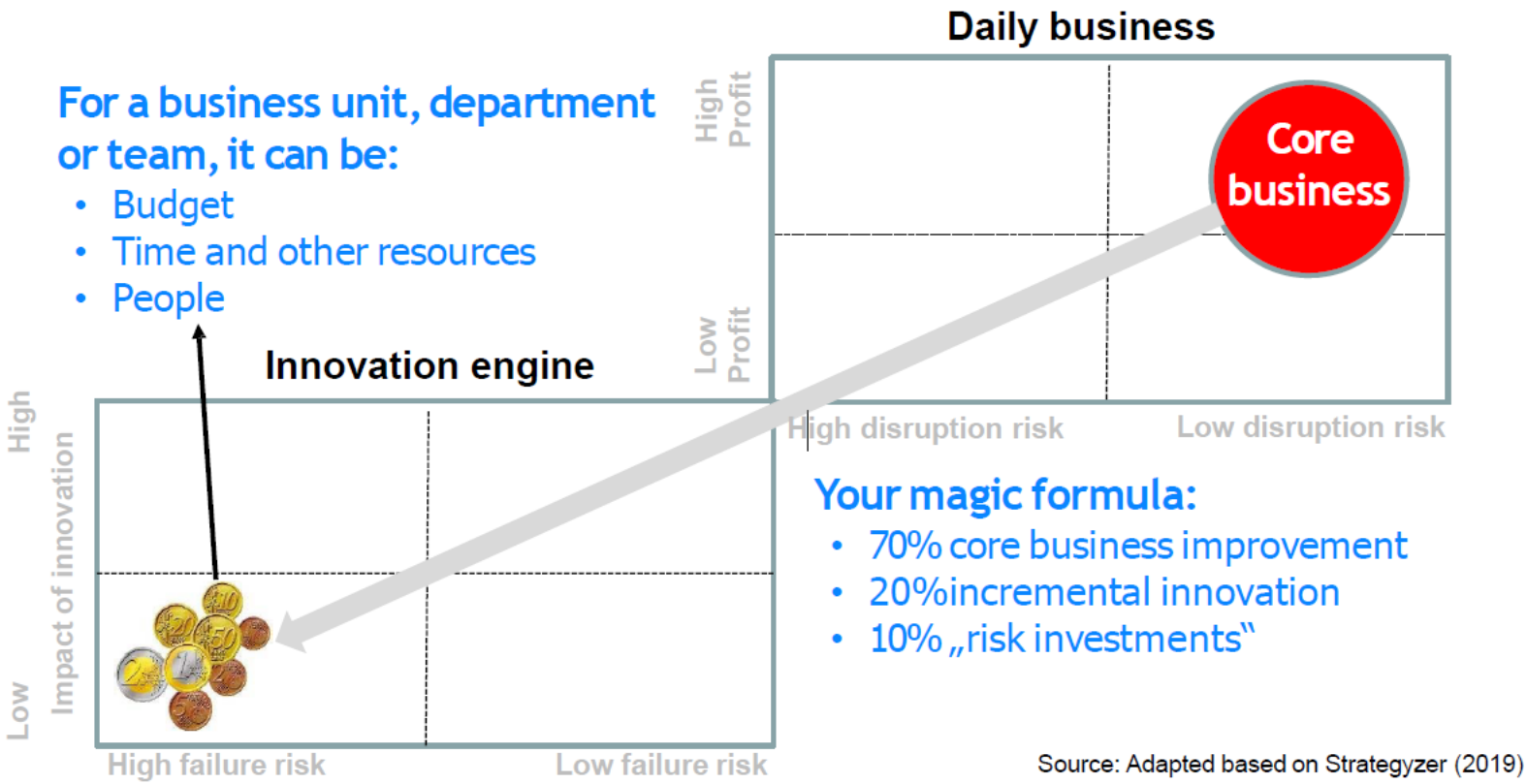
„Innovation engine“



Source: Adapted based on Strategyzer (2019)

Simulating a Start-Up Environment



For a business unit, department or team, it can be:

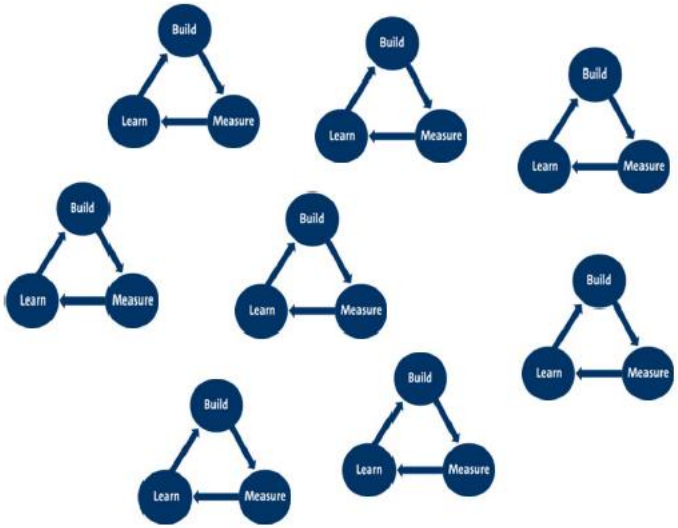
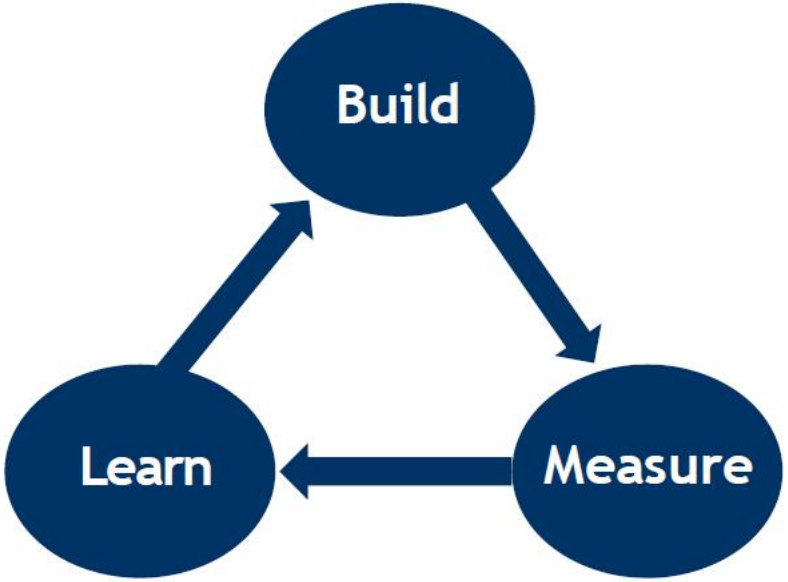
- Budget
- Time and other resources
- People

Your magic formula:

- 70% core business improvement
- 20%incremental innovation
- 10% „risk investments"

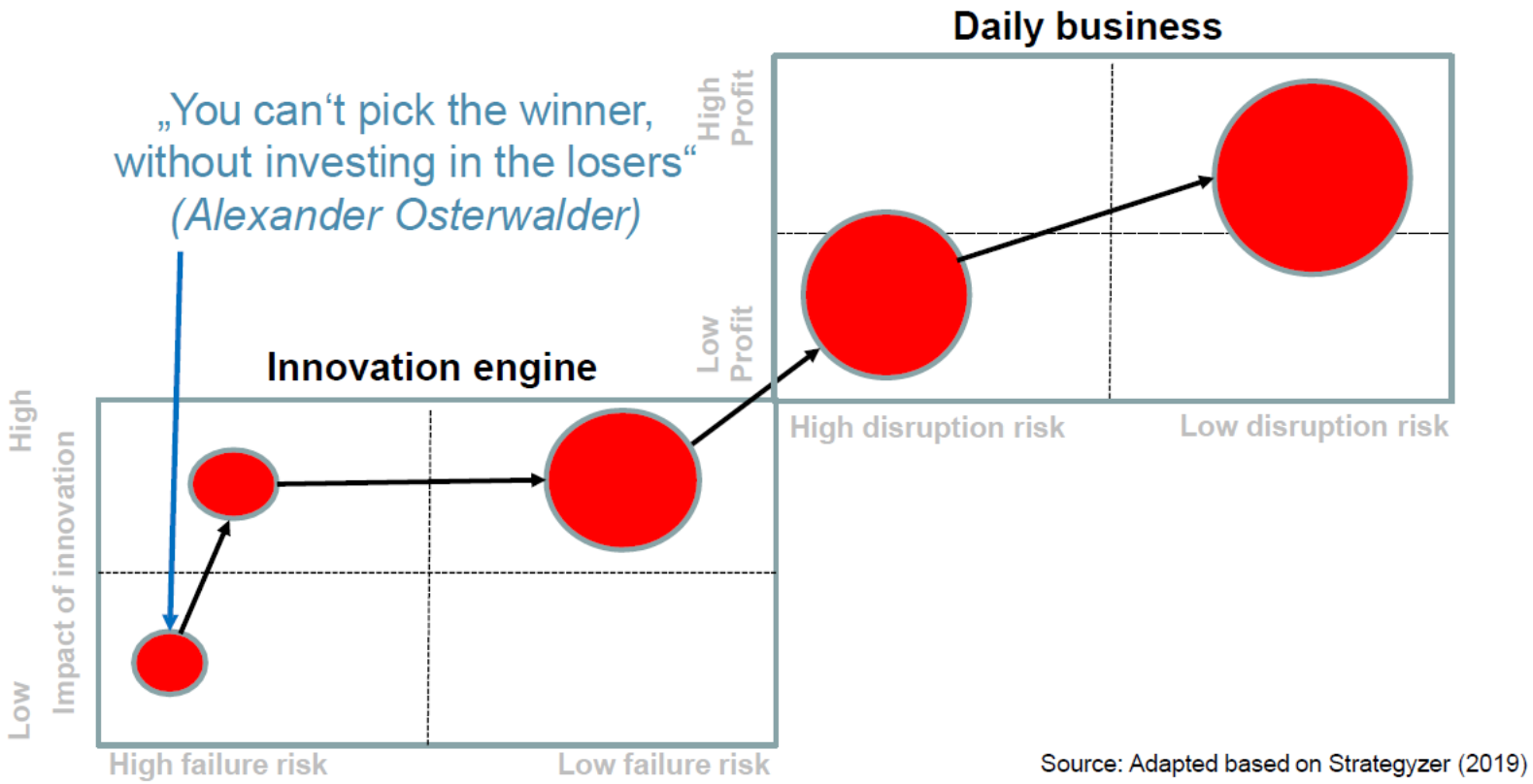
Source: Adapted based on Strategyzer (2019)

Simulating a Start-Up Environment

Corporations	Startups
	

Sources: Ash Maurya (2016)

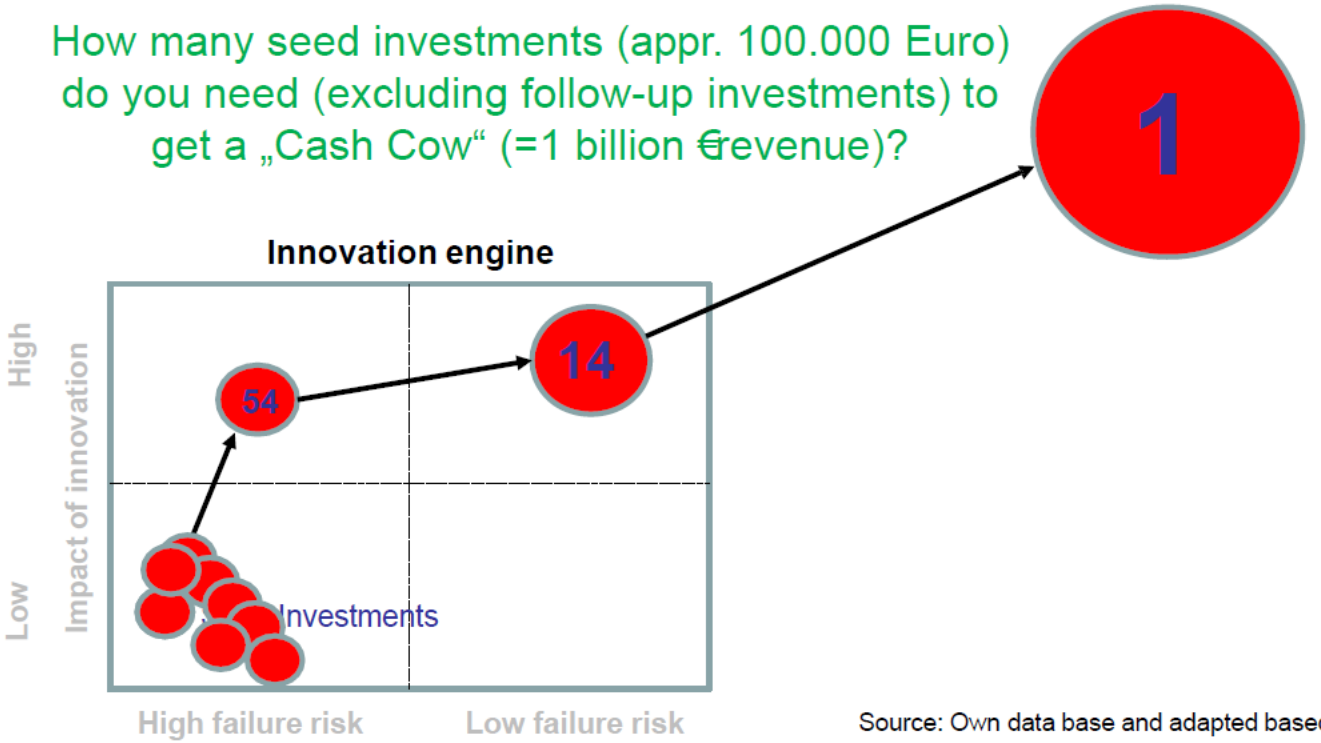
Simulating a Start-Up Environment



Source: Adapted based on Strategyzer (2019)

The Right Mindset

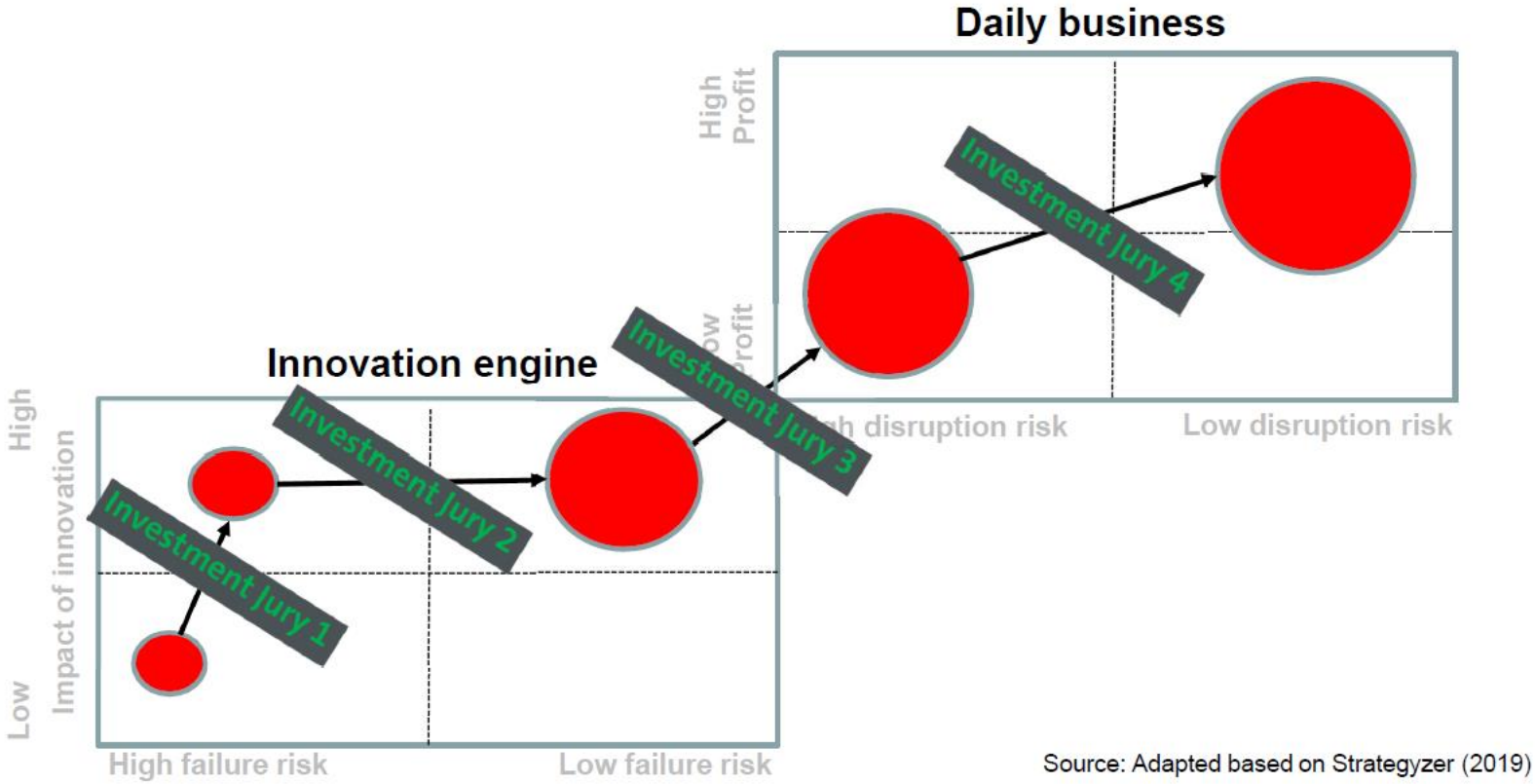
How many seed investments (appr. 100.000 Euro) do you need (excluding follow-up investments) to get a „Cash Cow“ (=1 billion €revenue)?



Source: Own data base and adapted based on Strategyzer (2019)

The Right Mindset: Seeding Ideas like VCs

Seeding Ideas



Source: Adapted based on Strategyzer (2019)

VC-like Strategies to Innovate

Mergers & acquistions	Intrapreneurship program	Innovation departments	Innovation ambassadors
Corporate VC	Internal incubators/ accelerators	R&D innovation labs	Innovation training programs
Innovation partnerships (with startups, open innovation, hackathons, etc.)	Internal Hackathon		Learning expeditions

To Sum It Up

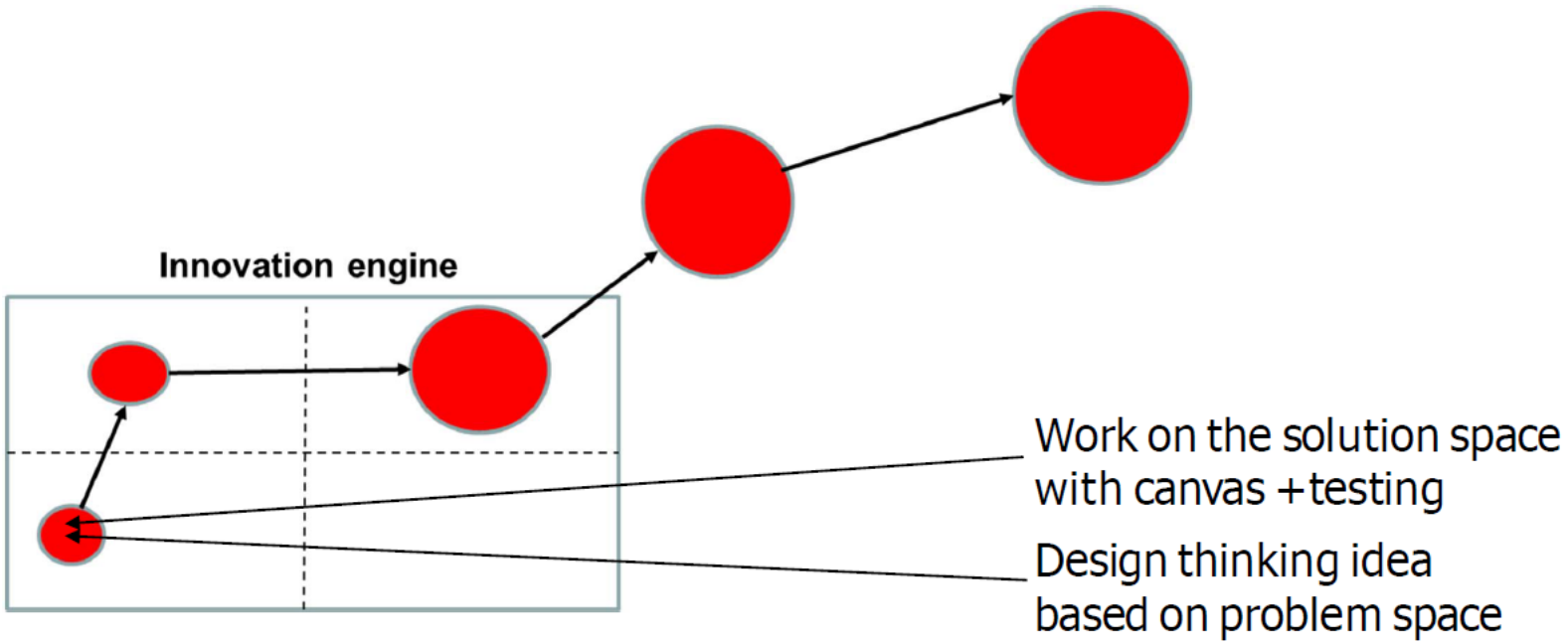
- The starting point for innovation is your innovation thesis
- Based on the innovation thesis, you can avoid theatres and set up your strategies for innovation in a portfolio approach
- You need many innovation experiments to get a winner ("You can't pick the winner without investing in the losers")
- Customize where and how your source your innovation projects (e.g., corporate VC, hackathon, internal training)

Innovation Myths

1. Business is business = Innovation is the result of the daily business.
   Better: There is a great difference between the daily business and the innovation engine, and they require different modes of operation (designs) and mindsets.

2. We must invest big amounts of money into a small number of good ideas to realize powerful innovation projects.
   Better: We test a **big** number of ideas with **small** amounts of money to step-by-step validate project hypotheses. We also kill ideas fastly to re-invest only into those ideas with validated hypotheses.

How to Apply All of This?



Lean Innovation Definition

Lean innovation means iterating from Plan A to a plan B, C, and finally to Plan X that works, before running out of resources.

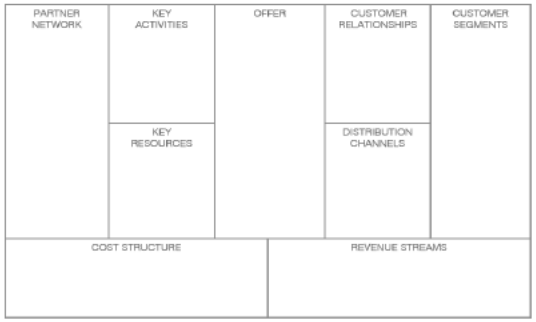
From the Problem Space to an Initial Ideas to a Canvas

- **Lean:** Share initial vision with the least resources possible
  - **Fast:** Develop several ideas in a day (not in a month)
  - **Concise:** Distill the essence of your idea (story telling)
  - **Portable / visualized:** Use single page idea tools

Sources: Ash Maurya, 2010 and Osterwalder/Pigneur, 2010

Lean Canvas

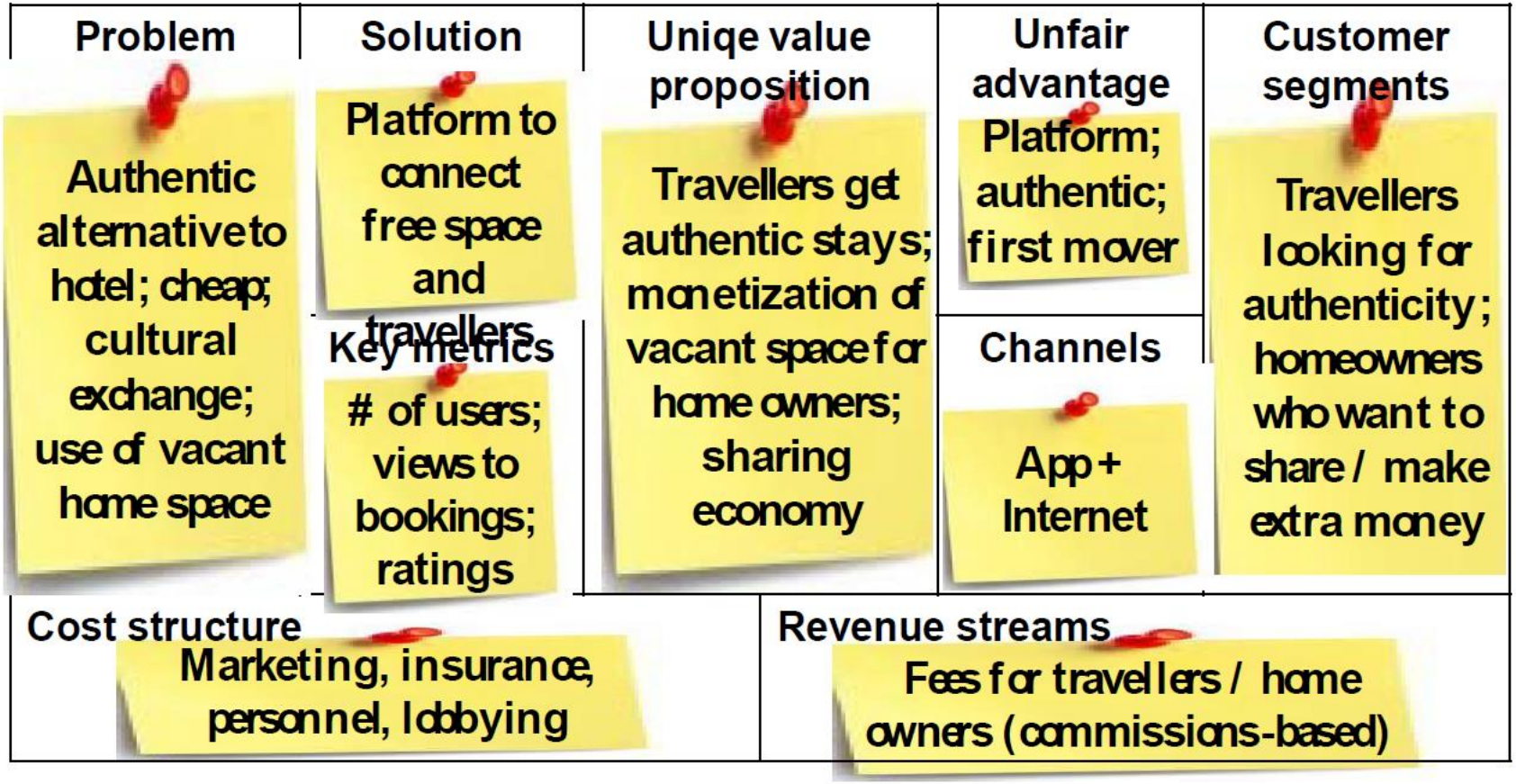
Business Model Canvas



Lean Business Canvas

Problem	Solution	Unique value proposition	Unfair advantage	Customer segments
What is the pain?	What is your solution?	Wh What is the client need that you satisfy?	y are you bett than others?	er Who are your customers?
	Key metrics How do you measure success?		**Channels** How do you get product / service to customers?	
Cost structure Main cost drivers?		**Revenue streams** Main sources of revenue?		

Airbnb


Problem
Authentic alternative to hotel; cheap; cultural exchange; use of vacant home space
Solution
Platform to connect free space and travellers
Key metrics
# of users; views to bookings; ratings
Uniqe value proposition
Travellers get authentic stays; monetization of vacant space for home owners; sharing economy
Unfair advantage
Platform; authentic; first mover
Channels
App + Internet
Customer segments
Travellers looking for authenticity; homeowners who want to share / make extra money
Cost structure
Marketing, insurance, personnel, lobbying
Revenue streams
Fees for travellers / home owners (commissions-based)

Agenda

01 Challenges for Innovation in Corporations

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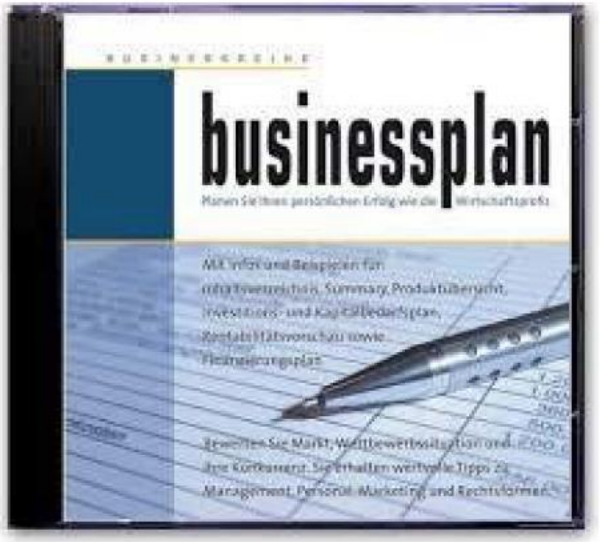
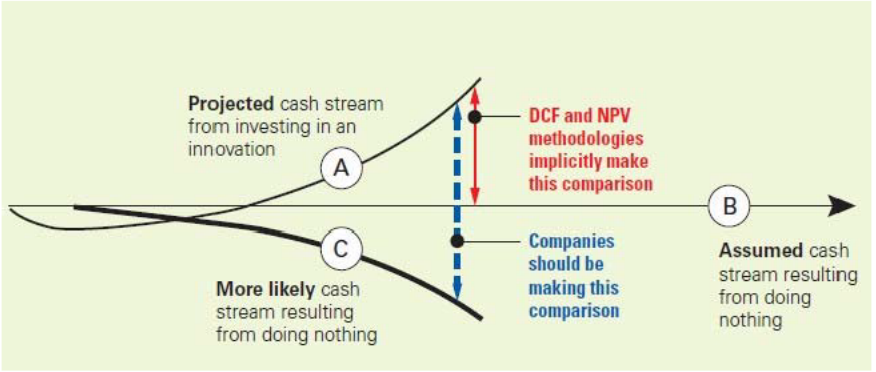
Typical Innovation Investment Decisions

- Large companies have traditionally used business plans to make investment decisions for innovation
- Traditional financial metrics are used to make decisions
  - E.g., traditional financial projections
  - E.g., ROI



Innovation Killer #1: Discounted Cash Flow

- Discounting future stream of cash flows of an innovation project into a present value creates an "anti-innovation bias"
  - Assumption made is that the present health of the company will persist in the future without investments (=base case of not investing)
  - However, most likely scenario of the do-nothing scenario is a non-linear decline in performance
- Projected value of an investment must be assessed against a range of scenarios (technology changes, price and margin pressure, sales volume decrease, etc.)



Source: Christensen et al. (2008, p. 101)

Innovation Killer #2: ROI

	Innovation project t=1	Innovation project t=2	Innovation project t=3
EBITDA	200,000	200,000	200,000
Depreciation	-100,000	-100,000	-100,000
EBIT	100,000	100,000	100,000
Assets (net)	500,000	400,000	300,000
ROI	20%	25%	33%

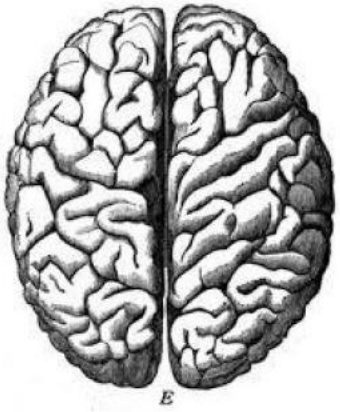
Innovation Killer #2: ROI

- Projects with the highest levels of ROI are often those that leverage a company's existing assets
- Thus, in any resource competition, projects that leverage current assets will look better than radical innovation projects that require the creation of new assets and capabilities
- Financial valuations (e.g., RONA) reward companies that increase net income while reducing the number of fixed assets employed

Innovation Killer #3: Strategic Evaluation

Great Strategies = Numbers + Storytelling

System 2:
- Logic
- Analytic thought
- Language
- Science and math
- Reasoning
- Think in words



System 1:
- Creativity
- Imagination
- Intuition
- Art and music awareness
- Visualization
- Feelings

Evaluation of Innovation Projets in Corporations

What usually doesn‘t work:

- Stadard financial metrics
- (Long) Business plans

The better approach:

- Develop your innovation thesis: A framework in which innovation takes place
- Use a set of tools to standardize the pitch of early-tage innovation projects in your portfolio
- Define a set of KPIs for different innovation juries (=innovation stages)
- Make sure that you have resources to survive from the idea to the scaling process

Source: Viki et al. (2017)

How to Measure?

- Strategic view on the success of the innovation portfolio. Usually managed by the board.
- Innovation management by executives and innovation managers. Decisions about continuation or killing of innovation projects.
- An innovation team uses these KPIs to track their performance in different experiments and in terms of hypotheses testing.

Source: Viki et al. (2017)

Measuring Innovation: Reporting KPIs

Imagine that you are managing an innovation team, in charge of developing new ideas and running experiments. What KPIs would you use?

Activity metrics	Impact metrics
Number of ideas generated	Risky assumptions identified
Number of ideas chosen	Hypotheses developed
Number of assumptions tested	Minimum fail criteria set
Number of experiments performed	Reported experiment results
Number of customer conversations	Decisions made (pivot, retest, kill)
Number of customer interviews	Cost-per-learning ratio
Number of prototypes developed	Learning velocity
Number of MVPs built	Validation velocity
Number of design sprints	

Source: Viki et al. (2017)

Measuring Innovation: Governance KPIs

Imagine that you are an executive, monitoring different innovation teams. What KPIs would you use?

Activity metrics	Impact metrics
Number of products in pipeline	Assumption-to-knowledge ratio
Number of products per innovation stage	Percentage of products at problem-solution fit
Number of ideas submitted	Percentage of products at product-market fit
Number of decisions made	Number of validated innovation ideas at current stage
Average amount spent per stage	

Source: Viki et al. (2017)

Measuring Innovation: Global KPIs

Imagine that you are a board member, in charge of innovation in your company. What KPIs would you use?

Activity metrics	Impact metrics
Number of products by innovation type (e.g., process innovation, product innovation, etc.)	Number of patents granted
Percentage of products aligned with innovation thesis	New business models ready to scale
Number of partnerships and collaborations	Cost savings through process innovation
	New market segments entered

Source: Viki et al. (2017)

Potential Trap #1

- Trap 1: Overestimating or underestimating what innovation measurement can do
  - Too detailed measurement (discourages radical innovation)
  - No measurement (follow-up, and management of innovation becomes difficult)

*Source: Richtner et al. (2017)

Potential Trap #2

- Trap 2: Measuring parts but not the whole
  - Executives frequently failed to formulate a holistic overview of innovation inputs, activities, and outputs
  - OR they focused too specifically on individual projects at the expense of their overall innovation portfolio
- Problematic results:
  - E.g., running similar projects in parallel
  - E.g., inefficient allocation of resources (=overall strategy, department strategy, etc.)
  - “I don’t need new ideas, I need people to solve current problems”

*Source: Richtner et al. (2017)

Potential Trap #3

- Trap 3: Overlooking the political aspect of innovation measures
  - Changing innovation measures has an impact on the company's incentive system ("what gets measured is what gets done, and what gets done is what gets rewarded")
  - Changing innovation measures changes the powergame within a company (e.g., resources for R&D versus business development)

*Source: Richtner et al. (2017)

Agenda

01 Challenges for Innovation in Corporations

02 Innovating in Corporations

03 Measuring Innovation

04 **Summary**

Summary

1. Innovation is necessary to adapt to changing market demands, crisis etc. / to enable the profit-pools of tomorrow
2. Innovation and daily business can be quite different; Simulate start-up like patterns in corporations
3. Measuring innovation shouldn’t stop it but pave the way for evolvement