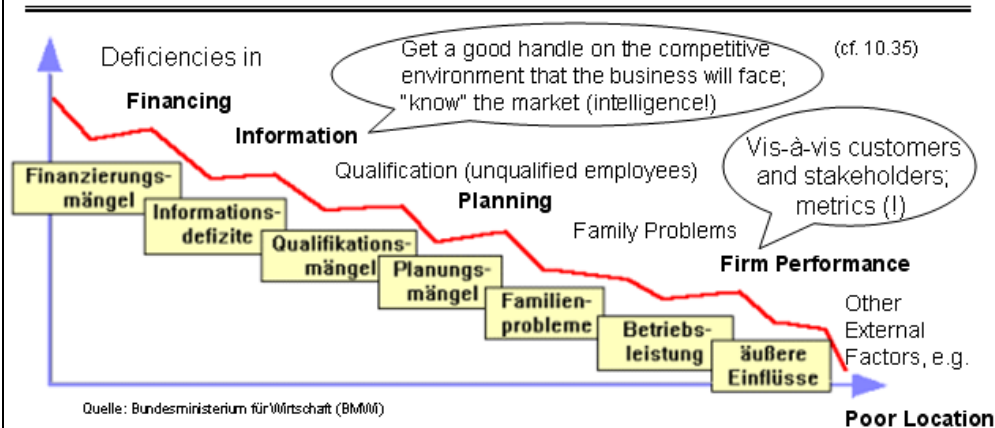


# Technology Entrepreneurship

## Entrepreneurship for and in Chemistry-Related Enterprises

MODULE 10  
Basics in Financial Understanding

### Failures for Firm Foundations



- **"Financing issues"** occur
  - on startup formation (e.g. undercapitalization)
  - at the earliest, most vulnerable stage of development and its change into "normal" survival mode or (even extraordinary) growth - running out of cash, lack of purchase orders, lack of payment by customers) - **Planning pays!**
  - Financial management

## Key Questions

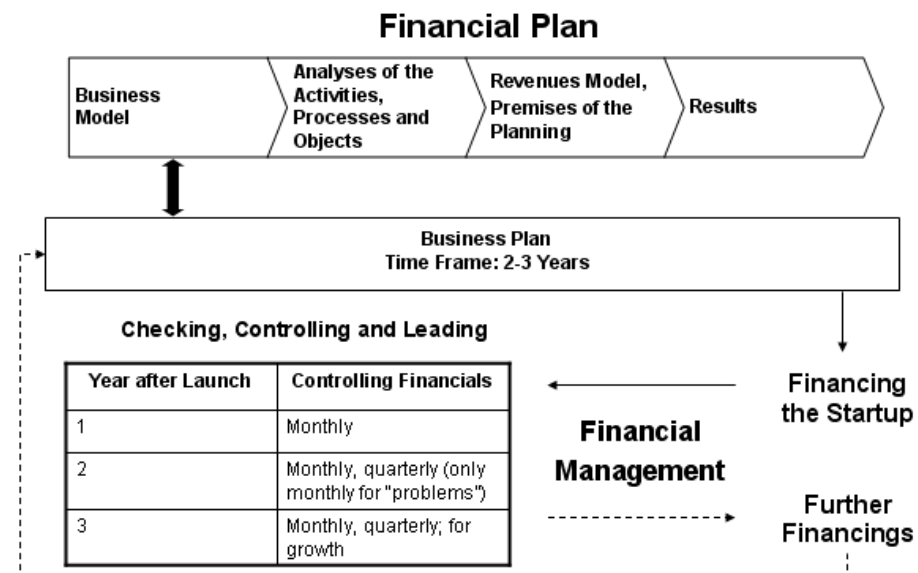
Vital questions to any entrepreneur *at any stage in the development* of a company

- How much money does my venture need?
- When is it needed?
- Where and from whom can it be raised?
- How long will it last?
- How should this process be orchestrated and managed (short-term and long-term; operational and strategic)?

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10.3

## Startup: Financial Plan and Financing

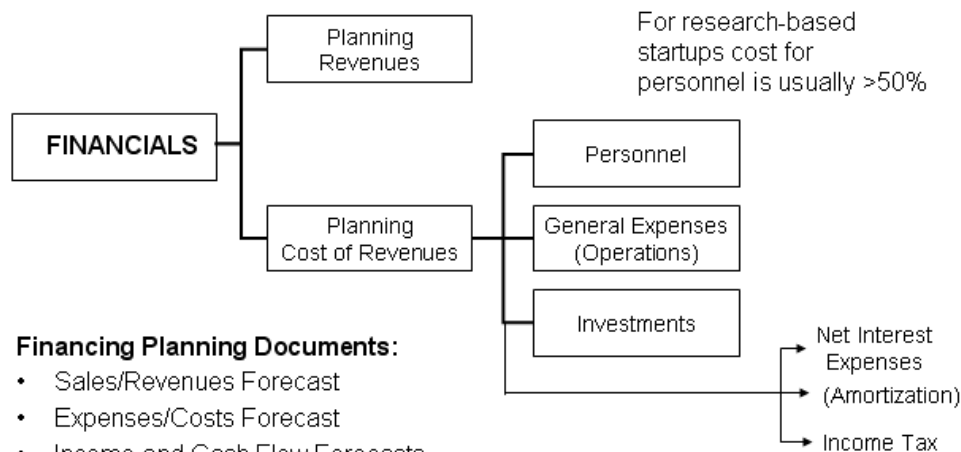


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10.4

## Financial Planning - Components

**For the Founder: Determining the economic potential of the new venture**



### Financing Planning Documents:

- Sales/Revenues Forecast
- Expenses/Costs Forecast
- Income and Cash Flow Forecasts
- Balance Sheet

**For an Investor:  
Demonstrate the potential return**

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Ref. Runge, p. 636; p. 637, Table III.18

10.5

## Four Steps to Building a Financial Plan

### 1. Revenues/sales forecast (from revenues model)

- Timeframe - two or three years.
- Assumption about revenues/sales (per customer, number of customers) and growth rate of revenues/sales.
- Calculation of the revenues/sales forecast.

### 2. Expenses/Costs Forecast

- Assumption about the costs of doing business in the specified time frame.
- Calculation of the costs associated with the projected revenues/sales of step 1.

### 3. Income and Cash Flow Forecasts

- Assumption about the timing of cash receivables and payables specified in the time frame.
- Calculation of the income and cash flow associated with the projected sales and costs on a monthly basis over the timeframe.

### 4. Balance sheet

- Assumptions about the starting value of cash and assets.
- Calculated based on the income and cash flows from step 3.

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Ref. Dorf & Byers, p. 381, Table 17.1

10.6

### ***Needed Money to Launch a (Chemical) NTBF: Estimating “Standard” Expense Items***

- ***Properties and Activities*** (“Activity-Based Costings”- ABC?)  
**Expenses that virtually all businesses must incur:**

#### **“Pre-Startup”**

- Contract services (ad hoc; lawyer/attorney, tax consultant, business consultant, intelligence/market research service, manager ...)
- License-in upfront payment (?)

#### **Startup** (Assuming rented “rooms” rather than purchased facilities)

- Labor (permanent employees) according to activity; contract labor
- Management & Administration (“Overhead”?)
- Office space rental (including I&CT?)
- Office materials & supplies; office equipment (tel., fax, PCs, desks/chairs, cabinets etc.) – purchase?
- Communication (tel./fax, copier, etc. PC network)
- Maintenance – extra fees? (office, computer/network Infrastructure)
- Utilities (electricity, heating/air conditioning, water)
- Outsourced activities (e.g. accounting)

#### **Marketing & Sales**

Promotion (set up and maintain a Web site; ads, exhibitions etc.)

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10.7

### ***Needed Money to Launch a Chemical NTBF: Estimating “Special” Expense Items***

#### **Lab and Production-Specific Items**

- Lab space rental (incl. special room renting, e.g. clean room; waste disposal)
- Water supply/disposal (process/waste water; special purity-grade water; e.g. pharma)
- Lab materials & supplies
- Lab equipment and instruments
- Special workstations for lab (?)
- “Production facilities”
- Maintenance (lab and “factory”; incl. instrument services)
- Warehouse (e.g. for raw material) or factory space rental
- Machinery and equipment rental/ lease for production

#### **Activities and Needed Services**

- License-in expenses (?)
- Special instrument usage rental
- Patent and trademark registration and maintenance
- Regulatory work/fees (?)
- Travel (Customers; Courses, Conferences, Exhibitions)
- Contract services (lawyers; accountants, patent attorney, license-out; alliance agreements)
- Outside Research Services (analytical; computerization)
- Information & Intelligence Services (technical, business information – literature/patents, computer-based; databases)

*Note:* if you provide technical service, travel and phone cost will be high; where to put – R&D, Sales, Overhead?

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10.8

### ***Non-Financial Resources – Crucial to Success of a New Venture***

- *Partners – Team*: help one another access capital, spread the workload, share the risk, and furnish expertise (- and “soul mates”, to keep you “warm”)
- Top “*management teams*” - affect company image, develop long-term plans, support daily activities, and create information networks; for *company growth*
- *Advisory boards* - provide *expertise* about a variety of specific business matters and pass *judgment* on new ideas (can initiate networking)
- *Networks* - create social capital, competitive advantage

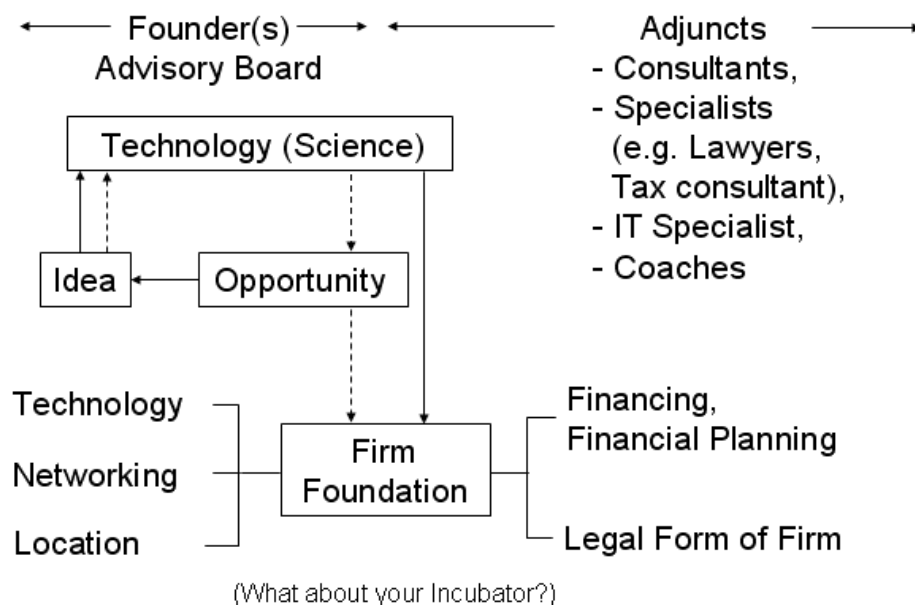
#### **Must**

- acknowledge one another’s talents
- learn to trust each other
- listen to one another
- communicate honestly

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10.9

### ***Areas for Entrepreneurs and “Adjuncts”***



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10.10

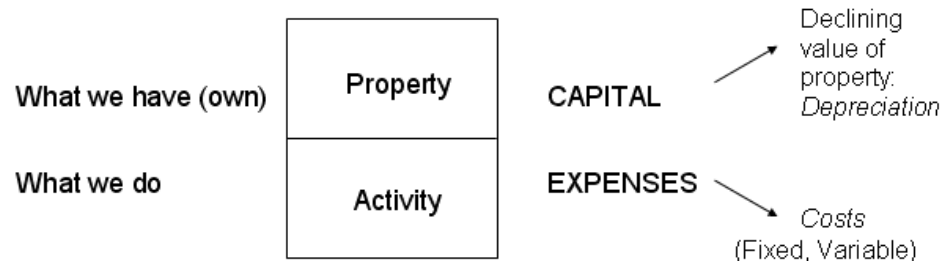
### Elaborating Key Accounting Relationships (1)

- **Management accounting** (confidential; for control) vs. **legal accounting** (comply with jurisdictional tax regulations)
- Accounting procedures basically refer to "**tangibles**"
- Main accounting documents and financial analysis
  - **Balance Sheet**
  - **Income and Loss Statement (Statement of Operations)** Gewinn- und Verlustrechnung
  - **Statement of Cash Flows** Kapitalflussrechnung

Bilanz

#### The Balance

A Picture of the Current Situation ("Moment")



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10.11

### Elaborating Key Accounting Relationships (2)

Einnahmen

Revenues (Sales)

Cost-of-Revenues (Sales)

When we get paid  
for a product,  
service...

Umsatzerlöse  
**Income**

Aufwendungen/Ausgaben  
**Expenses**

When we pay for  
something...

**Assets**

Aktiva

Liabilities often  
generate  
expenses

**Liabilities**

The value of  
anything we  
purchase, borrow,  
owe ...;  
how we finance it

Passiva

Verbindlichkeiten

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10.12

## Assets and Liabilities

Vermögenswerte

- Assets can be split into

- **Fixed Assets** (land, buildings, plants, machinery, equipment, instruments etc.) Anlagevermögen

- **Current Assets** (liquid in less than a year) Umlaufvermögen  
(cash, inventories; Accounts Receivable)

Debitoren-  
konto;  
Forderungen, Außenstände

Accounts Receivable reflected by "**Days Sales Outstanding**"  
( $DSO = (\text{Receivables} / \text{Sales}) * \text{Days}$ ); has **cash flow impact**

DSO - durchschnittliche Zahlungsziel

- Liabilities can be split into

- **Current Liabilities** (payable in less than a year) kurzfristige Verbindlichkeiten  
(Accounts Payable, short-term loans) Kreditorenkonto,  
Fällige Rechnungen

- **Long-Term Liabilities**  
Bonds issued/long-term loans

- **Equity** ("owned" by the shareholder)
  - Capital
  - Retained Earnings Nicht ausgeschüttete Erträge
  - Capital Surplus Kapitalrücklage

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10.13

## A Firm's Accounting vs. Market Value: Intangible Assets

- **Accounting Value (Book Value from Balance) =**  
Total Assets – [Intangible Assets (e.g. Licenses) + Liabilities]

**Market Value is different from Book Value!!!**

- Value of "**Intangible Assets**" ("*imputed value*"):=  
[Market Value (Price) – Book Value] + "Book Intangibles"
- **Equity:** Ownership (value) of a publicly traded company is divided in certificates called "common shares" Stammaktien
- **Market Capitalization** (public stock company) =  
Share Price \* Number of Common Shares Outstanding
- **Firm Value indicators** of a firm for stockholders:
  - **Earnings Per Common Share (EPS)** =  
Net Income / Common Shares
  - **Price Earnings Ratio (P/E)** = (Market Price / Earnings) Per Share

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Ref. Runge, p. 233, 234, 337, 658, 682

10.14



## Some Accounting Principles

- Basic Accounting formula (for the balance):

$$\text{Assets} = \text{Liabilities} + \text{Equity}$$

Werte = Verbindlichkeiten + Eigentümergevermögen

What the company owns

How the ownership of assets was financed  
(By third parties or by the owners)

- Accounting items are classified into “*accounts*” Konto according to their nature (such as “salary & fringes”, “depreciation”, “accounts payable” etc. cf. 10.7, 10.8), translated into monetary units, and organized in statements (- profit elements and cost elements → profit center and cost center)

Accruals (accounting items constituting the difference between earnings and cash from operations)

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10.15

## Devaluations over Time

- Capital (“*Money is worth more the sooner it is received.*”)
  - Inflation
  - Currency Exchange Rate (decrease or increase of value)
- Property
  - The *declining value of a fixed asset* over a given period of time is taken into account through “*depreciation*”
- **Depreciation** – rate depends on
  - Estimated useful life
  - Estimated resale value
  - What is common

*Different methods (to be accepted by tax authority): straight line (5 years: 1/5, 1/5, 1/5, 1/5, 1/5); double declining balance (DDB) - basis: 1+2+3+4+5=15 → 5/15, 4/15, 3/15, 2/15, 1/15, DDB considers that devaluation is greater at earlier time of use*
- Depreciation influences the profit before tax, and therefore the amount of taxes to be paid (= cash flow impact!)
- **Net Property:** cost of property minus depreciation

Nettovermögenswerte

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Ref. Runge, p. 876, 877

10.16



## Income (Profit and Loss) Statement

- Reports the **economic results** of a company over a time period. Shows the business financial activity over a period of time (monthly, annually).  
It is a moving picture showing *what has happened in your business* and is an excellent **tool for tracking and assessing your business**.

### Income Statement of NG Corp. – Year 2007

<b>= Revenues</b>	
+ Sales (of products)	
+ Licenses	
+ Contractual services (etc.)	
- Cost of Revenue	
<b>= Gross Profit (cf. "Gross Margin ")</b>	
(cf. 10.4; 10.5)	
- Sales and Marketing	
- General & Administrative	
- Research & Development	
- Depreciation	
- Amortization	
<b>= Operating Income (EBIT)</b>	
+ Interest Income (Expense) net	
<b>= Net Income before Taxes</b>	
- Income Tax Provision	
- Extraordinary Items	
<b>= Net Income (Profit)</b>	

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### Performance Metrics:

- Return on Sales  
**ROS** =  
Net Income / Sales
- **Gross Margin (%)** =  
Gross Profit / Sales
- **EBITDA**:  
Earnings Before  
Interest, Taxes,  
Depreciation &  
Amortization
- **EBIT**:  
Revenues – Operating  
Expenses

(Umsatzkostenverfahren)

10.17

### Gewinn- und Verlustrechnung

	2006	
	EUR	EUR
1. Umsatzerlöse		7.833.797,08
2. Erhöhung des Bestands an fertigen und unfertigen Erzeugnissen		423.345,45
3. sonstige betriebliche Erträge		546.971,25
4. Materialaufwand		
a) Aufwendungen für Roh-, Hilfs- und Betriebsstoffe und für bezogene Waren	-962.217,29	
b) Aufwendungen für bezogene Leistungen	-1.752.836,20	-2.715.053,49
5. Personalaufwand		
a) Löhne und Gehälter	-2.073.507,47	
b) soziale Abgaben und Aufwendungen für Altersversorgung und Unterstützung	-375.522,78	
davon für Altersversorgung EUR 13.156,06		-2.449.030,25
6. Abschreibungen auf immaterielle Vermögensgegenstände und Sachanlagen sowie auf aktivierte Aufwendungen für die Ingangsetzung des Geschäftsbetriebs		-522.688,76
7. sonstige betriebliche Aufwendungen		-2.096.173,69
8. sonstige Zinsen und ähnliche Erträge		93.939,02
9. Zinsen und ähnliche Aufwendungen		-27.060,71
davon an verbundene Unternehmen EUR 15.960,00		
10. Ergebnis der gewöhnlichen Geschäftstätigkeit		1.088.045,90
11. außerordentliche Erträge	124.563,20	
12. außerordentliche Aufwendungen	-1.506.226,44	
13. außerordentliches Ergebnis		-1.381.663,24
14. sonstige Steuern		-976,82
15. Konzernjahresfehlbetrag		-294.594,16
16. anteiliges Ergebnis fremder Gesellschafter		-41.922,52
17. Konzernergebnis nach Anteilen fremder Gesellschafter		-336.516,68
18. Konzernbilanzverlust		-336.516,68

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### Nanogate AG Geschäftsbericht 2006

- **Personalkosten:**  
2.449 TEUR
- **Raumkosten:**  
436 TEUR
- **Rechts- und Beratungskosten** sowie Abschluss- und Prüfungskosten:  
283 TEUR
- **Werbe- und Reisekosten:**  
286 TEUR
- **Patentkosten & Lizenzgebühren:** 199 TEUR
- **Abschreibungen:**  
523 TEUR
- **DSO:** 19 Tage (2006),  
33Tage (2005)
- **EBIT:** 1.020 TEUR  
EBIT Rendite (bzgl.  
Konzernumsatz): 13%

(Gesamtkostenverfahren)

10.18

### Tracking Operations: Nanophase Technologies

- The entire focus of Nanophase (slide 5.24) is nanotechnology, with two distinct and patented processes for the preparation and commercial manufacturing of *nanopowder metal oxides*, i.e. Aluminum Oxide, Zinc Oxide, Cerium Oxide, Titanium Dioxide, and several others.
- Nanophase has worldwide mutually *exclusive relationships with BASF for the supply of zinc oxide* into sunscreen applications. Altana AG has a stake in it.

	Years Ended December 31,				
	2007	2006	2005	2004	2003
<b>Statement of Operations Data:</b>					
Product revenue .....	\$11,766,565	\$8,612,705	\$6,444,444	\$4,253,478	\$4,880,313
Other revenue .....	442,543	378,133	357,463	954,456	566,348
Total revenue .....	12,209,108	8,990,838	6,801,907	5,207,934	5,446,661
Cost of revenue .....	9,032,187	7,057,707	5,827,719	5,125,216	5,205,065
Gross profit .....	3,176,921	1,933,131	974,188	82,718	241,596
Research and development expense .....	1,773,565	2,127,862	1,934,528	1,929,348	1,906,791
Selling, general and administrative expense .....	5,427,863	5,302,836	4,422,011	4,361,357	4,095,877
Lease accounting adjustment .....	-	-	279,810	-	-
Loss from operations .....	(4,024,507)	(5,497,567)	(5,662,161)	(6,207,987)	(5,761,072)
Interest income .....	661,512	366,701	295,935	171,582	67,992
Interest expense .....	(154,515)	(52,469)	(50,273)	(74,277)	(109,889)
Other, net .....	(73,660)	5,505	32,888	(306,273)	5,319
Provision for income taxes .....	-	-	-	(30,000)	(30,000)
Net loss .....	<u>\$(3,591,170)</u>	<u>\$(5,177,830)</u>	<u>\$(5,383,611)</u>	<u>\$(6,446,955)</u>	<u>\$(5,827,650)</u>
Net loss per share-basic and diluted .....	<u>\$ (0.18)</u>	<u>\$ (0.28)</u>	<u>\$ (0.30)</u>	<u>\$ (0.37)</u>	<u>\$ (0.38)</u>
Weighted average number of basic and diluted common shares outstanding .....	<u>20,038,868</u>	<u>18,344,334</u>	<u>17,937,932</u>	<u>17,266,228</u>	<u>15,391,537</u>

"Cost of revenue generally includes costs associated with commercial production and customer development arrangements.", p. 27; COGS - Source: [http://www.nanophase.com/pdf/NanophaseAnnualReport\\_2006.pdf](http://www.nanophase.com/pdf/NanophaseAnnualReport_2006.pdf)

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Ref. Runge, p. 557

10.19

### A Balance Sheet Model (1): Start of a Business

- Founder: Wolfgang Runge - Establish the NTBF with *name*: NanoSurf
- The *opportunity*: selling special nano-structured *rare* metal oxides (MeO) to plastics processors to improve surface properties
- The firm needs: raw materials to produce the nano particles; "*production*" is possible in a "mini-plant" (of incubator; no cost for use)

#### Balance Sheet

	ASSETS	LIABILITIES
	0	0
<b>TOTAL</b>	<b>0</b>	<b>0</b>

#### Every transaction affects the balance sheet!

- Wolfgang invests €5,000 cash in the firm and receives (formally) shares.

#### Balance Sheet (in EUR)

ASSETS		LIABILITIES	
Cash	5,000	Capital	5,000
<b>Total</b>	<b>5,000</b>	<b>Total</b>	<b>5,000</b>

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10.20

### ***A Balance Sheet Model (2): Making Profit***

- Wolfgang goes to a raw material supplier to purchase the crude rare metal oxides: 1,000 kg for €5,000 (€5/kg)
- Balance total unchanged: one asset (cash) replaced by another (MeO)

**Balance Sheet (in EUR)**

ASSETS		LIABILITIES	
MeO	5,000	Capital	5,000
Total	5,000	Total	5,000

- Wolfgang succeeds in *selling* 800 kg nano-structured MeO for a price of €10/kg (all production cost covered by incubator)
- The remaining 200 kg MeO are stored in the warehouse ("inventories")

**Balance Sheet (in EUR)**

ASSETS		LIABILITIES	
MeO	1,000	Capital	5,000
Cash	8,000	Profit	4,000
Total	9,000	Total	9,000

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10.21

### ***A Balance Sheet Model (3): Investing***

- Wolfgang buys a machine that weighs and packages the nano-MeO including putting a printed label on it which costs €7,000.
- Profit is not affected!

**Balance Sheet (in EUR)**

ASSETS		LIABILITIES	
MeO	1,000	Capital	5,000
Cash	1,000	Profit	4,000
Machine	7,000		
Total	9,000	Total	9,000

Question: Buy or Rent or Lease?

- Wolfgang met a guy from a large plastics processor and succeeded in capturing a very good contract to sell his nano products.
- His problem: he needs cash
- Therefore, he contacts a bank, and borrows €5,000 (short-term loan with 10% interest)

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10.22

### ***A Balance Sheet Model (4): Borrow for Expansion***

**Balance Sheet (in EUR)**

<b>ASSETS</b>		<b>LIABILITIES</b>	
MeO	1,000	Capital	5,000
Cash	6,000	Profit	4,000
Machine	7,000	Loan	5,000
Total	14,000	Total	14,000

- Wolfgang buys again 1,000 kg rare metal oxides for €5,000

**Balance Sheet (in EUR)**

<b>ASSETS</b>		<b>LIABILITIES</b>	
MeO	6,000	Capital	5,000
Cash	1,000	Profit	4,000
Machine	7,000	Loan	5,000
Total	14,000	Total	14,000

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10.23

### ***A Balance Sheet Model (5): Increase Sales***

- Wolfgang succeeds again in selling 800 kg MeO for a price of €10/kg

**Balance Sheet (in EUR)**

<b>ASSETS</b>		<b>LIABILITIES</b>	
MeO	2,000	Capital	5,000
Cash	9,000	Profit	8,000
Machine	7,000	Loan	5,000
Total	18,000	Total	18,000

- However, preparing the next production run Wolfgang damages slightly the machine.
- The machine producer estimates that the machine is now worth only €6,000.
- Wolfgang decides to depreciate the machine with €1,000.

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10.24

### ***A Balance Sheet Model (6): Asset Devaluation***

**Balance Sheet (in EUR)**

ASSETS		LIABILITIES	
MeO	2,000	Capital	5,000
Machine: 7,000		Profit	7,000
Deprec. : - 1,000	6,000		
Cash	9,000	Loan	5,000
Total	17,000	Total	17,000

EBIT

- *Depreciation* does not affect the cash position (no cash cost)
- However, depreciation reduces the profit.
- After the last transaction (end of reporting period) Wolfgang pays back the loan of €5,000 plus
  - Interest of 10%
- and pays
  - Taxes (30%)

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10.25

### ***A Balance Sheet Model (7): Profit After Tax***

**Balance Sheet (in EUR)**

ASSETS		LIABILITIES	
MeO	2,000	Capital	5,000
Machine: 7,000		Profit: 7000	4,400
Deprec. : - 1,000	6,000	Tax: -2,100	
Cash	1,400	Interest: -500	
		Loan	-
Total	9,400	Total	9,400

- *Cash* is a component of a business' net working capital and is its most liquid current asset.
- **Working Capital:** measure of the amount of *cash available in the short-term*; also, an indication of the funds needed to operate within a given business size (and time)
- *Net working capital* is the difference between a business' current assets and its current liabilities (cf. 10.13).

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10.26

## Format for a Balance Sheet

Balance Sheet: ABC Corp., 31 December 200x

<b>Current assets</b> (liquid in less than a year)	{	<b>Cash and equivalents</b> <b>Accounts receivable</b> <b>Inventories</b>	<b>Current liabilities</b> (payable in less than a year)	{	<b>Accounts payable</b> <b>Accounts expenses</b> <b>Short-term debt</b>
<b>Fixed assets</b>	{	<b>Property, plant, and equipment</b> (minus depreciation)	<b>Long-term liabilities</b>	{	<b>Bonds issued</b> <b>Bank loans</b>
<b>Other assets</b>	{	<b>Intangibles</b> (minus depreciation) <b>Investment securities</b>	<b>Shareholders' equity</b>	{	<b>Common stock</b> <b>Additional paid-in capital</b> <b>Retained earnings</b>
<b>Total assets = total liabilities + shareholders' equity</b>					

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Ref. Dorf & Byers, p. 392, Figure 17.4

10.27

## Bilanz 2006 Nanogate AG

Bilanzsumme: 19.315 TEUR; Eigenkapital 17.450; Eigenkapitalquote: 90.0%

Aktiva	31.12.2006		Passiva	31.12.2006	
	EUR	EUR		EUR	EUR
A. Aufwendungen für die Inangestaltung des Geschäftsbetriebs		36.529,00	A. Eigenkapital		
B. Anlagevermögen			I. Gezeichnetes Kapital		1.900.000,00
I. Immaterielle Vermögensgegenstände			- Bedingtes Kapital von EUR 150.000,00 -		
1. Software	34.729,69		II. Kapitalrücklage		14.767.697,99
2. Lizenzen, Marken und Patentrechte	44.319,33		III. Konzernjahresfehlbetrag		-336.516,68
3. Geschäfts- oder Firmenwert	2.973.777,33	3.052.826,35	IV. Ausgleichsposten für Anteile anderer Gesellschafter		1.118.668,78
II. Sachanlagen					17.449.842,09
1. technische Anlagen und Maschinen	211.573,44		B. Rückstellungen		
2. andere Anlagen, Betriebs- und Geschäftsausstattung	716.909,64		sonstige Rückstellungen		564.750,00
3. geleastete Anzählungen	6.763,30	935.246,38	C. Verbindlichkeiten		
III. Finanzanlagen			1. Verbindlichkeiten gegenüber Kreditinstituten	118.689,78	
Beteiligungen		1.032.182,84	2. erhaltene Anzahlungen auf Bestellungen	355.920,45	
		5.020.255,57	3. Verbindlichkeiten aus Lieferungen und Leistungen	572.907,75	
C. Umlaufvermögen			4. Verbindlichkeiten gegenüber verbundenen Unternehmen	990,53	
I. Vorräte			5. sonstige Verbindlichkeiten	64.220,36	1.112.668,67
1. Roh-, Hilfs- und Betriebsstoffe	149.830,39		D. Rechnungsabgrenzungsposten		188.139,00
2. unfertige Erzeugnisse	18.008,39				
3. fertige Erzeugnisse und Waren	544.598,57	712.437,15			
II. Forderungen und sonstige Vermögensgegenstände					
1. Forderungen aus Lieferungen und Leistungen	302.912,70				
2. Forderungen gegen verbundene Unternehmen	2.554,08				
3. Forderungen gegen Unternehmen, mit denen ein Beteiligungsverhältnis besteht	211.887,79				
4. sonstige Vermögensgegenstände	139.997,88	657.352,45			
III. Kassenbestand, Guthaben bei Kreditinstituten und Schecks		12.857.723,09			
		14.227.512,69			
D. Rechnungsabgrenzungsposten		31.102,50			
		19.315.399,76			19.315.399,76

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10.28

### ***Profit versus Cash Flow***

- **Selling is the ultimate basis for survival (and growth) of the NTBF**
- While sales may have been secured and goods delivered, *the related payments* may be deferred as a result of *giving credit to the customer*. At the same time, payments must be made to suppliers, staff etc., new equipment may have to be purchased etc. When planning the short- or long-term funding requirements of a business, it is *more important to forecast the likely cash requirements than the projected profitability* etc.

#### **Two distinctly different concepts:**

- *Profit* is created by *accounting conventions* and include *non-cash items*, such as depreciation; the difference between sales and costs within a specified period, is a *vital indicator of the performance of a business*.
- A **Cash Flow** shows the amount of money coming into the business (cash in-flow) and going out of the business (cash out-flow).  
A Cash Flow Statement is an analysis of *the timing of cash receipts and cash disbursements over a specific time period*. It tells us *how much cash is available in a business to keep the business running* - the actual cash flow.
- The working capital cash conversion cycle - also often called the *cash flow cycle* - is the length of time between the *payment* of what a business owes - payables - and the collection of what a business is owed - receivables

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10.29

### ***Cash Flow Illustrated***

- Is all streams of money that go **in** and **out** of the firm
- **IN:** All receipts, like:
  - Payment made by customers
  - Divestments ("Verkäufe")
  - Bank loans
  - (For stock companies: new shares subscription)
- **OUT:** All payments, like
  - Salaries (and employee benefits, rewards etc.)
  - Payment to raw material and utilities suppliers
  - Rent/lease payments (rooms, equipment; facilities)
  - Returns to banks
  - Investments ("Ankäufe")
  - Taxes

**Net Cash Flow: = IN - OUT**

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10.30



### **Cash Flow: Emphases**

- Working capital management is primarily concerned with the *day-to-day operations* rather than long-term business decisions.

#### **Components of Working Capital:**

Cash		No extra money
Accounts Receivable	Receivable conversion period (RCP) is the time between the sale of the final product on credit and cash receipts for the accounts receivable (cf. DSO)	
Accounts Payable	Payable deferral period (PDP) is the time between the purchase of raw material on credit and cash payments for the resulting accounts payable.	
Inventories	Inventory conversion period (ICP) refers to the length of time between purchase of raw material, production of the goods or service, and the sale of the finished product	
Accrued wages and taxes	Using money from the time items are collected or work is performed until payments are made (for regular payments; e.g. Social Security and income taxes).	
Marketable securities	Extra money (short-term loan to others)	

**Liquidity ratios:** measure the ability to *meet short-term financial obligations*

**Current Ratio:** Current Assets / Current Liabilities

**Acid-Test:** (Cash + Accounts Receivable) / Current Liabilities

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10.31

### **Conclusions for Giving or Receiving Credit**

1. *Accounts Receivable* (giving credit or late payment by customers) are assets of the company and must be financed
2. *Accounts Payable* are a way of financing the company's assets

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10.32

<b>Kapitalflussrechnung 2006 Nanogate AG</b>		
	31.12.2006	
	TEUR	
Periodenergebnis * (vor außerordentlichen Posten)	1.087	
Abreibungen auf Gegenstände des Anlagevermögens und auf aktivierte		
Aufwendungen für die Inangabsetzung des Geschäftsbetriebs	523	
Zunahme der Rückstellungen	49	
Gewinn aus dem Abgang von Gegenständen des Anlagevermögens	-	
Abnahme der Vorräte, der Forderungen aus Lieferungen und Leistungen		
sowie anderer Aktiva, die nicht der Investitions- oder Finanzierungstätigkeit		
zuzuordnen sind	-369	
Abnahme der Verbindlichkeiten aus Lieferungen und Leistungen sowie		
anderer Passiva, die nicht der Investitions- oder Finanzierungstätigkeit		
zuzuordnen sind	-115	
<b>Cash Flow aus laufender Geschäftstätigkeit</b>	<b>1.175</b>	
Einzahlungen aus Abgängen von Gegenständen des Anlagevermögens	10	
Auszahlungen für Investitionen in das Sachanlagevermögen	-531	
Auszahlungen für Investitionen in das immaterielle Anlagevermögen	-38	
Auszahlungen für Investitionen in das Finanzanlagevermögen	-221	
<b>Cash Flow aus Investitionstätigkeit</b>	<b>-780</b>	
Einzahlungen aus Kapitalerhöhung (gekürzt um Transaktionskosten) *	11.348	
Auszahlungen aus der Tilgung von Krediten	-118	
<b>Cash Flow aus Finanzierungstätigkeit</b>	<b>11.230</b>	
Zahlungswirksame Veränderung des Finanzmittelfonds	11.625	
Finanzmittelfonds am Anfang der Periode	1.233	
<b>Finanzmittelfonds am Ende der Periode *</b>	<b>12.858</b>	

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10.33

- The *Statement of Cash Flows* reports cash receipts and payments over a period, separating *operational, investing and financing activities*
- Sales in Germany: 87%
- DSO: 19 Tage (2006), 33Tage (2005)
- Capital from IPO (Initial Public Offering) – Erlös aus Börsengang: 11,230 TEUR (cf. prospectus, slide 7.13)
- Cash for stockholders \*Earnings per Common Share (EPS): Ergebnis je Aktie (2006) - 0.71 Euro

# Performance Measures for Startups and NTBF: Tracking Performance and Success Metrics for Venture Growth

Adapted from: Ala-Mutka, J. (2004): Execution Matters ...; [http://www.ebrc.fi/kuvat/744-757\\_04.pdf](http://www.ebrc.fi/kuvat/744-757_04.pdf)

	Pre- Startup	Startup	Growth	Expansion
1. Revenues (annual growth rate)	x	x	x	x
2. Number of employees (annual growth rate)	x	x	x	x
3. Organic growth			x	x
4. Non-organic growth			x	x
5. Profitability, profit			x	x
6. Meeting planned (focused) goals	x	x	x	x
7. Knowledge and technology	x	x		
8. Visibility (brand recognition)		x	x	x
9. Financing – Cash Flow	x	x	x	x
10. Customers and markets		x	x	x
11. Business processes and concepts			x	x

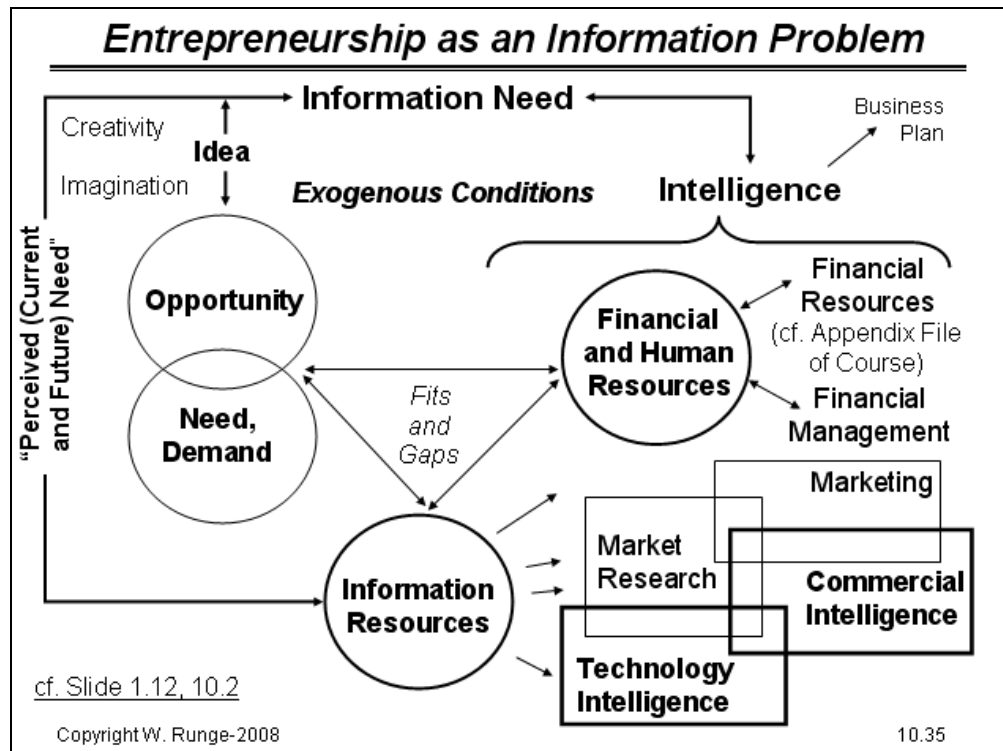
Derived:  
Revenues/employee; profit/employee

← Entrepreneur → ← Manager →

- Reaching the *breakeven point* (gains equal losses) is the first major step of a new firm towards profitability
- A **breakeven analysis** is used to determine how much sales volume your business needs to start making a profit; often used for developing a *pricing strategy* (formula: Fixed Costs divided by (Revenue per unit - Variable costs per unit))

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10.34



### **Internationalization of Startups: Issues of Currency Exchange Rates!**

- Example: ChemCon GmbH (Freiburg-Germany)
- Founded: 1997 as GbR ("consulting"; 1999 as GmbH; then "production")
- **Focus** on U.S. – FDA-certification (cGMP)
- Proportion of Revenues from U.S.: 80%

Currently:

- 2007 Revenues from Europe: 55%; 2008 target: 70%
- **Re-Focus:** Japan, emerging Asian countries, New Zealand, Australia

#### **Trans-Atlantic Volatility**

The euro-dollar exchange rate in the decade since the euro was launched on Jan. 1, 1999



Source: Thompson Datastream/WSJ Market Data Group

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10.36

# Technology Entrepreneurship

## Entrepreneurship for and in Chemistry-Related Enterprises

### MODULE 11

Business Models, Commercialization Models and Business Plans  
(A Summary and Reformulation of the Preceding Modules)

### ***Financing and Business Plans***

- Securing capital for a business in its early stages is one the most difficult challenges in getting a business up and running – e.g. via a business plan
- A *business plan*: a challenging effort containing also “soft” data/information and requiring “soft” skills
- A business plan contains *facts, assumptions and opinions*. Make them explicit and spell them out!
- When you are raising equity, your pitch is the “*voice and face*” of your business plan
- Key messages (and emotional support) conveyed to financing stakeholders (venture capitalists, bankers, lenders, grant providers etc.) already via:
  - The Executive Summary of the Business Plan
  - Presentations to financial stakeholders

## **Business Model**

- A “*business model*” is an organization’s *core logic for creating value*, a hypothesis how to create value.
  - Since *organizations compete for customers and resources*, a business model must highlight *what is distinctive* about the firm - *how to win customers, earn profits, and woo investors and backers*. Effective business models are rich and detailed, and the components reinforce each other: change any one and you have got a different model.
- A *solid business model* – is a *key target of venture capitalists’ firm assessment (but also for other lenders)*.
  - Work out all the details of what you are selling, to whom, and at what price; and how you are going to reach your customers, persuade them to buy from you, and support them when things go wrong.
- *Commercialization Model*: a Business Model’s sub-model (often the last step in the chain “idea – opportunity – commercialization”; interrelated entities)
- Business Model vs. Strategy:  
A business model is not a strategy;  
the *business model* is a “*what*” of business innovation,  
a *strategy* is its *quantification* and a “*how*” (strategic planning)

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Ref. Runge, p. 723

11.3

## **A Commercialization Model: AgraQuest, Inc.**

- AgraQuest (<http://www.agraquest.com/>) founded by female entrepreneur Pamela Marrone in the U.S. in 1995; sales (2006) ca. \$20 million; 75 employees (2007) – Pam left AgraQuest in 2006 to found a new firm “Marrone Organic Innovations” (MOI)
- **AgraQuest Business: environmentally friendly *natural product* solutions for pest management through integrated systems supply and stand alone products supply (Wal-Mart!)**  
**Activities:** research (discovery), development/production and marketing of biopesticides made by microorganisms that live on plants or in the soil.

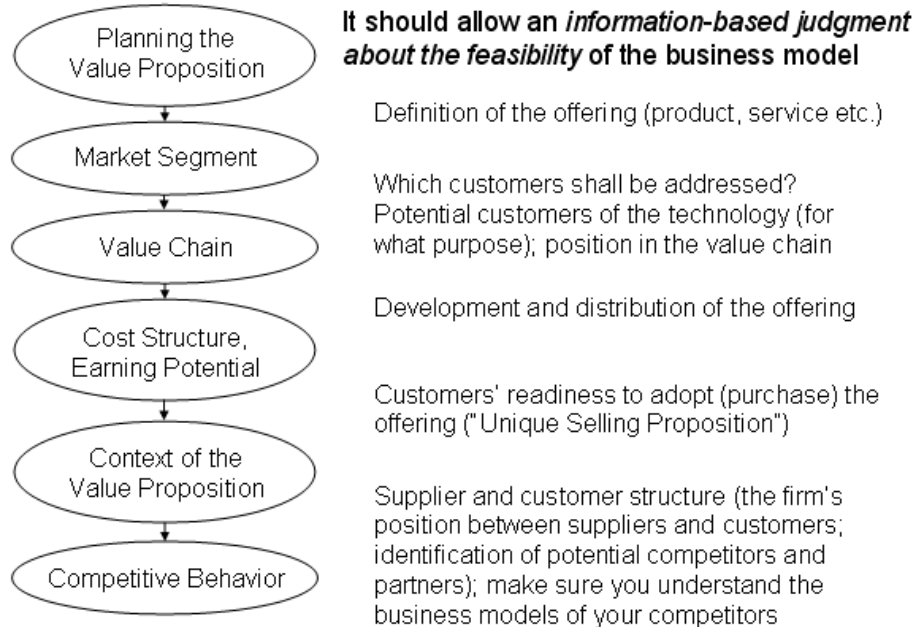
Technology (Idea)	Discovers, develops, and markets effective, environmentally friendly, and safe natural products (with federal and state approvals) for farm, home and public health pest management that can compete with chemicals on performance, reliability, and ease of use; holds 29 U.S. patents and 13 foreign patents for seven commercialized products
Market & Outlook (Opportunity)	U.S. biopesticide industry \$600 mil.; biopesticide industry is growing in tandem with conventional chemical companies; “green” trend of increasing demand (= revenues) for organic food and regulations in industrialized countries; CAGR 10-15%
<b>Commer- cialization Model</b> (cf. 11.7)	<i>Customers</i> include farmers and consumers (home); <i>production and selling</i> biopesticide products through <i>established sales channels</i> , both domestically and internationally; <i>Drivers</i> : attitudes of consumers and globalization of the food industry

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Ref. Runge, p. 189; extensive case discussions in Dorf and Byers

11.4

## **Components of a Business Model**



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11.5

## **Business Model: Emphasis or Change**

After firm launch based on a given business model things often change and the *business model will evolve* to respond to new situations (e.g. customers change priorities, new technology/regulatory developments).

### **"Business Model Innovation":**

1. **R&D:** Create new technologies, materials, products, or processes or applications; intellectual properties; novel approaches to R&D
2. **Platforms:** Create modular platforms and "strategic control points"
3. **Offerings:** Create new products, services (technical services), systems/devices, solutions ("end-to-end" problems for customers)
4. **Value chain:** Change position or scope of value chain participation
5. **Processes:** Innovate on operating processes (technical, behavioral)
6. **Customers:** Find new customer segments or unmet customer needs
7. **Customer Relation:** Change how customers interact with you
8. **Channels:** Change how you go to market with your offerings
9. **Revenue model:** Change how you get value (purchase, license etc.)
10. **Logistics/Supply Chain:** Change the way you source and ship products
11. **Networking:** Change how you interact with customers or cooperate

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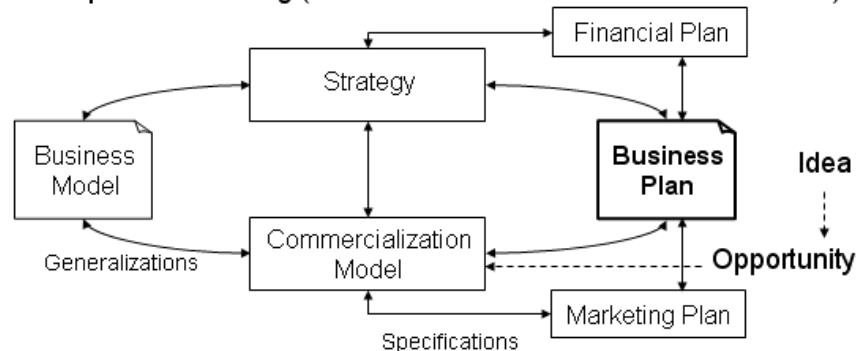
Ref. Runge, p. 650

11.6



### ***Business Plan: Ingredients and Processes***

- Focuses on *the entire venture (or new business) in a context*; describes all the *interrelated* elements involved in starting it
  - Describes the venture and its *current* market, strategies - and its *future* directions (technically and commercially)
  - Helps determining the *viability* of your enterprise
  - Guides further *planning* and organizing and define “*metrics*” (tracking achievements of corporate goals by “measurements”)
  - Helps with *financing* (be aware of what investors/lenders look for)



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11.7

### ***Reasons for Writing a Business Plan (Re-Visited)***

Ventures do not initially need a (formal) business model or even a business plan (slide 4.29)! .... **Advantages:**

- To *motivate and focus your “management team”* and people and *your strategy* (an “*alignment tool*”)
- To sell yourself to the business world – “*sanity check*”
- To obtain *financing*, for instance, through
  - Bank financing
  - Venture capital organizations
  - Governmental grants or subsidies
- To arrange *strategic alliances* with “peer firms” or large firms (joint research alliance (JRA), joint development alliance (JDA), production agreements, marketing and sales agreements, etc.)
- To obtain large contracts and orders
- A structured approach to the new businesses; detection of gaps
- To prepare and complete mergers and acquisitions

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11.8



## ***Business Plans and Entrepreneurial Optimism***

- One of the greatest risks for *any* person considering a new venture is the general *tendency for human beings to be overconfident* and expecting things to turn better than they actually do.
- Many business plans are from entrepreneurs who are *overly optimistic about their business proposal* and have a tendency to *underestimate competitors' capabilities*.
- Remember *Murphy's Laws*, e.g.
  - Nothing is as easy as it looks
  - Left to themselves, things tend to go from bad to worse
  - (In any field of scientific endeavor,) anything that can go wrong will go wrong

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Ref. Dorf and Byers, p. 43

11.9

## ***Business Plan Architecture***

A "complete business plan" is a highly *structured document* and should contain these basic elements (mostly in this general order):

- TABLE OF CONTENTS
- EXECUTIVE SUMMARY
- BUSINESS CONCEPT (BUSINESS MODEL)
- TECHNOLOGY
- DESCRIPTION OF PRODUCTS AND/OR SERVICES
- INDUSTRY CHARACTERISTICS AND ENVIRONMENT
- ORGANIZATION AND OPERATIONS
- OWNERSHIP STRUCTURE
- MANAGEMENT AND PERSONNEL
- MARKETING PLAN
  - Market Analysis
  - Competitive Analysis
  - Marketing Strategies
- FINANCIAL INFORMATION
  - Financial Requirements
  - Projected Profit and Loss Statement
  - Projected Cash Flow Statement
  - Balance Sheet
- UNCERTAINTIES, RISKS AND ISSUES
- SUPPORTING DOCUMENTATION

***A business plan is a selling document that conveys the excitement and promise of your business to stakeholders or any potential backers.***

**Business plans appear in various levels of aggregation and detail:**

1. The Summary Business Plan - up to ten pages
2. The Executive Summary – up to two pages
3. The Full Business Plan – 10 - 50 pages
4. The Operational Business Plan - 40 - 200 pages

**A business plan should ask and answer the tough questions! (cf. 4.24, 9.4)**

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cf. Dorf &amp; Byers, p. 162-165: An annotated TOC for a BP

11.10

### ***Business Plan Parts: The Executive Summary***

- ***The most important section of the plan;***  
comes at the beginning (max. 2 pages)  
It will be read before anything else and *must enable the reader to determine whether or not he/she should read further.*  
This may be the first, and possibly only, section read by potential lenders or investors!
- This section should be drafted first as a guide to write the main part of the business plan. After completion of the plan the summary's final version shall be re-written.
- Key items (also for presentations, cf. 11.35, 11.36):
  - Amount needed to finance startup of the business;
  - Legal form of business and location;
  - Description of business product and/or services;  
your value propositions;
  - Description of technology;
  - Estimate of market potential;
  - Assessment of the competition;
  - Your competitive advantage;
  - Brief backgrounds of management team;
  - Estimate of potential revenue (profit forecasts).

AgraQuest (Slide 11.4):  
*Executive Summary*  
*Example*  
(Dorf & Byers, p. 53-55)

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11.11

### ***Business Plan Parts: People***

- This area on management and personnel and you, the founder, is of ***great interest to private investors***, since they tend to invest in people before products. Full CVs should be included in an appendix.  
Describe the employees (and co-founders), if any, you will need to operate your business (education, skills, degrees);  
have all the key members of your team in place or document your hiring plan
  - Key management or management roles of the founding team (cf. 7.27) should be set out in this section; include also their length of service (if applicable).  
Give brief backgrounds, showing their ages and function and major achievements (since the investor is looking for a proven track record).
  - The management team must have quality, depth and maturity.
  - Briefly describe *your management style/philosophy*, as well as provide all pertinent information in regards to employees, if applicable.
  - How skilled are the work force, and how skilled do they need to be?
  - You should explain your employee compensation policy in greater detail – and your compensation
  - You may also want to discuss *how you plan to recruit, train, retain, and evaluate your employees*.  
Think of the *attractiveness of your location* (cluster, quality of life etc.)
  - Try to determine the pay and incentives offered by similar businesses. After all, you will be competing with them for employees as well as customers.

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11.12

### ***Business Plan Parts: The Technology***

- Discuss any *research and development activities currently underway*, or anything relating to technology that would give you a *competitive advantage* (activity stage: research, development, demonstration etc.; anticipated applications, products/processes)
  - *Class of technology* (e.g. enhancing, enabling, emerging, etc.); platform technologies are most attractive
- An Exercise in Technology Intelligence
  - Who is also engaged in this technology (globally; universities, research institutes, firms; governmental support situations)
  - What patents etc. are held, by whom, and what licensing arrangements are in place?
  - Are there replacement (pacing) issues through generic (pacing) technologies?
  - Regulatory or attitude-based (“green”) advantage
  - Lead time (time needed for others to catch up)
  - What technological advances are at the horizon?
  - Contacts, networks, advisory team
  - If applicable, location - describe site and why it was chosen with regard to technology aspects (cluster, research park, etc.)

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11.13

### ***Business Plan Parts: Offerings***

- *Types of offering* (product, service (contract research, technical service, consulting; software), device/system, knowledge/licensing)
- Any *legal/regulatory* or industry *standards* issues to be addressed
- You may also want to explain the relative importance of each product line or service including design, styling, and trademark considerations.
- Describe briefly the *operations relevant to your offerings*
- If applicable, what is the *input (raw materials, intermediates)*; Who are the main suppliers? Is supplier dependency an issue? What about volatile price of input (also energy factors)?
- Is there any *after sales service* or *warranty liability*?
- Are there *competitive offerings/products* (“counter-types”)?
- Address your competitive advantage by product or service
- Options/plans to move up the value chain (11.18-11.25)?
- Outline your *line of products* in relation to markets using the below grid (“strategy matrix”)

		Product		
Market		Current	Modified	New
	Current			
	Extended			
	New			

“Current” may mean here: competitive products exist. Current or modified product to new market can mean *regionally new markets* (e.g. China)

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Ref. Runge, p. 711

11.14

### ***Business Plan Parts: The Market (Re-Visited)***

- This is an important section and needs a degree of thought.
  - What market are you in? How will this market change and why?
  - Who will be generally your customers, what segments are they in, what is their geographic/demographic spread?
  - Who are your major (potential) customers? What customers are already in place (e.g. a purchasing guarantee), and what is the estimated sales value?
  - Who are your competitors on the markets?
  - Why are you different, how will you stay different?
  - What are the likely competitive pressures over the next few years?
  - What is your advertising and marketing strategy? What is the budget for these activities? Other processes being used to attract and retain customers?
  - How is sales and marketing organized?

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11.15

### ***The Market Structure – Industry Segment***

**Example:** Chiral Chemicals –  
part of Fine Chemicals (cf. 4.17)

- The differentiation of products
- Fundamental (competing) technologies (e.g. chemical vs. biotechnological; e.g. asymmetric hydrogenation)
- The conditions of market entry and exit
- The number of key suppliers (sellers)
- The size and area distribution of suppliers (India, China!)
- The number of buyers (customers by type; region, age - other segmentation criteria: innovativeness (early users, lead customers); purchasing power; civil – military; societal attitude (“green”)); industry (chemical/pharma/Ag – secondary structure: *customers-of-customers*)
- The cost conditions, how are prices set
- The sensitivity of demand to changes in price

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Ref. Runge, p. 161, pp. 162; p. 169-171, 175

11.16

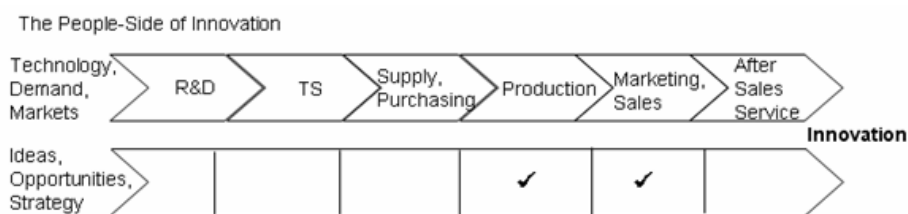
### ***Business Plan Parts: The Industry***

- The Big Picture - An exercise in market research and technology intelligence
- Defining your industry
  - Growth Rate and Maturity (industry stage in its life cycle: new, emerging, expanding, maturing, declining)
    - Products or Services (Where do you stand? How big a deal is it?)
    - **Value Chain** (What exists now? What value do you add?)
    - Balance of Power (Buyer/seller ratio, relative size of players, price setting)
  - Customer segments
  - Major competitors (Know them very well, compare them with your firm; Which companies lead your industry? How is the market shared by them?)
  - What is its (likely) future?
- New (and emerging) industries are good for entrepreneurial firms: they can move fast, big companies do not have a clue yet; there are not many customers yet

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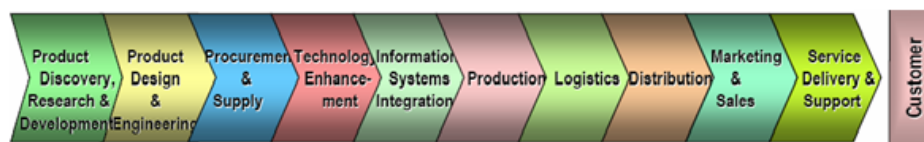
11.17

### ***Internal Value Chain Stages of Technology-Based Firms***



***Which activities can we do best?***

**Competitive advantage is achieved in the value chain!**



***Financial Management:***

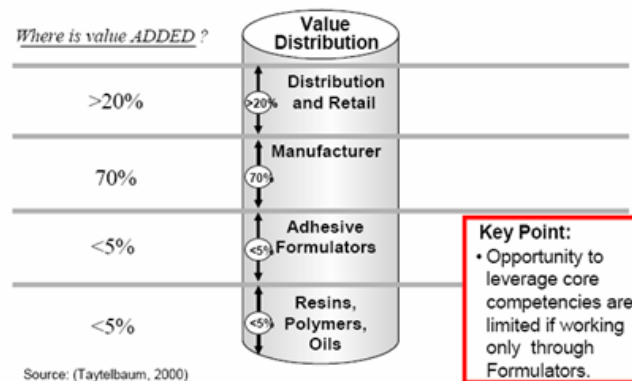
**Identify important cost- and profit-enhancement opportunities!**

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11.18

## (Extended) Value Chains: Value Systems

### Nonwoven Hygiene Adhesives Value Chain Analysis



### Chemical Formulator Value Chain Analysis

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Figure: Albright, R. E.; Nelson, B. (2004); John Wiley &amp; Sons

11.19

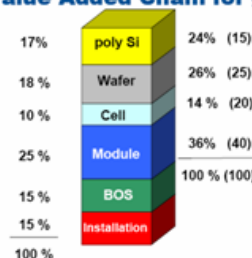
## Value Chains (and Systems)

- “Supplier-to-customer value” chain positioning: the next step in the value chain “*supplier – components – devices/modules (systems)*”
- For instance, BASF, Merck KGaA and DuPont in organic light-emitting diode (OLED) business (special: polymeric light-emitting diode (pLED)), e.g. for flat panel displays (cf. also MEAs of fuel cells)

Value Chain:	Raw Material (BASF)	Displays (Teco)	Devices (e.g. Sony)	Retail	End-Users (Consumers)
Value:	€0.35 billion	€3.0 billion	€48.8 billion (only mobile phones)		

Market (Size)

### Value Added Chain for grid-connected PV

Value 2005  
(2004 in brackets)Solar Photovoltaic market,  
cost and trends in the EU(Ref. <http://eneken.ieej.or.jp/en/data/pdf/368.pdf>)Increasingly important  
is the industry to produce  
manufacturing equipment  
and materials for the  
whole value chain.

Product

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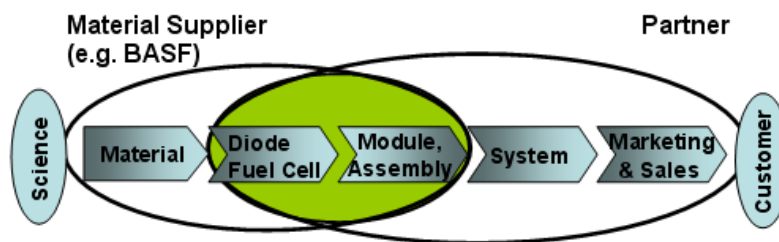
Ref. Runge, p. 700, 701; p. 455, 456

11.20



## The Value System

**Supplier-to-customer value chain positioning:**  
the next step in the value chain “*supplier – components – devices/modules (systems)*”

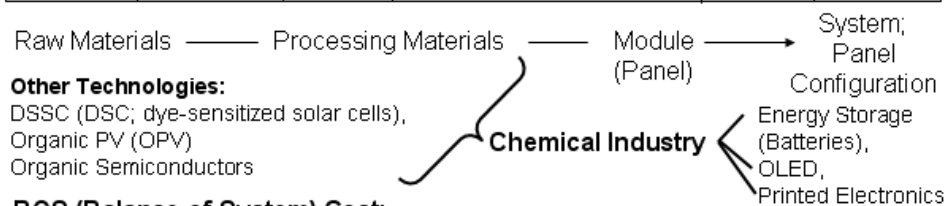
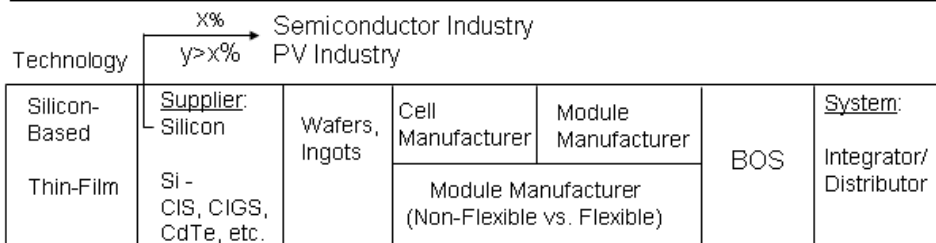


BASF - JIL:  
Joint Innovation Lab –  
Organic Electronics  
(OLED, Fuel Cell MEAs)

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11.21

## The PV Supplier-to-Customer Value Chain



### BOS (Balance-of-System) Cost:

- a term for the parts of a solar electric system besides the actual solar panels. It includes batteries, cables, inverter, safety and monitoring equipment, and the mounting racks that hold the panels; may also represents costs of all components other than the PV modules including design, land, site preparation, system installation, support structures, power conditioning, operation and maintenance, batteries, indirect storage, and other related costs.

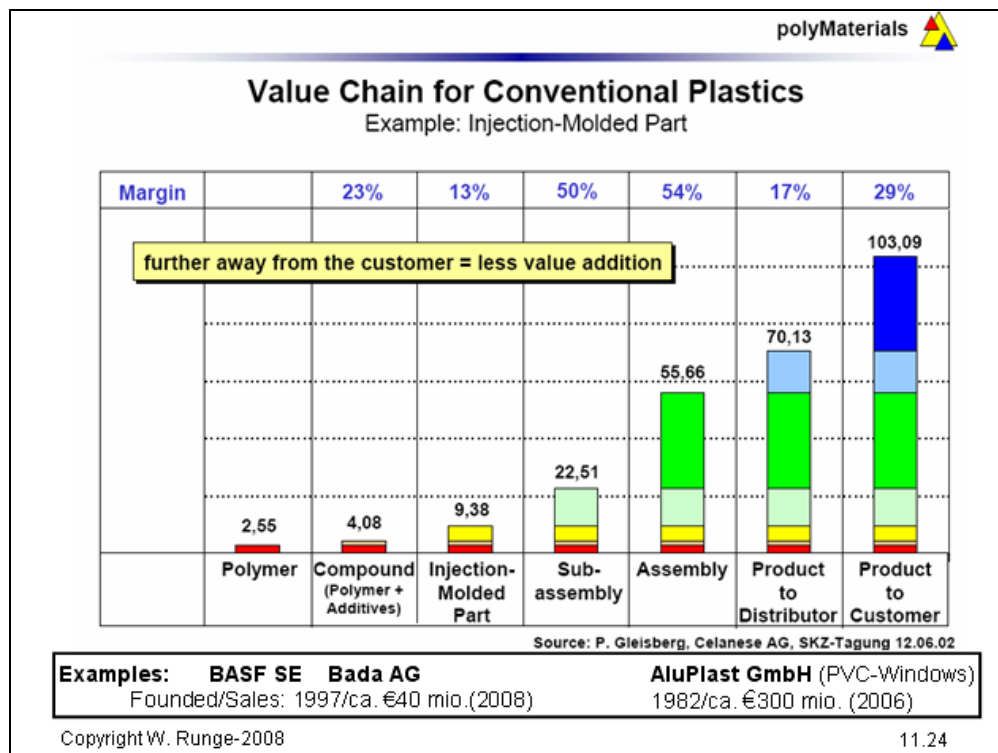
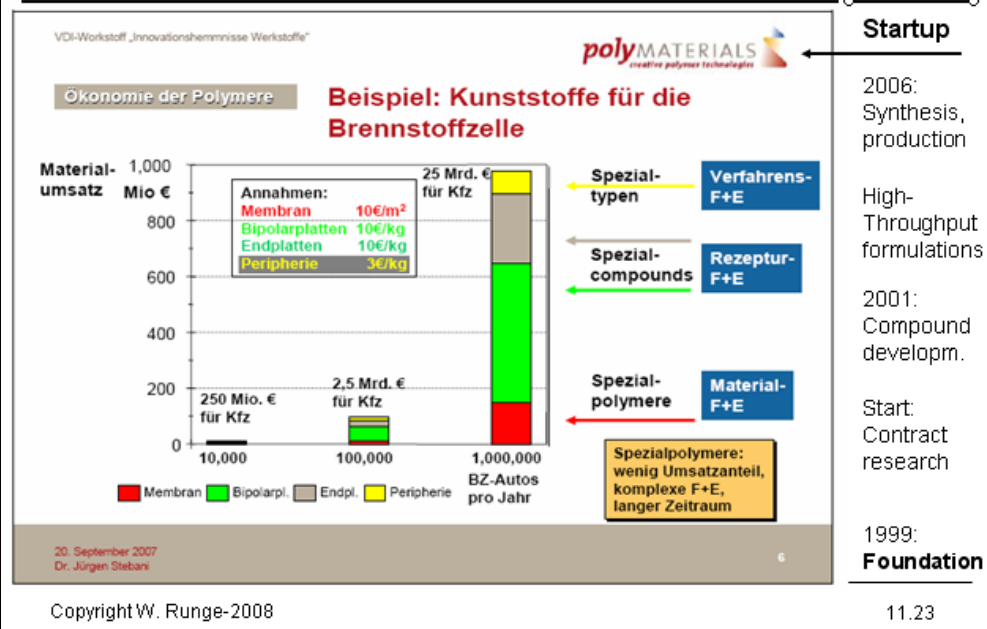
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11.22



## Werterzeugung durch Polymere bei Brennstoffzellen

Value Creation for Fuel Cells Through Polymers



## ***The Marketing Plan: Key Targets***

- An overall marketing strategy (internationalization?)
- The plan: implementing ("5P" – 9.4) and specifying the commercialization model (cf. 11.7)

A marketing plan (document) outlines *how to attract potential customers/clients* to your offering (product) and *convince them to buy*, time and again, e.g. through

- **Pricing**  
(e.g. know cost proportion in the product-related value chain, in percentage terms; if the cost of sourcing of chemicals is comparatively small there is relative price-insensitivity; include service and warranty policies)
- **Distribution ("Place")**
- **Sales tactics** ("sales cycle")
- **Branding**
- **Promotion and advertising**
- **Positioning**; value adding operation ("quality") and services

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11.25

## ***Entrepreneurship with Research and Production***

- (Chemistry-oriented) foundations of new firms with *research and development, process and application technology and production* usually require financing with a *two-digit millions* amount of money (seed; early- and late-stage), as demonstrated by
- Smart Fuel Cell AG (SFC) (Ref. Runge, pp. 331)
- hte AG (Ref. Runge, p. 362; "high throughput")
- MnemoScience GmbH  
(shape-memory polymers for medical applications)  
founded in 1998 in Germany as a spin-out of the  
Massachusetts Institute of Technology (MIT) by serial  
entrepreneur Prof. R. Langer and German visiting scientist A.  
Lendlein (now Prof. in Potsdam/Berlin) based on two basic  
international patents;  
convinced MIT that founding conditions for the particular  
startup are better in Germany than in the U.S.

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11.26

## Caveat

- His experience tells serial entrepreneur David S. Soanne (founder of Nano-Tex LLC) that:
- "from concept to product launch in the *materials science* space typically takes three years of concentrated effort."
- In addition, he's realized that
- "even with a very conservative business plan, *each project generally ends up taking twice as long (and costing twice as much) to accomplish...with many twists and turns between conception and launch.*"

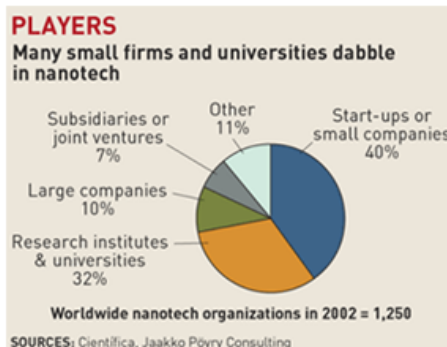
(Norm Wu (2005): Beyond Nano-Tex: Portrait of a "Parallel Entrepreneur". 5/5/2005. [http://www.hawaiinanosciences.com/pdf/Art\\_ExtremeNano.pdf](http://www.hawaiinanosciences.com/pdf/Art_ExtremeNano.pdf))

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11.27

## Entrepreneurship in Nanotechnology?

- **There are issues of commercialization of nanotechnology.**
- Nano spells (governmental/state) grants – there is only little (capitalists or corporate) venture capital in that field
- Venture capital investing in companies in the U.S. using nanotechnology has fallen.  
The percentage of total venture capital devoted to nanotechnology has held more or less constant between 1.5 and 1.7%.



Ca. 50% of the startups in the U.S.

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- Companies raised money (in 2004 and 2007) have essentially been in *late-stage fund-raising*; typically they are not showing ideas or prototypes, but a large-scale *manufacturing concept*.
- Chemical nanotechnology targets *nanocomposites* and *nanoformulations* (for coatings and adhesives); "nano-tools"

Ref. Runge, p. 545, Figure III.6; pp. 561

11.28

### ***Splitting the Key Components for Funding and Executing a New Venture as Seen by Venture Capitalists***

- 20% of the value of the venture: the ***idea***. Successful investors invest in the execution of *ideas that will create revenue*; associated with a **sense of urgency**
- 50% of the value of the venture: ***people*** – the entrepreneur and his/her “team”. They build the company; **leadership**
- 30% of the value of the venture: a successful and fundable business requires a ***sound structure and processes right at the start*** (OPERATION, cf. 11.10).
- Without a structured and validated market, sales, operation, product development and financial *plan* (reasonable financings) *and team for execution* the entrepreneur will constantly reacting to competitive or other forces and will be in “fire fighting mode”.
- The biggest risk for investing in any idea or technology is the creation of an elegant solution for which there is no problem!

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11.29

### ***Would Current Investors Invest into Such a Team?***

Would you have invested?



Microsoft Corporation, 1978

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11.30

### ***The VCs' Due-Diligence Process: Be Prepared***

Venture capitalists will counter-check through various means, such as:

- **Expert Opinions: Analysts**  
Asking industry analysts what they think of your company and products.  
Getting multiple perspectives on the market size and trends. They may also seek information on every key player in your market.
- **Competition**  
May even speak to competitors to find out how they see their market opportunities and understand how they perceive the threat you pose.  
Carefully studying the successes and failures of other companies in your market to assess your chances of success.
- **Management references and background checks**  
(if your startup is already running)  
Asking for multiple references for every key executive. They will not only call these references, but also people that these references recommend.  
Seeking out others who have worked with you (and for you) to establish a composite picture.  
Ask how good you were as a leader or team player, how you dealt with problems or conflicts, if you can be managed, and if you will step out of the way when the time is right.

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11.31

### ***Exit: Much Food for Anticipative Thought***

- *Exit: An area of conflict in external financing via venture organizations*
- *Venture capitalists are looking for two basic things when considering whether to invest*
  - *High return*  
*VCs invest strictly for the financial returns, probably they require unusual returns as well, perhaps seven to ten times their original investment within five to seven years.*  
*They sell to those offering the most.*
  - *Easy exit*  
*When the time comes, they will want you to support their decision to sell the company, merge it with another firm, or take it public (selling may even be back to the founder).*  
*You may want to change the world and take the company to greater heights, but they will want to make sure there is an out.*
- *Corporate venturing tends to consider integrating the startup into the parent firm.*
- *The startup (owner, team) mostly strives for being independent*

(Cf. Pam Marrone's exit from AgraQuest (11.4) )

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11.32



## ***Business Plan and Investor Presentations***

- Arouse interest immediately, because investors tend to make their decision in the first 30 seconds of your presentation!
- Note the time frame:  
it is usually more difficult to prepare a 20-min. long comprehensive presentation than a 60-min. one
- Your Entrepreneurial Personality:  
be yourself, address the audience, be direct, speak in full short and concise sentences, show energy and passion)
- The Team:  
profile the members; why you are particularly qualified to succeed
- Form: "professional look", 3-10 lines per slide body, one font, limited use of color for emphases;  
for 3 – 4 slides presentations use tabular layout
- Contents:  
clear mission statement, provide facts rather than assumptions, be explicit with assumptions

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11.33

## ***Ten and Twenty Minutes Presentations***

- Structure for a 10 Minutes Presentation: 4-5 Slides  
(Example: Clean Mobile GmbH - Bernhard Gutmann, Investor Presentation;  
<http://www.munichnetwork.com/SITE/UPLOAD/DOCUMENT/061020Cleanmobile.pdf>)  
**The Paragraphs:**
  - The Entrepreneur/Team
  - The Idea (a product or a service) and Mission
  - The Strategy (how will you proceed with achieving your goals, the timeline)
  - The Market (the market and marketing, the competitors, why will your product or service be unique or better)
  - The Financial Requirements (how much capital do you need)
  - The Business Model in more detail
  - The Applications
  - The Final Statement (must be powerful and exciting)
- 20 Minutes Presentation ("The Art of the Start" – 2004-10-20):  
10/20/30 - Guy Kawasaki's Rule (10 slides, 20 minutes, in font no smaller than 30 points)

Note that PowerPoint contains templates for a business plan, marketing plan, and many others of interest  
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11.34

## The 10/20/30 Rule: Slide Topics

Educators Corner: Entrepreneurship Education Resources  
<http://educorner.stanford.edu/authorMaterialInfo.html?id=1177>

Feedback \* | About Us | Using the Site | Contact

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**Guy Kawasaki**  
 Garage Technology Ventures  
 Entrepreneurial Thought Leader Speaker Series  
 STVP  
 2004-10-20 2 min. 51 sec. ID: 1177

### Make a Great Pitch

**ART START**

**10 slides**

Title	Marketing and sales
Problem	Competition
Solution	Team
Business model	Projections
Underlying magic	Status and timeline

Description: Making pitches is a way of life for an entrepreneur. Kawasaki provides his tips for ensuring each pitch is better than the last. His 10/20/30 rule for PowerPoint slides is essential.

Video Clips: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

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11.35

### Quick Facts

**MANAGEMENT**  
 Clifton A. Baile, CEO  
 Michael J. Adang, CSO

**LOCATION**  
 425 River Road  
 Athens, GA 30602-2771

**HISTORY**  
 Incorporated in 2003 with a vision to "provide beneficial biotechnology for a crowded planet".

**INVESTMENT TO DATE**  
 \$1.4M in private and venture funds and over \$2.7M in research grant support.

**FINANCING SOUGHT**  
 \$2M by April 2007

**USE OF FUNDS**  
 Product formulation, field-testing and new product research.

**BOARD OF DIRECTORS**  
 Clifton A. Baile, Ph.D.—Professor at UGA & former Monsanto R&D Dir.  
 Michael J. Adang, Ph.D.—Professor & inventor of first BT transgenic plant technology  
 Donald H. Dean, Ph.D.—Ohio State U. Professor & pioneer of Bt Biochem.  
 Edwin C. Quattlebaum, Ph.D.—Entomologist & former biopesticide CEO. Presently, CEO of MetaMorphix.  
 William F. Kirk—Vice President of DuPont and President of agricultural enterprise  
 Robert A. Woods—Former Chairman Syngenta Corp-US  
 David G. Perryman, J.D.—with Needle & Rosenberg, P.C., exclusively practicing biotech patent law

**CORPORATE COUNCIL**  
 Sutherland Ashbill & Brennan LLP, Atlanta, GA

**CONTACT**  
 Dr. Clifton A. Baile  
 706-542-4094  
 cbaile@uga.edu

### InsectiGen

*Beneficial Biotechnology for a Crowded Planet®*

**Company Description**  
 InsectiGen is a biotechnology company focused on discovery and sales of innovative biopesticide solutions to improve agricultural productivity while protecting the environment.

**Our Markets**  
 InsectiGen has two key markets. One is the important crop protection trait market valued at over \$30B. The other is the foliar application market for biopesticides valued presently at \$160M but a market with many unmet needs.

**Product and Services**  
 BtBooster® is InsectiGen's first product to be taken to the market which improves the effectiveness and market potential of the current largest selling biological insecticide which is based on *Bacillus thuringiensis* (Bt) to ensure high crop yields and low environmental impact. InsectiGen also has an exclusive license agreement with DuPont for crop protection traits in cotton, with the option to develop other major crops.

**Technologies**  
 InsectiGen has discovered technology that improves or "boosts" the performance of Bt biological insecticides and extends the target range via InsectiGen's unique understanding of insect physiology and protein binding.

**Intellectual Property**  
 InsectiGen has strong IP to protect discoveries and numerous provisional applications.

**Achievements to Date**  
 Completion of Board appointments, DuPont/Pioneer license arrangement completed, initial funding completed, USDA SBIR grant awarded in 2006, Adang received Inventor's Award (2006) from the University of Georgia, consultants retained in key areas to build competencies, continued discoveries for next generation targeted products, greenhouse testing in preparation.

**Financial Projections (\$M)**

	2006	2007	2008	2009	2010	2011	2012
Revenue	0.1	0.3	4.9	3.2	23.8	40.4	71.4
G. Margin	0.07	0.2	2.9	7.6	13.9	23.4	42.0
Expense	2.3	3.2	4.3	5.2	6.3	7.7	9.7
EBITDA	<2.3>	<3.0>	<1.4>	2.4	7.6	15.7	32.3

Copyright 2006 InsectiGen, Inc. All Rights Reserved.

### A Factsheet Organized Like a Business Plan for a Startup

Using a Web site to attract investors

Pitch with a Dashboard!

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<http://www.insectigen.com/quickfacts.htm>

11.36



### **Communication and Presentation: Corresponding Situations**

<b>ENTREPRENEURSHIP</b>	<b>INTRAPRENEURSHIP</b>
Elevator pitch (speech)	Elevator pitch - USP
One-Page Summary of entrepreneurial company profile (e.g. company advertising or promoting on Web; cf. Insectigen - 11.37)	One-Page Summary (company profile, market profile, chemical profile) to higher management; usually done by Marketing/BI or TI; focus: competitive firms
10-15 minutes Business plan presentation	10-15 minutes presentation of project
Full business plan – to lenders, investors or other backers)	Project (NPD, NBD) Proposal; entry into project according to a Stage Gate process – to multifunctional group

Your goals, a team's goals for a startup

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Your goals streamlined according to the business/firm goals

11.37

#### **Discuss the investor presentation of "clean mobile"**

(cf. Slides 11.10, 11.34, 11.35, 11.36)



Completeness with regard to  
- Topics (?)  
- Information in topics  
Presentation Layout

**Practice your presentation skills!**

**Präsentation  
Forum Clean Power Generation**

**Garching, 20. 10. 2006**

<http://www.munichnetwork.com/SITE/UPLOAD/DOCUMENT/061020Cleanmobile.pdf>

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11.38

**Clean Mobile GmbH**

Gründung:

Januar 2006



Gesellschafter/Team:

**Rudi Höbel**, Fahrzeugingenieur, ex BMW, DB, Formel1 und 3**Werner Gruber**, Elektroingenieur, ex Bosch, BMW, Rohde&Schwarz**Bernhard Gutmann**, Kaufmann, ex Procter&Gamble, Microsoft

Zielsetzung:

Lösung des **Leistungs-** und **Reichweitenproblems** bei Elektrofahrzeugen

Strategie/Basis Geschäftsmodell:

Vermarktung eines innovativen, patentierten **Brennstoffzellenantriebs** für Kleinfahrzeuge (Roller, Mopeds, Rikschas etc.)  
=> **Weltweit 1. Killerapplikation für Brennstoffzellen !!**

Finanzbedarf:

**3,2 Mio €** über 2 Jahre

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11.39

**Grundlage Geschäftsmodell****Innovation mit patentierten Alleinstellungsmerkmalen**Elektrofahrzeuge können unter Nutzung **alternativer Kraftstoffe** zum **ersten Mal** ohne **Reichweitenbeschränkung, Leistungsbeschränkung** und **Aufladezwang** betrieben werden !

- Methanol wird in BSZ in elektrische Energie, Wärme, H<sub>2</sub>O und geringe Menge CO<sub>2</sub> gewandelt
- 1 ltr Methanol für mindestens 200 km Reichweite
- Prototyp seit 1 ½ Jahren fehlerfrei in Betrieb – 5,000 km mit 25 ltr Treibstoff

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11.40



**Kooperationspartner:** Smart Fuel Cell AG, München  
Fraunhofer Institut, Freiburg  
Infineon AG, München

**Zielkunden:** Europäische Postbetriebe  
Kommerzielle Kunden  
Privatkunden

**Markttreiber** Dynamische Rahmenbedingungen

- Feinstaubdiskussion, Kyoto-Protokoll, ...
- Weltweiter Boom alternativer Energien, ...
- Citymaut, Pendlersubventionen, Ölpreis, ...
- Alternde Bevölkerung, ...

**Marktpotential heute:**  
(Europa p.a.)

Motorisierte Zweiräder	1,1 Mio Fahrzeuge
Elektrische Rollstühle	40,000 Fahrzeuge
Kommerzielle Fahrzeuge	75,000 Fahrzeuge
Andere (Boote, Trikes, Gabelstapler, etc.)	

**Wichtigste Finanzdaten (Jahr 4):** Umsatz: 50-100 Mio €

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**Anwendungen für CM BSZ-Antriebe**



**Clean Mobile GmbH**  
Bernhard Gutmann

Witneystr. 1  
82008 Munich, Germany  
Tel: +49 (89) 6650 9732  
Fax: +49 (89) 6650 9735  
email: [bernhard.gutmann@clean-mobile.com](mailto:bernhard.gutmann@clean-mobile.com)  
http: [www.clean-mobile.com](http://www.clean-mobile.com)

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## Technology Entrepreneurship

### Entrepreneurship for and in Chemistry-Related Enterprises

Prepare students for top job tracks in industry (Slide 0.4).

#### MODULE 12

#### Differences between Small and Large Firms

### ***Entrepreneurship and the Corporate Environment***

- Firms emphasize *entrepreneurial features* of their “*innovators*”:
  - For them [people] to be successful in our industrial environment they need to have the following qualities - “*entrepreneurial thinking*”, ... (Degussa– now Evonik Industries; Ref. Runge, p. 437)
  - Thanks to a high level of innovation, creativity and *entrepreneurial thinking* Merck is the number one in Liquid Crystals worldwide. (Merck KGaA; Ref. Runge, p. 438); Entrepreneurial rather than ‘green eye-shade’ people (Henkel AG & Co. KGaA; Ref. Runge, p. 437)
  - *Thinking and acting* entrepreneurially is synonymous with decision-making, creativity, accountability and further development (Altana AG; Ref. Runge p. 229)

### ***Entrepreneurship in the Corporate Environment***

- Does an entrepreneur become an intrapreneur in a firm – in any firm?  
Can firms develop and retain “inside entrepreneurs”?
- “*Innovative behavior*”:  
Individuals founding innovative firms vs. behavior of *individuals in organizational and inter-organizational contexts* (persons acting as individual entrepreneurs or individuals in corporate functions)
- *Entrepreneurial individuals behave and act in firms “under constraints”, in a socio-cultural context, in teams and workgroups – in a “system” (with cultural, political, organizational, creativity and action constraints) – (1.20, 2.3)*
- The system and its social interactions direct and control individual attitudes, behavior, learning etc. – rules, procedures, routines, bureaucracy
- **Note:** Entrepreneurs relying on VCs, business angels or other kinds of persons with “power” may put entrepreneurs (at least) under *financially or milestones determined constraints*.

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12.3

### ***What Changes Formally with the Firms’ Sizes?***

Successful firms (NTBF) start small and may grow and ultimately become (very) large:

- Few (10) *employees* change to 100, 1,000, 10,000, 100,000
- Operational activities become “*functions*” (R&D, Manufacturing, Marketing & Sales etc.) and *sub-units* and related *work processes* (project teams; product/business management teams; “task forces”)
- One initial product extends into several (many; thousands) products
- One technology or scientific/technical discipline extends into several technologies and sciences (multi-disciplinarity; e.g. chemistry plus biotechnology)
- One business changes to *many businesses (divisions)* and business units (BU)
- One (preferred) national region of operation extends into several *multinational/transnational regions* and we may have *global operation* (note also the *multinational cultures in big firms*)
- Ownership and corporate governance (2.3) may change
- *Issues:* Strategic planning and resource allocations, coordination, communication and control (executive, management, steering teams; coordination teams; project selection teams - *politics*)

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12.4

## Entrepreneurship in Firms - Intrapreneurship

### Startup-to-Firm Mapping:

1. Individual operational capabilities to corporate functions and sub-units
2. Entrepreneurial ideas and risk taking to ideas, corporate culture and strategy
3. Personal interrelationships to information handling, communication and coordination
4. Individual activities to corporate work processes and various types of teams

Combine **individual competencies** and sharing of information and knowledge;  
**individual learning**

Corporate **core competencies** and **organizational learning**

### People in Firms - "Human Resources":

- **Needed:** market (not necessarily marketing) and technical knowledge; looking for opportunities, rewards and profits
- **Personal traits needed:** creativity, initiative, risk taking, persistence, achievement, stress-resistant – managing conflicts
- **Different people for different types of innovation** or life times of innovation!

**Innovator/Pioneer:** "wants to do things different" ("disruptive")

**Builder/Adapter:** "wants to do things better" ("incremental")

- **"Innovation climate":**

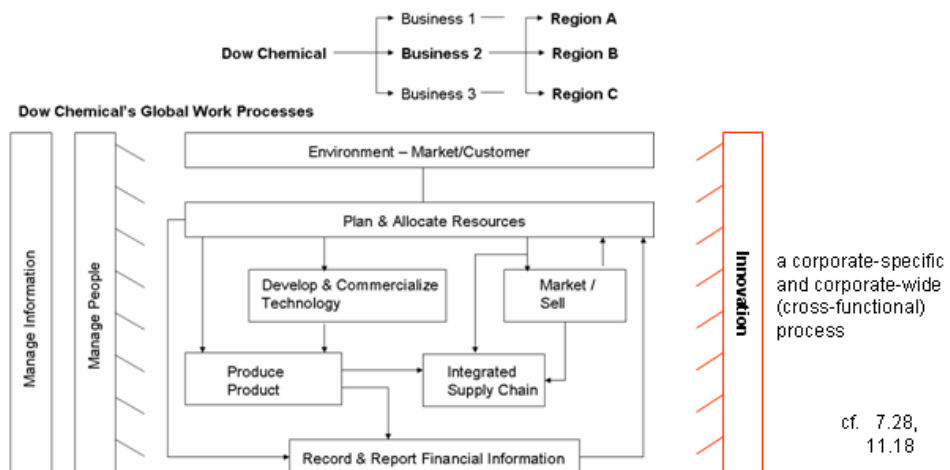
**balancing creativity and control, initiative and achievements**

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Ref. Runge, pp. 437; pp. 449; Table II.30

12.5

## An Organizational Model of Global Work Processes



- Concerning people large firms are (usually) not democratic
- "Old (military) organizational model": hierarchical/ top-down "command-and-control", reporting up the hierarchical tree; managers/leaders; CEO exposed
- Other ("new") models: essentially balancing bottom-up and top down

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Ref. Runge, p. 371, Figure II.32

12.6

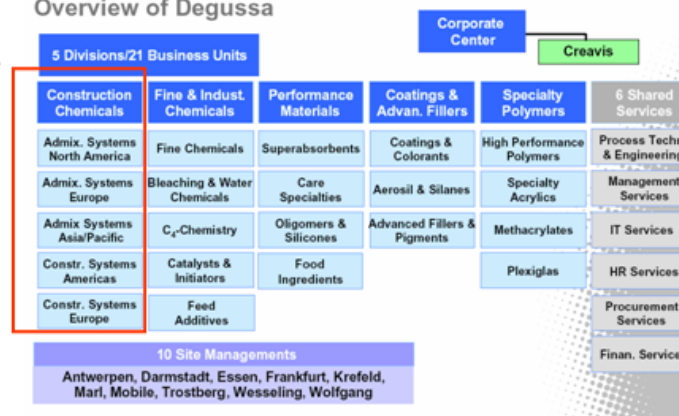


### Example of Formally Organizing a Large Firm

Purchased by  
BASF

#### Overview of Degussa

(now part of Evonik Industries)



- Firms re-organize their structures and businesses continuously
- “Primary work processes”: *profit-making, value creating*
- “Secondary work processes”: *not profit making, support/services; “overhead”*

#### Organizing Global Operation:

Typical Approach	Hierarchy	Example
Multinational or Transnational	Region by Business	BASF
Global	Business by Region	Dow Chemical

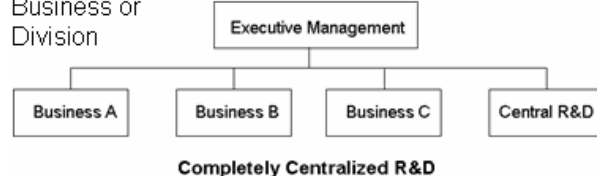
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Ref. Runge, p. 368, Figure II.30; p. 696, 698

12.7

### R&D (De)Centralization: Business versus Central Research

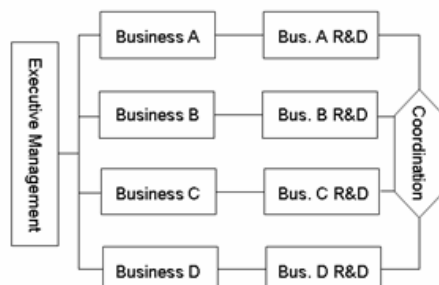
Business or  
Division



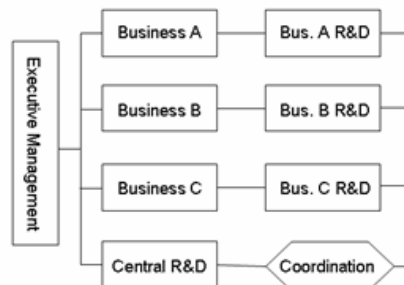
Completely Centralized R&D

Other organizational forms emphasize *products groups and/or technology platforms* incl. “all” company functions (e.g. 3M)

Completely Decentralized R&D



Shared Central/Business R&D



**Issue:** R&D reporting to BU Leader: short-term profit vs. long-term perspectives

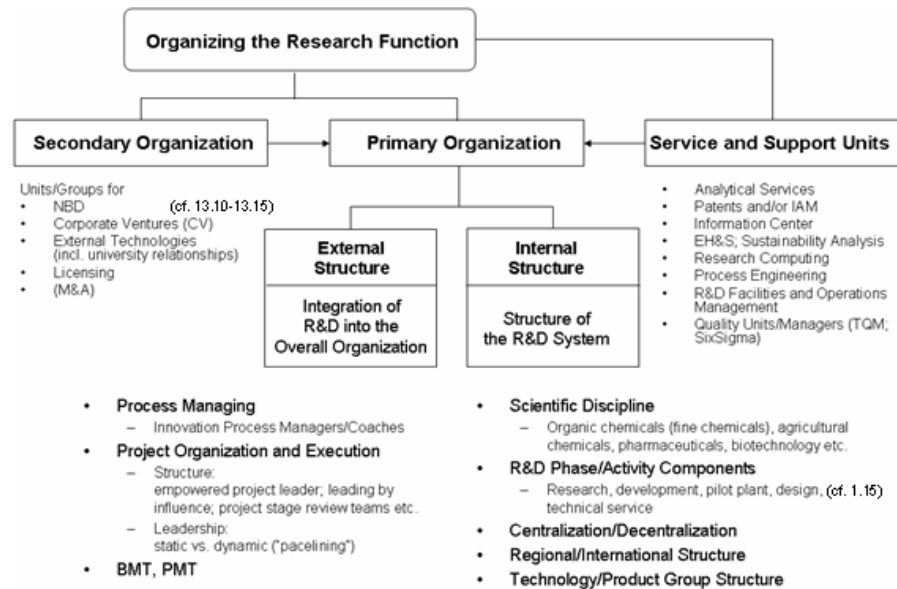
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Ref. Runge, p. 719, Figure III.44; p. 720-722

12.8



## R&D Organizational Sub-Structures

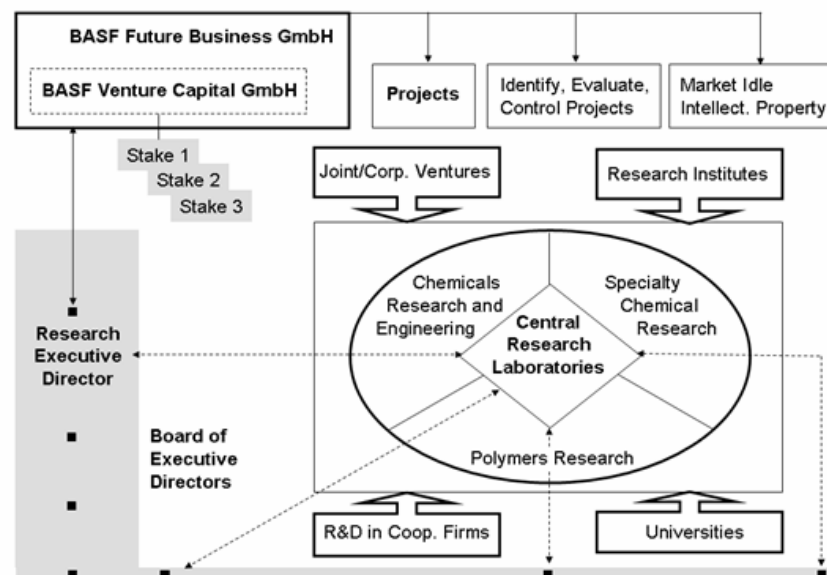


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Ref. Runge, p. 718, Figure III.43

12.9

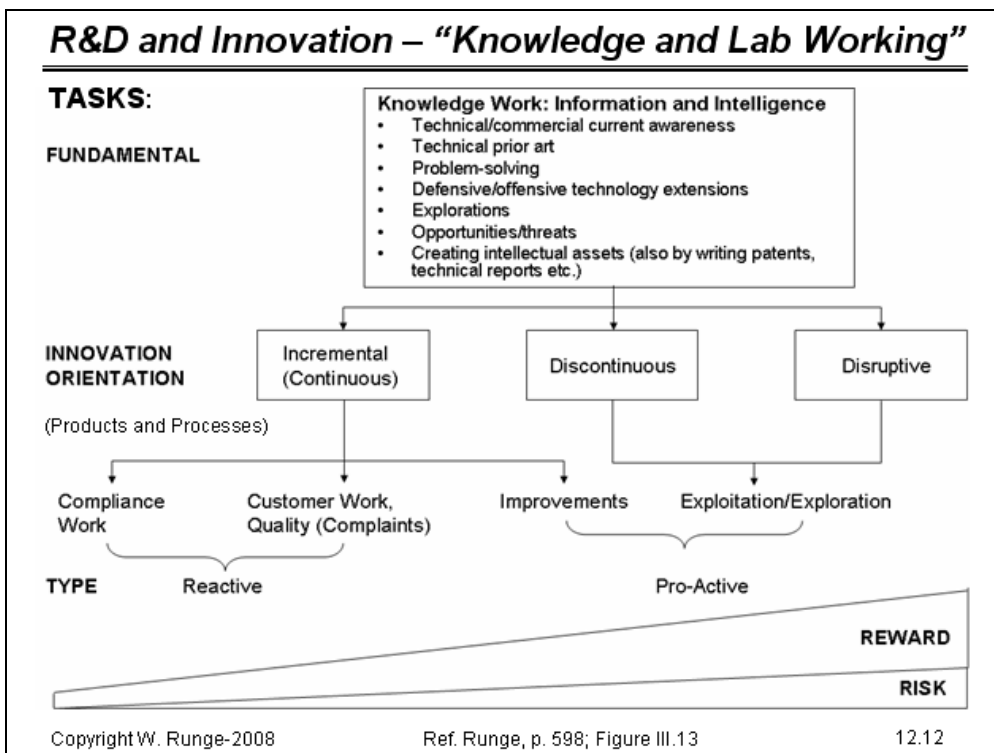
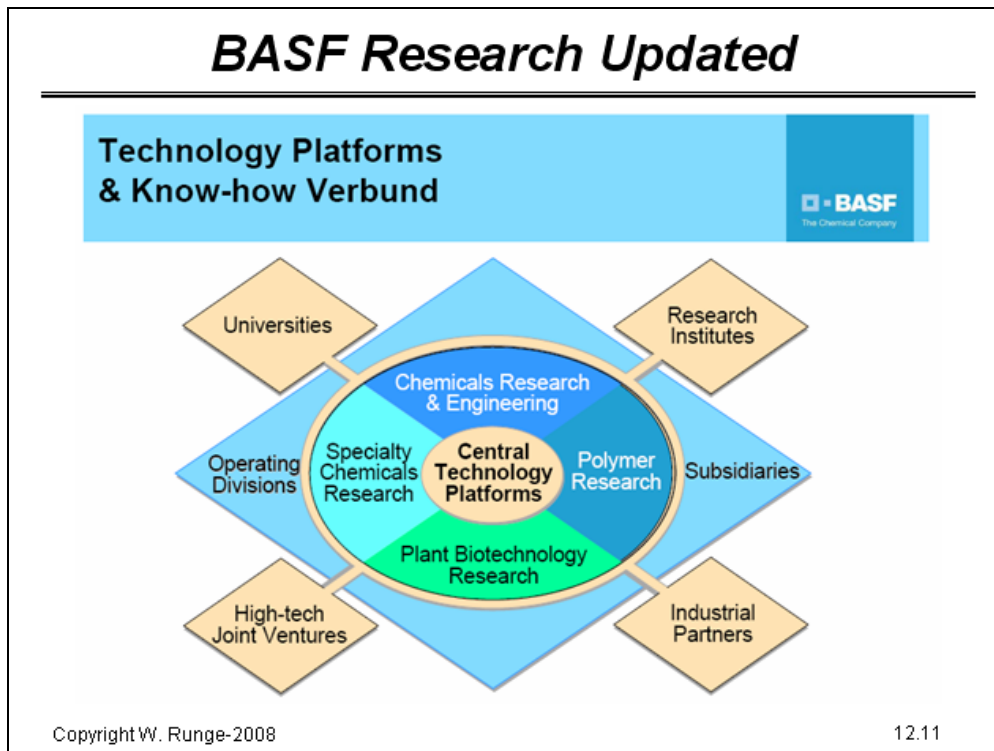
## Research Structures and Organizational Positioning: BASF Research

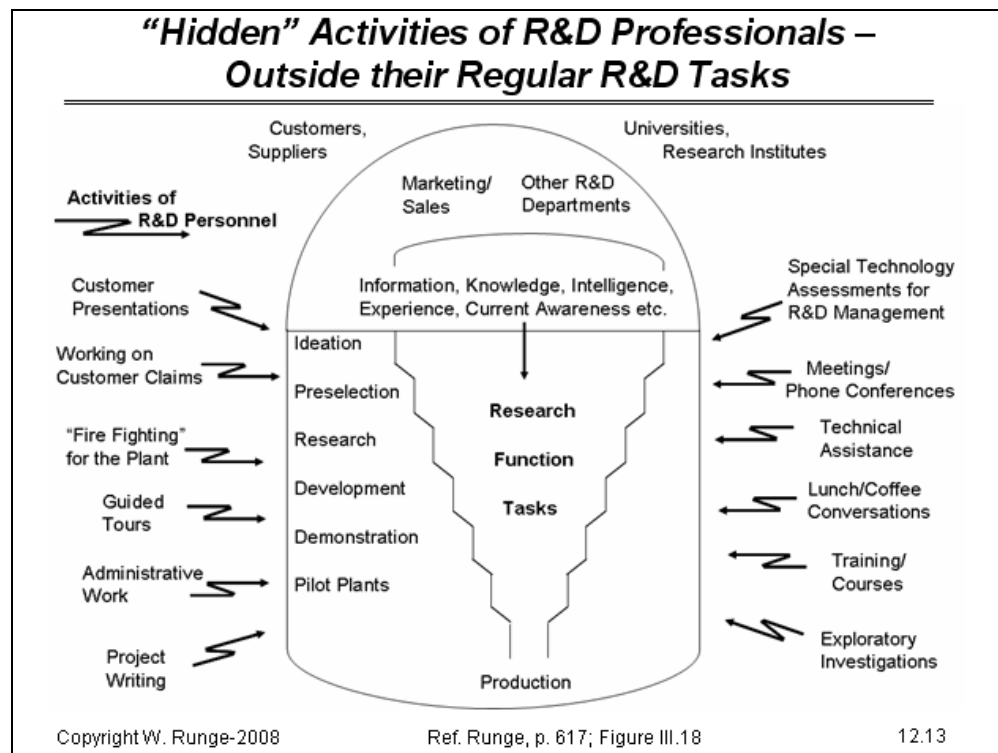


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Ref. Runge, p. 698, Figure III.37

12.10





## R&D Effectiveness

Overall, R&D effectiveness includes, for instance

- “Innovation climate”: balance creativity & control and initiative & achievements - manage “eccentric” people;
- Professional R&D personnel's *individual qualities* and *qualities in teams*

*As R&D organizations look at upgrading their R&D talent, they will need to ensure that their recruitment and retention strategies reinforce the rewards that are most valued by R&D professionals.*

- Research, development and technology intelligence core competencies; interfacing Marketing;
- Identifying technology options, identifying project options;
- Selecting (“right”) projects; strategic fit;
- Linking market/demand aspects to technical efforts;
- Linking manufacturing aspects to technical efforts

## **Core Competencies**

***“Core competency”: a central variable for innovation!***

The one thing that a company *can do better than its competitors*; an area of *specialized expertise that is the result of orchestrating complex streams of technology and work activity and processes*, including unique relationships with customers, suppliers, research, development or marketing partners, and operational agility or unique business practices (e.g. BASF Verbund)

- *Technical core competencies* are essentially associated with the company's R&D (, Engineering) and Production functions.
- ***Core competency of the R&D function for innovation:***  
*Application and market knowledge for the context of technologies* (from technology intelligence) in addition to *technical competencies* as well as a *commercial mindset* of researchers (and scientists)
- An organization's competencies reside in its *culture including valuation* (criteria by which decisions about priorities are made) and corporate governance and processes. Without conscious change (or even disruption) competency development tend to be *path-dependent*.
- An organization's capabilities define its disabilities!  
Core competencies can make innovation *path-dependent*.

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Ref. Runge, p. 71

12.15

## **Core Competencies and Core Rigidities**

- ***“Dynamic capability”*** as a basis of *systemic innovation*:  
long-term competitive performance of the firm lies in its *ability to build and develop firm-specific capabilities* and, simultaneously, to *renew and re-configure its competencies* in response to key factors and conditions of the environment.
- ***“Core rigidities”***: the downside of “core competencies”;  
may block the mindset of the organization *focusing on the status quo and past success* and *“filtering” the signals according to whether they fit in the status quo* (“confirmation of prejudices”).
- “Past success” includes the business model, the management style and decision making, prioritizing, the attitudes and mindsets, behaviors and processes and routines (“how things are done here”).
- Core rigidities represent *barriers for disruptive technical, but also organizational innovations!* They prevent even well-managed companies from developing disruptive innovations (technologies) until it is too late (“idea killers” – Runge p.753/754)
- Core rigidities are not specifically related to organizational structure, for instance, hierarchical-mechanical organizations!

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Ref. Runge, p. 8, 808

12.16

### ***Facing Opportunities: Common Traps When Firms Are Faced With Emerging Technologies***

1. *Postpone participation*, which is a natural response when faced with conflicting opinions, divergent interests, and an inability to foresee future possibilities.
2. In an effort to remain in their comfort zone and familiar niche, companies may *pursue only familiar technologies*.
3. With any new technology, there is a *hesitation to make a strong commitment to change* (and allocate sufficient resources to generate a "serious" approach). A reluctance to commit to technological and managerial change, however, can result in missed opportunities.
4. The *lack of persistence*; company leadership needs to push continuously the process of innovation.
5. Disruptive technologies are typically commercialized first in *emerging or insignificant ("special") markets that are perceived to be not large enough* to satisfy the growth needs of large firms.

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Ref. Runge, p. 716

12.17

### ***Creating Capabilities to Cope with Change***

Innovative firms must respond to market opportunities, even if they cannot meet the challenges alone!

When managers determine that an organization's capabilities are not suited for a new task they are faced with several options through which they can create new capabilities (*technical or/and organizational*).

1. Try to change the processes and values of the current organization ("*build*"; but be aware of core rigidities) **Unlearn?**
2. Cooperate with or acquire a different organization whose processes and values are a close match with the new task ("*cooperate or buy*") – 1.17
3. *Spin out an independent organization* and develop within it the new processes and values that are required to solve the new problem. Issue: *how much distance from the "mainstream"?*
4. "**Hybrids**" options: (e.g. Evonik Industries (Degussa) – Creavis (cf. 12.7) – Project Houses; BASF Future Business GmbH (cf. 12.10))
  1. Spin out an organization to deal with "cooperate or buy" options for *future businesses or areas outside current businesses*
  2. Create a *project-like temporary organization* for technical and market development with the options (at project end) to integrate them into a business or to run as a separate (subsidiary) organization ("spin-off").

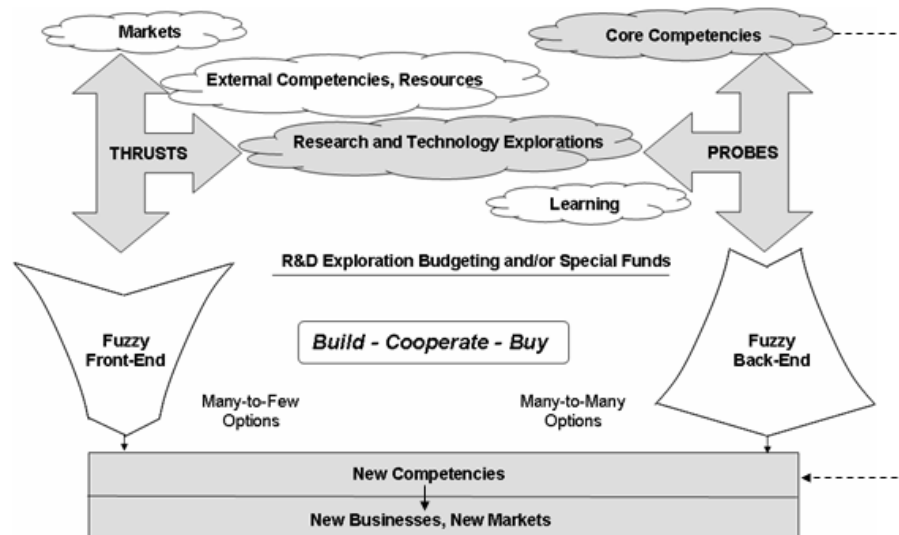
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Ref. Runge, p. 556, 696-699, Figure III.37, p. 729, Figure III.48

12.18

## ***“Building”: Structuring Explorations***

The ultimate *usage spectrum* or applications for disruptive technologies are *unknown in advance*. Exploratory research also *tests market assumptions* in advance of expensive commitments.

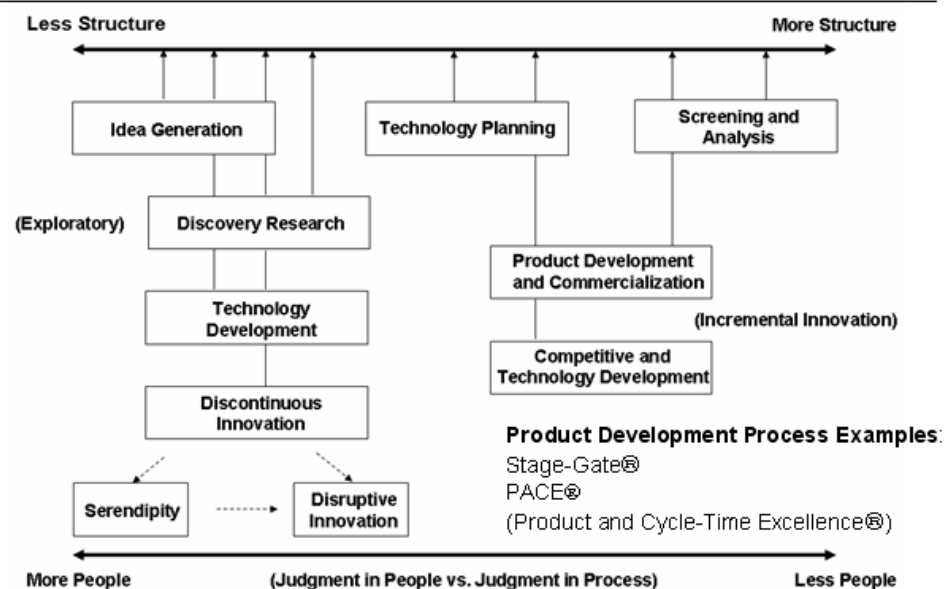


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Ref. Runge, pp. 683; p. 726; p. 727 Figure III.47

12.19

## ***The Structure Continuum for Innovation in Large Firms***



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Ref. Runge, p. 746, 748, Figure III.49

12.20



## Staged Innovation Processes

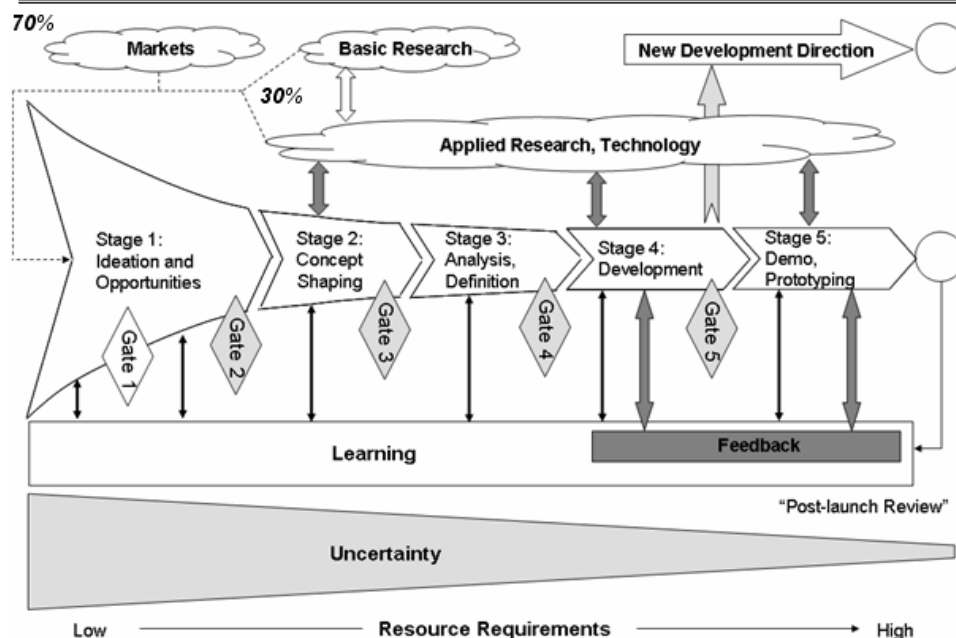
- **Stage-Gate® (PhaseGate) process:** an *archetype* common with more or less modifications in the chemical industry as a *corporate-specific* and *corporate-wide* process
- Actually a “*new product development*” (NPD) process
- Conceptualized to have “*decision points*” (“*gates*”) *after the end of each stage* and to define *after review (usually by a dedicated group)* whether and how to proceed in the process (cf. VC financing rounds)
- Assessment usually by *given criteria*, explicit “*milestones*” or control points (“*judgment in the process*”) or “*tacitly*” by group consensus
- Objectives: *reduce uncertainty and risk*; “*efficiency*” (reduce cost), ensure that “*unsuccessful*” projects are killed as early as possible (“*failing fast*”; cf. slides 12.22)
- A stage review requires that *all activities be finished up for review before the next phase can start* (“*synchronization*”)
- The industrial stage-gate process with its documents (“**project proposal**” in structured forms) and decision-making exhibits analogies with the entrepreneur’s **business plan** approach (slides 11.37, 12.23)
- In applying a strict, formalized approach simply on the basis of yes/no decisions according to the pre-defined criteria it is “*programmable*” and sets up a “*closed, tell (demand)*” research and innovation style.
- Particularly appropriate for *incremental innovation*.  
The stage-gate process is *fine for managing established businesses*.

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Ref. Runge, p. 423; p. 608, Table III.13; p. 653, 654

12.21

### A “Structured” Innovation Process: Stage-Gate® NPD

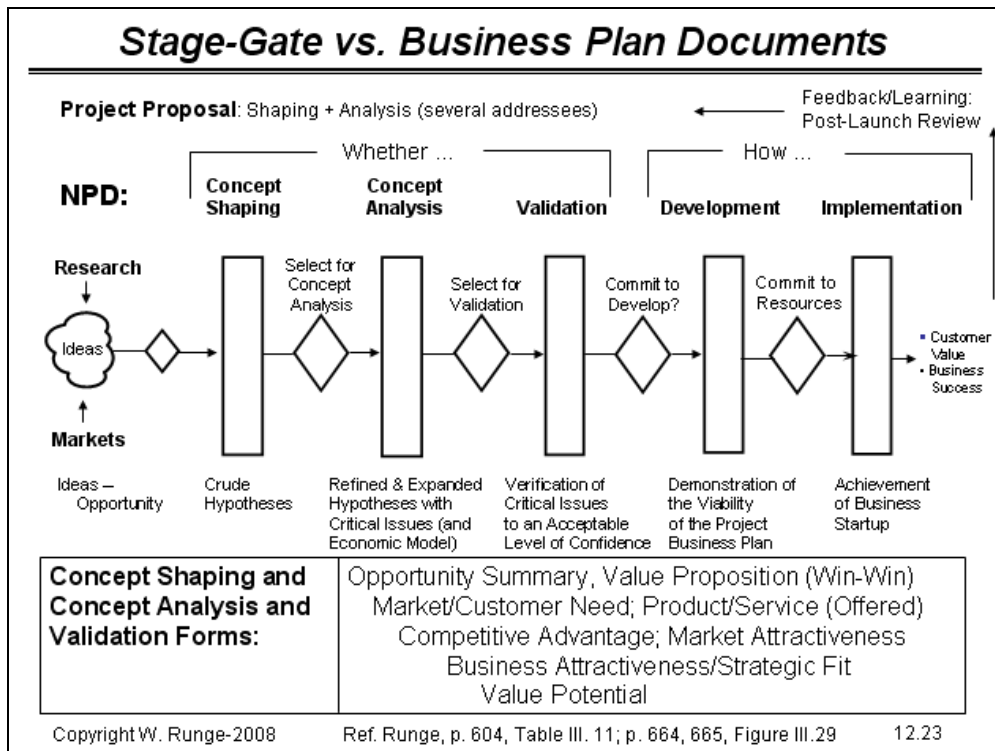


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Ref. Runge, p. 604, Table III.11, p. 854; Figure III.26

12.22





## Ideas and Innovation for Offerings

(Remember: Central Research vs. Business Research)

- Idea generation as a *structured process* ("ideation") vs. ideas and imagination and serendipity as "*events*"
- Sourcing of *ideas and discoveries from inside and outside* (scouts, cooperation with universities, research institutes, etc.)  
Most of the ideas successfully developed and implemented by any firm came from outside that firm – questions: what's new and/or different?
- "Technology Push" vs. "Demand (Market) Pull" (4.11)
- The probability of successful chemical offerings reaching the market is 5 – 10 per 1,000 (0.5 – 1%).  
Paraphrased adapting the well known fairy-tale "The Frog Prince" to R&D projects Dröscher from Evonik Industries (formerly Degussa) emphasized that

*"R&D has the task to kiss 100 frogs in order to get 1 prince!"*  
(cf. also slide 1.13 concerning venturing)

## ***Ideas and Problem-Solving***

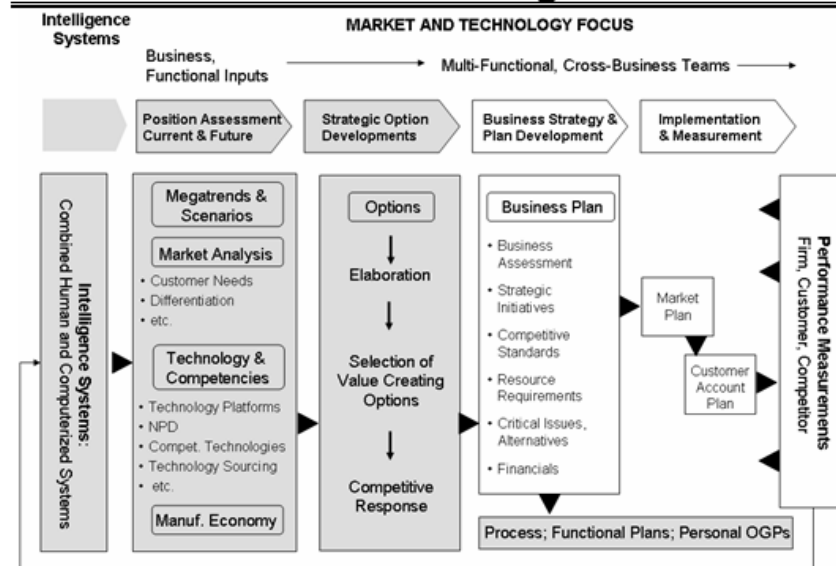
- **Except for serendipities innovation sprouts essentially out of two sources of ideas (slide 4.15):**
  - Ideas that may originate independently in *persons' imagination and creativity*,
  - Ideas that result from *problem-solving or ideas combined with opportunity identification for a particular context*, which means out of insights into interrelationships between entities or patterns – or gaps in patterns (technology and market, technology and scientific phenomena, technology and societal attitudes, technology and work processes, technology and complexity etc.) –
- **Big problems means big opportunities!**
- **Having problems - of customers, manufacturing, society etc. versus "have a solution, look for the problem" ("technology push")**
- **Problem-solving :**  
*affected by a combination of a searching process and by the availability of the knowledge required to solve the problem; identifying the generic structure of the problem increases the search space.*
- **Measuring problem-solving style of people:**  
"Kirton Adaptive-Innovative" (KAI) instrument (KAI) - measures whether a person is an adaptive or innovative problem solver (cf. 3.15)
- **Major barriers for ideas in large firms** are the current "climate" (or corporate culture) with "failure avoidance" and "cost as killer" (too early cost considerations may kill good ideas!) and "*core rigidities*".

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Ref. Runge, p. 750

12.25

## ***A Typical Path to Incremental (Discontinuous?) Innovation in Large Firms***




Shaded areas indicate major input from R&D, Manufacturing and Technical Service;  
NPD = New Product Development; OGP = Objectives, Goals and Plans of employees

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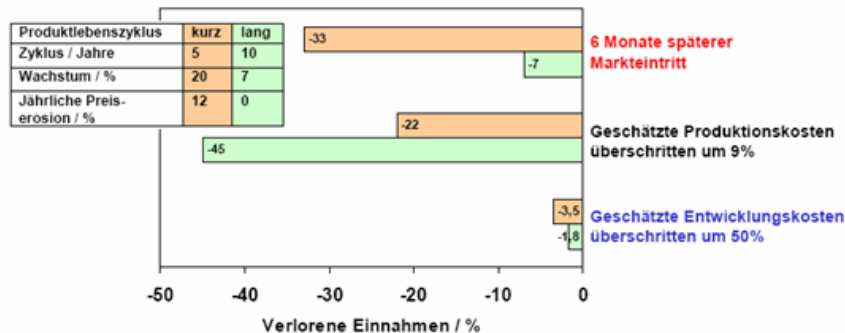
Ref. Runge, p. 715, Figure III.42

12.26

## Time and Money Quantified

polyMaterials 

### Einfluß verschiedener Zielverfehlungen auf die Einnahmen



Specialty  
Chemicals  
(Slide 4.21)

Plastics &  
Polymers

Bei kurzen Produktzyklen ist die Zeit bis zum Markteintritt absolut entscheidend, bei längeren Produktzyklen sind die Produktionskosten kritisch.

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12.27

## Key Differences Between Small and Large Technical Firms

Function	Small Firms	Large Firms
Management	<ul style="list-style-type: none"> <li>- Fast and focused decisions;</li> <li>- Inclination to risk taking</li> <li>- "Organizational low distances", "voice-of-the-employee", closeness of knowledge and control, visible leadership and exemplary roles</li> <li>- Fast organizational learning</li> </ul>	<ul style="list-style-type: none"> <li>- Complex decision-making processes;</li> <li>- Minimization of risk taking</li> <li>- Possibilities for relatively quick re-allocation of resources or pool important resources in one project</li> <li>- dichotomy of leaders versus managers</li> <li>- Slower organizational learning</li> </ul>
Marketing	<ul style="list-style-type: none"> <li>- Personal contacts of top management (to customers and coop partners)</li> <li>- Restricted resources (little, if at all), manpower</li> </ul>	<ul style="list-style-type: none"> <li>- Global networks</li> <li>- Professional organization with skilled personnel</li> <li>- Profound economic and commercial knowledge in dedicated fields</li> </ul>
Financial	<ul style="list-style-type: none"> <li>- Restricted resources;</li> <li>- Profits are often re-invested</li> </ul>	<ul style="list-style-type: none"> <li>- More resources and bigger "cake"</li> <li>- Complex planning, allocation and approval processes</li> <li>- Competition of divisions for funds</li> </ul>
Production	<ul style="list-style-type: none"> <li>- Often simple plants (or no plants at all, meaning "virtual companies")</li> <li>- Limited versatility in multi-purpose facilities</li> </ul>	<ul style="list-style-type: none"> <li>- Broad technological capabilities and experiences</li> <li>- Economies of scale</li> <li>- Potential and experiences to handle complex projects</li> </ul>
Research	<ul style="list-style-type: none"> <li>- Flexible</li> <li>- Informal organization with access and exchange points to production and focused "market knowledge"</li> <li>- Restricted resources</li> </ul>	<ul style="list-style-type: none"> <li>- Formalized organization, considerable bureaucratic risks</li> <li>- Intra- and inter-functional communication and coordination issues</li> <li>- Know how for complex development projects</li> </ul>
Technical Service	<ul style="list-style-type: none"> <li>- Restricted resources</li> <li>- Often aligned with Research</li> </ul>	<ul style="list-style-type: none"> <li>- Global professional networks</li> <li>- Large organization with personnel having differentiated skills</li> <li>- Accessibility via a multitude of channels</li> <li>- Issues of responsiveness</li> </ul>

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Ref. Runge, p. 183, Table II.8

12.28

# Technology Entrepreneurship

## Entrepreneurship for and in Chemistry-Related Enterprises

### MODULE 13

Intrapreneurship: Company Requirements  
and Barriers for Entrepreneurial Activities

## *Disruptive and Discontinuous Innovation and New Businesses*

Discontinuous or disruptive innovation means in *market value created*, not in technology!

A large (chemical) firm's success (and shareholder's dream) results in:  
**Breakthrough Innovation**

Disruptive Discontinuous	Project Class for Changed or New Businesses	Typical Magnitudes of Revenues
	Small:	<\$20 million in revenues
	Medium:	\$20 million - \$200 million in revenues
	Large:	\$250 million - \$500 million in revenues
	"Big Bangs", "Blockbusters":	\$1 billion and more in revenues (big ideas that can create new industries)

- The creation of discontinuous or disruptive innovation usually results from *changing one or more dimensions of the existing business system ("offerings")*, or by creating *entirely new business systems*

### ***Breakthrough Innovation and Employees***

- Discontinuous or disruptive innovation ideas are associated with *high market uncertainty and risk* (but big rewards)
- Disruptive innovations are *difficult to deal with*, because they do not only require *new resources (and competencies)*, - but they *(often) conflict with the organization's processes and values* (also a different value proposition).
- Breakthrough innovation needs *persistence and continuity*
- *People* ("exceptional characters") are key for breakthrough innovations (scientific/technical entrepreneurs - *intrapreneurs*).
- *People make projects!*  
If a corresponding *selection team* likes the idea or project (and like each other) and is willing to take the risk, "the project will fly" (with "*champions*" and "*sponsors*" (Slides 13.8, 13.9) emerging – "*entrepreneurial pairs*").
- There are approaches to "organized" technical innovation *channeling an "unstructured" approach to breakthroughs into the firm's structured innovation process* (Slides 13.8, 12.20).

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13.3

### ***Discontinuous/Disruptive Innovation: Large and Small Firms***

- Attempts *targeting discontinuous/radical innovations* (including those at the very big companies) have produced more failures than successes.
- There are seemingly more examples of small, entrepreneurial firms generating radical innovations; but the majority of them have also failed.
- *Established companies tend to be followers in disruptive innovation.* One reason: a *risk-avoiding corporate culture*, being "conservative"
- Furthermore, established firms' leading customers generally do not want, or cannot, use a disruptive technology at first.
- Drastic shift in demand occurred when the disruptive product's performance exceeded the market demand (entrant firms overtook established firms).  
SME entrants have advantages (low-end, niche and/or new markets).
- Options for large firm: identify business and/or technological threats or opportunities; "build, cooperate or buy"; New Business Development (NBD) process; (corporate venturing - an important part of the NBD process in the chemical industry)

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13.4

### ***Some Issues in Large Firms for “Breakthrough” Innovations***

- How do you *encourage and select* breakthrough ideas, link to opportunities and prepare a lift-off for (discontinuous or radical) innovation?
- How do you make sure that disruptive ideas *have a soil to blossom and grow*, get *upper management commitment* and ...
- *Is there a right “home”* for discontinuous/radical innovation?
  - Central Research (whether and when to transfer to business)
  - Existing Business Unit (Business Research)
  - New Business Unit (intra- or extra muros; extra muros with “outsiders?”)
  - Spin-Off (Venture)
- Who are the *right people for the transition from development to production?* (shift temporarily Research & Development people to Production? – DuPont’s Kevlar)
- How do *manufacturing challenges* impact market entry?
  - Product cost (yield, purity, economy of scale?)
  - Imposing a dominant standard

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Ref. Runge, p 418, 419, 606

13.5

### ***Human Factors for Breakthrough Innovations***

- Breakthrough innovation in the chemical industry almost never comes from an articulated need; it comes from
  - an insight into an *unarticulated* need,
  - a *scarcity* (including fighting monopoly) - “necessity is the mother of invention”,
  - an *industry “Holy Grail”* (a “dream” or vision)
  - *serendipity*.
- **When it comes to innovation, the key point is this:**  
Breakthrough innovation typically comes from *looking at the world through a different lens*, by *exceptional or even eccentric characters* (“mavericity”, unorthodoxy).
- People get the courage to *try new things and take risk* not because they are convinced to do so by a wealth of analytical evidence but because they have an *internal drive*, they feel something *viscerally* in their personality.
- Radical innovators think of their *companies as portfolios of assets and competencies*.
- But, too many executives are concerned that encouraging 500 “freewheel” or unconventional ideas will incite their people to waste time going off in thousands of crazy directions. Apart from the efforts, that is not the problem. People have been beaten down, boxed in, and brainwashed for so long that the challenge is not to rein in their far-fetched and absurd fantasies. The challenge is to get them to *expand their thinking*.
- Moreover, in most companies, the only person who can buy an idea is your boss or your boss's boss. (Don't publicize your idea too early to your boss!)

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Ref. Runge, p 431

13.6



### ***Approaches to Intrapreneurship: Corporate “Funds” for Innovation***

- Most famous: The “15% rule” of 3M allows virtually anyone at the 3M company to spend up to 15% of the workweek on anything he or she wants to, as long as it is product-related (“*firm culture*”!!).
- Chemical firms (e.g. BASF, Dow, DuPont) have often *programs* to develop and fund innovative ideas from employees through an internal venture arm *when the particular (assessed) good idea does not fit clearly within any of the firm’s business units*
  - Say, \$50,000 can be made available to any employee who wished to undertake an independent pre-commercial investigation of a technology or business concept.
  - Or, provide time to researchers to follow own ideas (apart from attributed projects) through exploratory research (BASF, Dow)
- However, *reality* sometimes (often?) interferes with good intentions. Work overload can simply be one reason for not implementing an idea; employees may stop submitting (business plan-like) project requests for funding due to increased workloads and a general lack of time.

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Ref. Runge, p. 726, 727, 777

13.7

### ***Leading and Hedging Breakthrough Innovation: A “Special Affair” of an Entrepreneurial Pair***

- When lacking a supportive corporate culture a “maverick” and “project *champion*” must pro-actively catch the attention of a “*sponsor*” known for his/her personal characteristics and *influence and/or power in the firm* (knows “which buttons to press” how to “sell”); to create the “*champion/sponsor pair*”
- *Pushing* the project (“till stage 3” in the firm’s formal process; cf. slide 12.22) and acquisition of resources is *ad hoc* (special corporate funds?)

The crossroads:

- The following steps including project staffing, team building and getting needed people on board for development, completion of tasks and transfer to production rely essentially on *individual initiatives*.
- Further activities are channeled into the company’s (formal) innovation process.

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Ref. Runge, p. 723

13.8



### ***The Technical Businessman: The Role Model for a Sponsor of Breakthrough Innovations***

- Sponsors have *heavy weight and influence in the company – throughout functions and management*
- The Sponsor – Features and Processes
  - Sets the context – communicates a clear vision for the unit/organization;
  - Finds and selects “innovators” – bets on people, not just plans;
  - Chooses projects to sponsor;
  - Forms cross-functional project teams – strives for functionally and competency “complete” teams;
  - Supports the team - provides resources and is a “one stop shop” for decisions that will stick;
  - Guides the team - sets milestones, asks the right questions, and knows when to redirect the team’s efforts;
  - Rewards the team – keeps them on track.

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Ref. Runge, p. 723

13.9

### ***New Business Development (NBD)***

- NBD: a *process* that has to be *managed* and shows up as a *capability*. NBD appear in various structural constellations, in the businesses and/or as part of Central R&D, organizationally inside the firm (intra muros), but outside the businesses or outside (extra muros) and loosely coupled; cf. Air Products & Chemicals, Dow; BASF, Evonik Ind.
- “New Business Development” (NBD) in technology-based firms: a *corporate innovation “experiment”* as is “New Product Development” (NPD) of the R&D function.
- NBD is *related to a particular “business model”* as an organization’s core *logic* for creating *value* (11.3).  
*Deliverables*: Business Model + Proof-of-Concept (PoC)
- NBD is a *notoriously risky* proposition.  
NBD is not only associated with high risk and uncertainty for the firm. Working in NBD units *puts also employees at higher risk* of failure and, hence, cannot be viewed as a “good career move”, unless the company put in place a defined career path and employee development plan to attract particularly bright people with *combined technical and commercial minds* for such jobs, which means actually “intrapreneurs”.
- “*Entrepreneurial pairs*”: advantageous “architectures” for NBD setup.
- The NBD organization of a firm is *to develop a new business, not to run it!* Success or failure is also determined by subsequent activities.

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Ref. Runge, p. 722, 723, 727

13.10

### ***New Business Development: Orientations***

NBD (in and outside the current business organization): a major route to *corporate renewal and growth* (beyond NPD)

*Opportunities*: particularly “*future*” and markets *new-to-the-firm* (*new-to-the-world*) requiring new product, technology (and sometimes marketing) competencies

Develop a company of sufficient size out of an NBD initiative: 5-8 years

#### **Business Orientations:**

- An existent business of the firm is extended (NBD mainly in the business); existing businesses are combined into an extended new one
- A new business is created and integrated into the firm;
- A new business is created and separated from the parent firm as a spin-off.

#### **Human Resources Orientations:**

- **Essentially “Insiders”** (e.g. BASF Future Business GmbH – BFB; 12.10)
  - Wide range of experience in product development, application technology and marketing.
  - Personnel has experience in one or more of the company’s operating sectors
- **Essentially “Outsiders”** (e.g. Dow)
  - Personnel with three primary roles/positions: Ideators, Evaluators, and Implementers
- **Compass: Strategy or Business Model (change or new?)**

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Ref. Runge, p. 723, 728, 729

13.11

### ***NDB: Location and Uncertainties***

Location and structure for organizational units to deal with NBD:

Depends on *how close corresponding activities are to core businesses and technical core competencies*;

Development outside the core businesses tends to happen in a separate NBD unit and through M&A activities (cf. 12.8, 12.10).

#### **Uncertainties:**

- **Successfully capturing “new/new” (product/market) opportunities can be very problematic, as companies often lack the appropriate experience base to guide them (“they don’t know what they don’t know”).**
  - Uncertainty *how the science is going to develop* (including related regulatory developments)
  - At what *pace* new technologies will emerge.
  - Which *markets* are going to emerge (and how to develop these)
  - *Customer adoption* creates additional uncertainties
  - *Learning challenges*: how close to firm’s core competencies (“new-to-the-firm”, “new-to-the-world”)

#### **Methods (“build, cooperate, buy”):**

- **Building and developing internally new technical and/or marketing competencies, essentially through *exploratory research*.**
- **Cooperation and alliances with academia and other research institutes or firms (slide 1.17);**
- **Venturing and acquisitions**

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Ref. Runge, p. 722

13.12

### ***Job Description (Tasks and Requirements) “NBD Manager Specialty Chemicals”***

#### **Tasks: Intelligence-related and intrapreneurial activities**

- Lead, control and coordinate projects for strategic business development
- Collect and analyze information concerning markets, competitors and customers
- Work on strategic issues of the specialty chemicals' businesses
- Track technologies, products, markets and companies in selected areas to derive opportunity-risk potentials, recommendations and action necessities
- Work in teams and support chemicals' businesses with technology assessments, strategic decisions and acquisition processes

#### **Required:**

Dr./PhD in natural science; 3-5 years job experience; 1-2 years in business development or strategic marketing or setting up a startup;  
 - several years experience in coordinating global projects;  
 - strengths in presentation and reporting;  
 - a personal network in specialty chemicals will be helpful;

Your traits: ...

Usable as a springboard for entrepreneurship!

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13.13

### ***Corporate Venturing (CV) – Venture Capital (VC)***

A case for technology intelligence concerning NTBFs:

- Types
  - *Internal CV*: build a new business within the company, but *independently outside the given corporate structures and core businesses* (e.g. an internal startup with “intrapreneurial settings”)
  - *External CV (and VC)*: Corporate Venture Capital (CVC) organization or taking, at least, *partial ownership in independent external venture organizations*, mainly through financing and participation in equity. Engagement can also be without money, e.g. IP (cf. slides 1.17, 10.19, 5.23, 7.16).
- Major aims of external corporate venturing
  - Tracking the market and learning about the details of the technology the new technology-based firm (NTBF) is working on;
  - Acquire skills, capabilities, and technologies outside the current company's competencies not otherwise easily available;
  - Access to entrepreneurs who could impact the firm's business.
- Some current orientations of chemical companies' ventures:
  - nanotechnology, ionic liquids, OLED, fuel cells and alternative (“clean”) energy (photovoltaic, solar cells); organic semiconductors; printed electronics; “devices” for organic electronics

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Ref. Runge, p. 554, 695-697

13.14

## ***Orientations for Corporate Venturing***

- Focus on two firm's life stages: ("seed") early stage vs. late stage (development/expansion).
- Firm attributes for attractive corporate ventures:
  - A clear *value proposition*;
  - Large targeted markets and technology with "*platform*" characteristics (multiple commercialization opportunities);
  - Defensible *intellectual property*;
  - Demonstration or prototypes (or commercialization units);
  - An energized management team or a visible "*outstanding*" entrepreneur.
- Chemical firms usually prefer "*late-stage venturing*" (e.g. BASF, Cargill) or support startups' early stages specifically, for instance, through validation of business models, provision of support to generate business plans, search of strategic partners etc. (e.g. Evonik's Creavis; formerly Degussa)
- Re-Visited: Difference to "normal" venture capital: Investor relationship one step further by entering into *value-generating relationships with the portfolio companies*, such as strategic advice, consulting support as well as access to resources (slides 7.16, 7.17)

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Ref. Runge, p. 694-696

13.15

## ***Skunkworks***

- A skunkworks runs a *project* in a way that is *outside the usual (company) rules*
- *Company-internal groups* to achieve unusual results (*approved by management*)
- Typically, a skunkworks has a *small number of members* in order to reduce communications and coordination overhead
  - Is often given *responsibility* for developing something in a *short time with minimal management constraints*
  - Skunkworks project may be secret
  - Sometimes used to spearhead a product design that thereafter will be developed according to the usual process
- For instance, DuPont's skunkworks experience at the beginning of the 1990s to speed the new-product process:  
Those projects often did not produce much profit.

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Ref. Runge, p. 696

13.16

### ***Breakthrough Innovation Despite the System***

- Many people who succeed at breakthrough innovation inside large companies will tell you that they did it *despite the system* ("**bootlegging**"), *against the official direction*!
- But few senior executives or senior managers seem to find that state of affairs to be remarkable and disturbing.
- Not every bootlegger works for the best of the company.
- Corporate culture will determine the direction of bootlegging.

"Bootlegging"  
Examples

Reward

No Reward

**3M:**

Dick Drew's pursuit of the masking tape

**Hewlett-Packard (HP):**

Charles (Chuck) House pushing a display monitor

**Perstorp:**

Laminate flooring product team (Pergo spin-off)

**Sony:**

Ken Kutaragi - PlayStation

**Bayer:**

Klaus Grohe - Ciprobay

Neubauer, U. (2006): Nachrichten aus der Chemie 54, 759-761.

Ref. Runge, p. 461, 464; p. 723

13.17

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### ***Dilbert's "Salary Theorem"***

"Engineers and scientists can never earn as much as business executives, sales people, accountants and especially liberal arts majors."

**The less you know, the more you earn!**

Dilbert's theorem can be supported by a mathematical equation based on the following two well known postulates:

- Postulate 1: Knowledge is Power.
- Postulate 2: Time is Money.
- As every engineer knows:  $\text{Power} = \text{Work} / \text{Time}$ .
- Hence:  $\text{Money} = \text{Work} / \text{Knowledge}$

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13.18

**Dilbert Web Site:** <http://www.unitedmedia.com/comics/dilbert/>

1. [http://www.dilbert.com/most\\_popular/](http://www.dilbert.com/most_popular/) 2. <http://www.unitedmedia.com/comics/dilbert/archive/dilbert-20080110.html>



**Dilbert –**

**(Main) Characters:**

**Dilbert** is a stereotypical technically-minded single male engineer.

**Pointy-Haired Boss (PHB)** is hopelessly incompetent at management and is very bombastic. He does not understand technical issues.

**Wally** is one of the oldest engineers; he hates work, avoids it whenever he can.

**Alice** is one of the more competent engineers. She has a huge, triangular hairstyle. She is often frustrated at her work not getting proper recognition, which she believes is due to her gender.

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## ***Appendix: Selected Contact Points for Starting up a Firm***

### **Technology Entrepreneurship**

Mixed German/English text!

## ***Chemical Startup Firms in Germany***

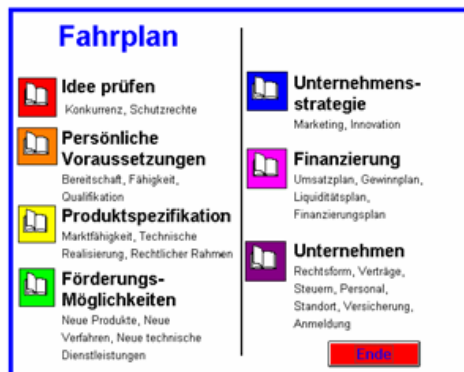
- Chemical Start-up Companies: Database  
<http://www.chemstart.org/>
- GDCh mit VCW-Fachgruppe:  
Seit Anfang Februar 2007 hat die VCW einen *Wettbewerb* gestartet, um *Ideen und Konzepte* im Bereich Chemie und Life Science zu fördern  
([http://www.gdch.de/strukturen/fg/wirtschaft/vcw\\_va.htm](http://www.gdch.de/strukturen/fg/wirtschaft/vcw_va.htm))  
In sechs (halbtägigen) Regionalveranstaltungen werden *Grundlagen vermittelt, wie erste Ideen in ein konkretes Geschäftskonzept* und anschließend einen *Business Plan* umgesetzt werden.  
Erfahrungsberichte von erfahrenen Gründern und Investoren bieten die Möglichkeit, von deren Fachwissen für erfolgreiche Geschäftsgründungen zu profitieren.  
Die Teilnehmer werden aufgerufen, *Geschäftsideen* einzureichen.  
Die zehn besten Kandidaten erhalten ein 10-stündiges Training durch ADL und Festel Capital, um die Geschäftsidee zu einem Business-Plan auszubauen.
- German Biotech Database  
(<http://www.germanbiotech.com/de/index.php>)

## Guided Tours for Planning

- Technik-Orientierte-Unternehmensgründung (TOU)  
<http://www.tzl.de/tou-planer/fahrplan.htm>  
**Software:** Gründungsplaner; <http://www.tzl.de/tou-planer/>
- **Checklisten:** Existenzgründung –  
 Unternehmensgründung:  
<http://checkliste.de/unternehmen/existenzgruendung/>

"TOU-Planer"

Checklisten der  
 Deutschen Ausgleichs-  
 bank für Unter-  
 nehmensgründer  
 (mit *Persönlichkeits-*  
*test* für Unternehmer)



<http://www.fes.de/fulltext/fo-wirtschaft/00724009.htm>  
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## General Information

- Gründermagazin.online:  
[\(http://www.gruendermagazin.com/;](http://www.gruendermagazin.com/)  
[http://www.gruendermagazin.com/existenzgruendung-index-56--118--high\\_tech\\_gruenderfonds.htm\)](http://www.gruendermagazin.com/existenzgruendung-index-56--118--high_tech_gruenderfonds.htm)
- Innovationsreport  
[http://www.innovations-report.de\)](http://www.innovations-report.de)  
 Mit Nachrichten & Berichten aus Biowissenschaften,  
 Chemie, Materialwissenschaften und vielen anderen  
 Bereichen

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A.4

### ***Policy in Germany Concerning Entrepreneurship***

The field of promoting technology-based startups are concentrated on three areas:

- improving the financing conditions for startups, especially the access to venture capital,
  - improving the infrastructure and legal framework relevant to startups, and
  - improving the climate for entrepreneurship, with special emphasis laid on the higher education and public research sector.
- Technology-based startups are supported not only by direct subsidies but also by means of *consulting*.
  - One example among several initiatives is the Business Angels Network (BAND - Business Angels Netzwerk Deutschland e.V.; <http://www.business-angels.de/>), which offers startups access to experienced managers who give advice to young entrepreneurs in the early stages of firm creation.

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### ***Governmental and General Resources***

- **Bundesministerium für Wirtschaft und Technologie**
  - EXIST – Existenzgründungen aus der Wissenschaft (<http://www.exist.de>; <http://www.exist.de/nachrichten/index.php>)
  - Existenzgründungsportal - <http://www.existenzgruender.de/>; (<http://www.softwarepaket.de>)
  - Gründersoftware (Ver. 9.0) (<http://www.softwarepaket.de>)
  - Wirtschaftliche Förderung, Hilfen für Investitionen und Innovationen (<http://www.bmwi.de/Dateien/BMWi/PDF/foerderdatenbank/wirtschaftliche-foerderung,property=pdf,bereich=bmwi,sprache=de,rwb=true.pdf>)
  - Junge Unternehmen. Probleme und Lösungen bei der Existenzfestigung (<http://www.netzeitung.de/oth/0035/120935.pdf>)
- **Bundesministerium für Bildung und Forschung**
  - Nano-Entrepreneurship-Academies in Deutschland ([http://www.techportal.de/de/0/2/news,public,newsdetail\\_public/1/start/.../7778/](http://www.techportal.de/de/0/2/news,public,newsdetail_public/1/start/.../7778/))
  - **NEnA**, the new initiative of **nano4women** is part of the action program „Power for Entrepreneurs“. From 2007 to 2009 three Nano-Entrepreneurship-Academies will take place to promote the entrepreneurial ambitions and competences of young female scientists (<http://www.nano-4-women.de/content/view/8/31>)
- **Existenzgründer-Institut Berlin e.V.**  
Für Existenzgründer, mit offenem Forum zur Diskussion, Informationsveranstaltungen und Businessplan-Wettbewerb ([www.existenzgruender-institut.de](http://www.existenzgruender-institut.de))

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## ***Hotline in Germany***

- Das Bundesministerium für Wirtschaft und Technologie hat gemeinsam mit den Vorständen großer deutscher Banken eine Finanzierungs-Hotline eingerichtet.
- Unter der Telefonnummer **01888 615-8000** (Montag bis Freitag von 09:00 bis 16:00 Uhr) können sich kleinere und mittlere Unternehmen in Finanzierungs- und Förderfragen an zwölf besonders geschulte Experten des Bundeswirtschaftsministeriums, der KfW-Mittelstandsbank, der Sparkassen-Finanzgruppe und der Zentralinstitute der Genossenschaftsbanken wenden.
- Die Förderdatenbank des Bundes  
(<http://www.foerderdatenbank.de/Foerder-DB/Navigation/root,did=169564.html>)
- Europe: Gate2Growth.com – The Pan-European Gateway to Business & Innovation Financing  
(<http://www.gate2growth.com/>)

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## ***Gründerinitiativen - Foundation Initiatives***

- **Science4Life**  
Initiative der hessischen Landesregierung und Hoechst spezifisch auf die Bedürfnisse von Ideenträgern im Bereich *Life Sciences und Chemie* zugeschnitten. (<http://www.science4life.de>),  
Basis: alljährlich bundesweit ausgetragener *Businessplan-Wettbewerb Science4Life Business Forum*: Zugang zu Netzwerken, direkter Austausch von Informationen und Kooperationsmöglichkeiten
- **enable2start**  
Die Gründerinitiative der FINANCIAL TIMES DEUTSCHLAND  
(<http://www.enable.de/>);  
gute Kommentare zu typischen Problemen
- **Start2grow – verbunden mit Gründungswettbewerben**  
(<http://www.start2grow.de/de/home/>)  
Gründerinnen und Gründer bei der schnellen, fundierten Umsetzung ihrer Geschäftsidee und somit beim Aufbau eines eigenen Unternehmens zu unterstützen. Das kostenfreie Angebot von start2grow umfasst deshalb ein Coaching-Konzept. Ein Kernelement ist dabei der Know-how-Transfer durch das start2grow-Netzwerk - über 600 Fachleute stehen den Gründerinnen und Gründern als Coaches zur Verfügung; mit *Businessplan-Wettbewerb Business Plan Manual*  
(<http://www.start2grow.de/de/services/downloads/>); Handbuch, Muster, 5-Jahres-Planung (Excel)

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### ***Capital Investments – Some Examples***

- High-Tech Gründerfonds - Investoren:  
Bund, KfW-Bankengruppe, BASF, Telekom, Siemens  
(<http://www.high-tech-gruenderfonds.de/htgf/>;[http://www.gruendermagazin.com/existenzgruendung-index-56--118--high\\_tech\\_gruenderfonds.htm](http://www.gruendermagazin.com/existenzgruendung-index-56--118--high_tech_gruenderfonds.htm))
- KfW Mittelstandsbank  
Die KfW Mittelstandsbank bündelt nach eigenen Angaben alle Angebote für Gründer sowie kleine und mittlere Unternehmen  
(<http://www.kfw-mittelstandsbank.de>)
- MBG Mittelständische Beteiligungsgesellschaft Baden-Württemberg GmbH  
(<http://www.mbg.de/index.php>)
- Der Bundesverband Deutscher Kapitalbeteiligungsgesellschaften –  
German Private Equity and Venture Capital Association e.V. (BVK)  
(<http://www.bvk-ev.de/>)
- BAND (Business Angels Netzwerk Deutschland e.V.)  
([http://www.business-angels-forum.de/fs\\_index\\_d.html](http://www.business-angels-forum.de/fs_index_d.html))

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### ***Business Plan Competitions - Businessplan-Wettbewerbe (1)***

- Der Deutsche Gründerpreis – Startup  
bundesweit größter Gründungswettbewerb, der von den Sparkassen gemeinsam mit dem "Stern", dem ZDF, Porsche und McKinsey veranstaltet wird  
(<http://www.deutscher-gruenderpreis.de/>)
- Fünf Prämierungskategorien orientieren sich am Lebenszyklus eines Startups von der Gründung bis zum erfolgreichen Unternehmen
  - Konzept
  - Aufsteiger
  - Unternehmer
  - Visionär
  - Lebenswerk



Beispielhafte  
Fälle für Startups

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### ***Business Plan Competitions - Businessplan-Wettbewerbe (2)***

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- An opportunity to
  - Gain experience,
  - Visibility,
  - Money („Award“)
- Gründungszuschuss.de  
(<http://www.gruendungszuschuss.de/businessplan/weitere-themen/businessplanwettbewerbe.html>)
- Businessplan-Wettbewerb Berlin-Brandenburg (BPW);  
Videopräsentation der Preisträger; speziell BPW-Hochschulpreis  
(<http://www.b-p-w.de/2007/index.php>)
- Münchener Business Plan Wettbewerb (MBPW),  
(<http://www.gruendungszuschuss.de/businessplan/weitere-themen/businessplanwettbewerbe.html>)

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### ***GründerGuide - NewCome.de***

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- Existenzgründung und Unternehmensnachfolge in Baden-Württemberg  
(<http://www.newcome.de/existenzgruendung/index.php>)
  - Online-Handbuch
  - *Inkubatorenprogramm*: für 2-3 Jahre auf dem Campus, die Ressourcen der Hochschule oder der Forschungseinrichtung kostenlos oder kostengünstig nutzen
- Programmschwerpunkt „Start auf dem Campus“  
(<http://www.hochschulportal.newcome.de/hochschulen/index.php>)
- Junge Innovatoren: Existenzgründungen aus Hochschulen und Forschungseinrichtungen  
(<http://www.hochschulportal.newcome.de/hochschulen/Foerderprogramme/index.php?oid=9856>)
- u.v.m

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### ***Some Resources in the U.S.***

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- U.S. Small Business Administration (SBA)  
(<http://www.sba.gov/index.html>)
- Success Stories by Technology: Chemistry  
NASA: Small Business Innovation Research - Small Business  
Technology Transfer  
(<http://sbir.gsfc.nasa.gov/SBIR/successes/chemis.htm#open>)
- Entrepreneur.com  
<http://www.entrepreneur.com/>
- Entrepreneur-Web  
(Free Entrepreneur Personality Test)  
<http://www.entrepreneur-web.com/>
- Stanford: Entrepreneurship Education Resources;  
Stanford Technology Ventures Program  
Educational short videos on patents, licensing and  
technology, and much more (requires free-of-charge  
registration)  
<http://edcorner.stanford.edu>; <http://stvp.stanford.edu>
- Business Week: Small business news and advice  
(<http://www.businessweek.com/smallbiz/>)

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### ***More from the U.S.***

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- What lenders want to see in a loan proposal  
([http://www.bizjournals.com/SBA2007/startup\\_basics.html](http://www.bizjournals.com/SBA2007/startup_basics.html))
- SCORE (Counselors to America's Small Business), an SBA  
resource partner, has business-plan templates, but also other Excel,  
Word or PDF templates, such as
  - Bank Loan Request for Small Business
  - Balance Sheet (Projected)
  - Breakeven Analysis
  - Cash Flow Statement
  - Competitive Analysis
  - Start-Up Expenses
  - Profit and Loss Projection (3 Years)
  - Etc.([http://www.score.org/template\\_gallery.html](http://www.score.org/template_gallery.html))

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