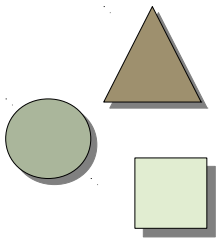
# 74. Relevance Analysis and Technology Transfer - How to Earn Money with Your PhD



Prof. Dr. rer. nat. Uwe Aßmann
Lehrstuhl Softwaretechnologie
Fakultät Informatik
TU Dresden
13-0.2, 14.01.14

1) Relevance Analysis and Value Proposition Analysis
2) Business Development
    1) BOA
    2) Business Cases
3) Forms of Technology Transfer
4) Push Transfer
5) Pull Transfer
6) Coopetition
7) Founding Startups





## References



[Osterwalder/Pigneur] Alexander Osterwalder. Ives Pigneur. Business Model Generation. Wiley. !Fantastic!

There is a preview available from the website http://www.businessmodelgeneration.com/book, do NOT miss it

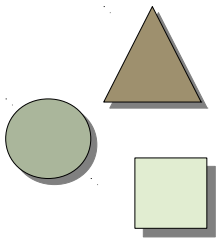
http://www.businessmodelgeneration.com/downloads/businessmodelgeneration_preview.pdf

[Maurya] Ash Maurya. Running Lean. Iterate from Plan A to a Plan That Works. O'Reilly. Excellent for Startup Founding.

[Carlson-Wilmot] Curtis R. Carlson, William W. Wilmot. Innovation. The Five Disciplines for Creating what Customers Want SRI International. Crown Business, US, 2006 !Excellent!

# 74.1 Relevance of Research







## How Relevant is a Research Problem?



- For selling: Distance to commercialization and product or service
- Age of problem
- Maturity of field: how long it has been investigated

# Value Proposition Analysis

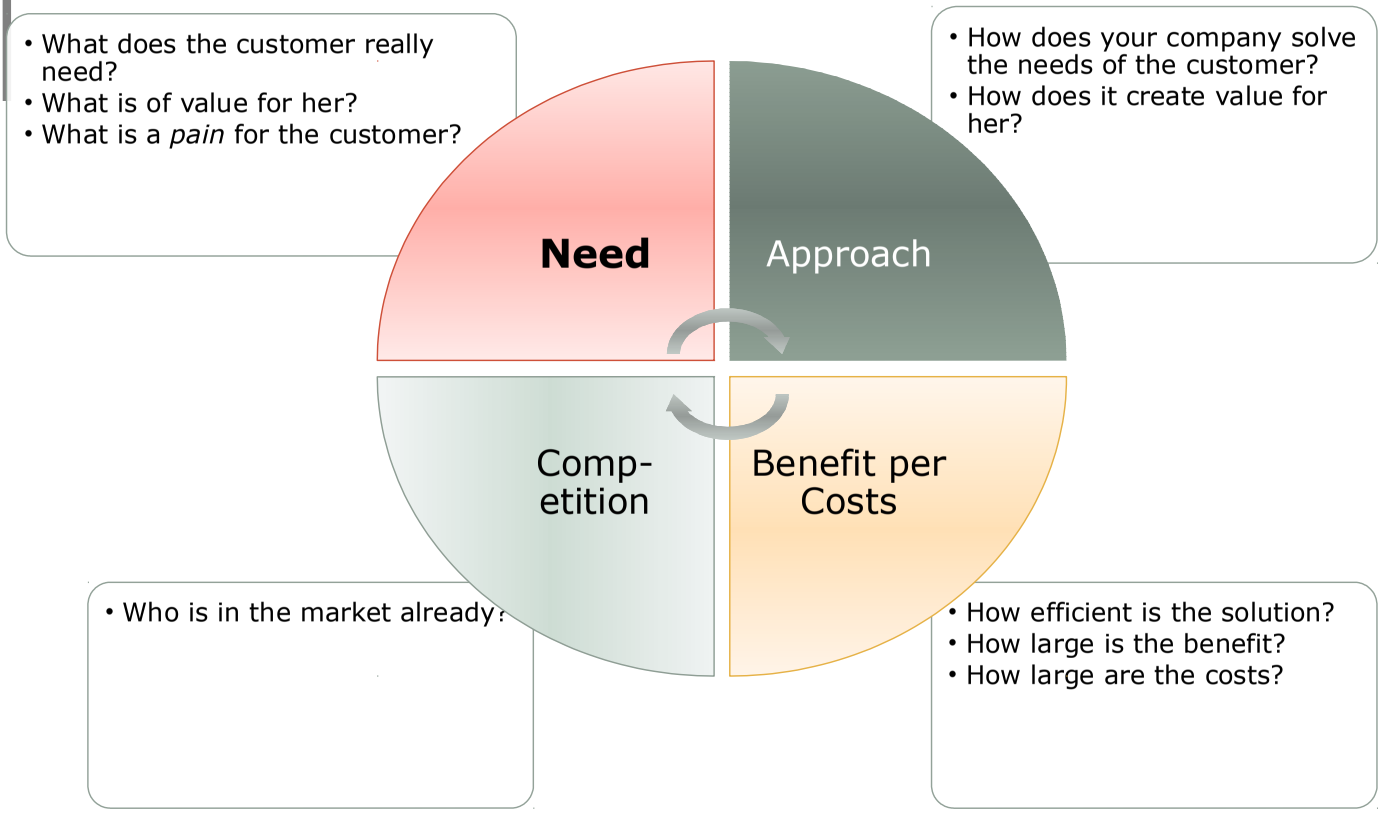


- VPA is similar to Problem/Goal Analysis, however, it thinks about the **pains** and the **gains** of the customer or target group.
  - Pains are problems that hurt the customer
- Usually, the goal is to reduce pain and improve gain.
- A VPA is important in the beginning of a Master's or PhD process, because it helps to clearify the scope of the work.
- For VPA, you may use
  - Pain-Gain-ZOPP
  - Innovation Scorecard
  - NABC from Carlson/Wilmot



# NABC Analysis [Carlson-Wilmot]






http://www.oulu.fi/english/sites/default/files/content/NABC_presentation.pdf

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- For preparing your next application for a job,
- Analyze the future employer with NABC
  - What are his needs?
  - What is your approach?
  - What is his benefits?
  - Who are your competitors?
- Learn the answers for these questions by heart, to be able to present them in the interview!




## 74.1.2 Strategic Analyses for Research

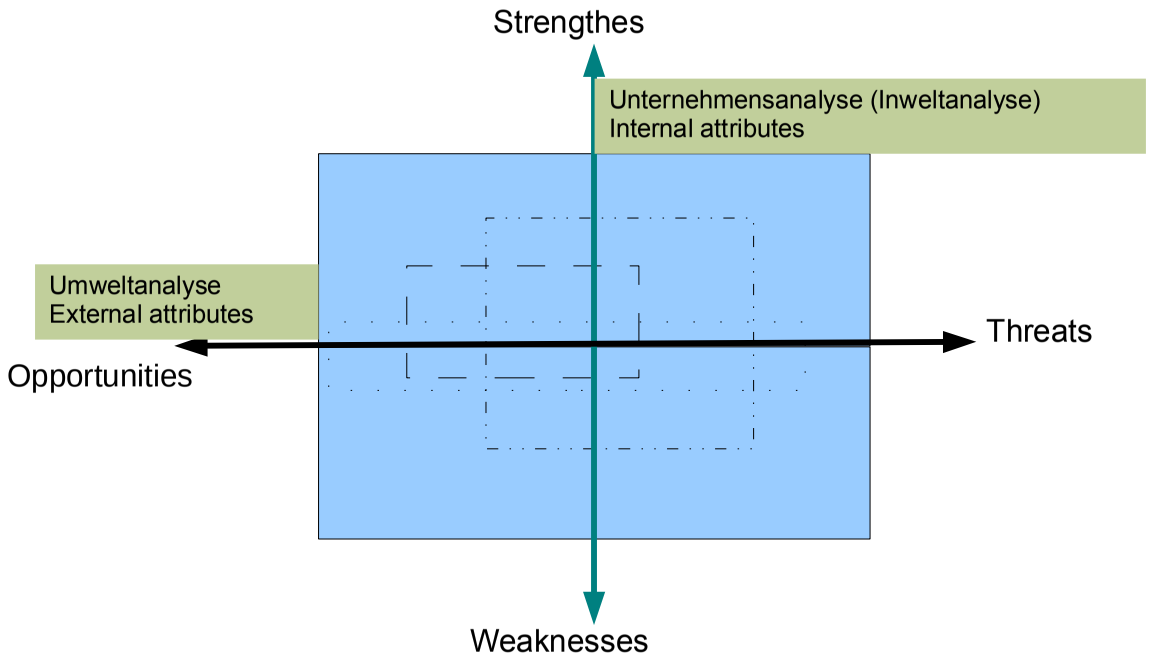


- Not all research is *relevant*
- Often, decisions have to be made about which way to go in research. Several general analysis for strategy can be used.
- [more material in course "Software Management (summer)"]

# SWOT Analysis for Research Relevance



- SWOT is a 4-dimensional attribute analysis for the development of a strategy for of a project [Albert Humphrey]
- For strategic decisions of your thesis and your research

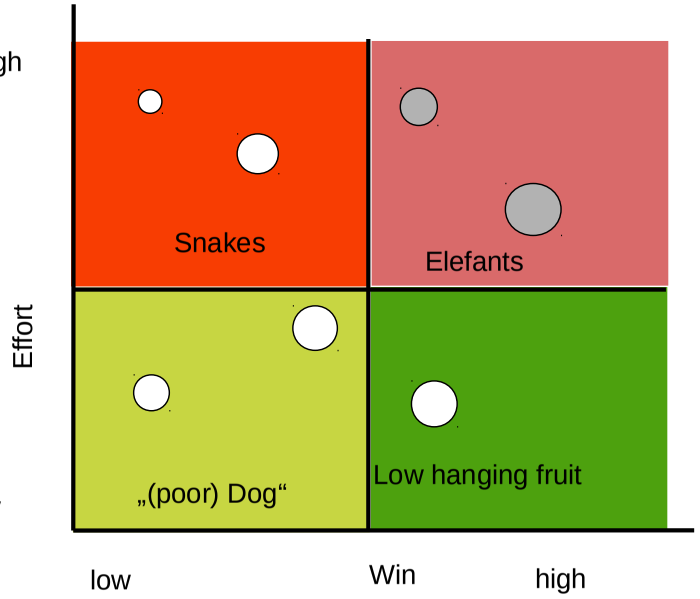





# „Low Hanging Fruit" Analyse



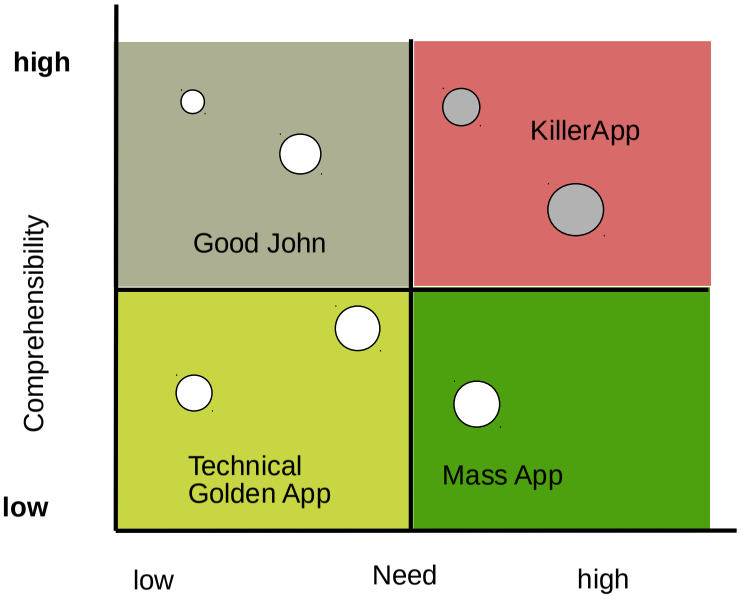
- **"low hanging fruit"-Analysis (Fruchtbarkeitsanalyse)** analyses the set of possible research questions and results in a research portfolio
- The **Cost-Utility-Product** is:
  - **Cost-utility-product** = Win*Effort
- Most attractive are **"low hanging fruits" (Abstaubertore)**, because they bring bit win with low effort
- **Dogs** questions can be investigated, but will not lead to anything
- **Snakes** kill immediately – never do research on them!
- **Elefants** kill your research and your life on the long term if you are not careful. But they can also be rewarding



# „KillerApp" Analysis (Attractivity Portfolio)



- Die **"KillerApp"-Analysis** investigates for a product or a research paper
  - whether it is needed
  - whether it is comprehensible
- the **Attractivity Product** is a Utility-utility-product:
  - **Attractivity** = Need * Comprehensibility
- Most attractive papers or projects are "KillerApps", because they are easy to comprehend and useful for many






# Home Work

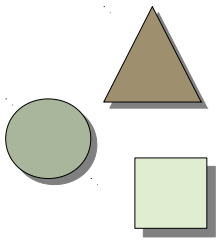


- Conduct a "low hanging fruit" analysis for the topic "Smart Grid"
- Conduct a "killer app analysis" for the topic Smart Grid
  - find a killer ap
  - find a golden technical app

# 74.2 Relevance for Others: Business Development



- .. from business opportunities to business cases..

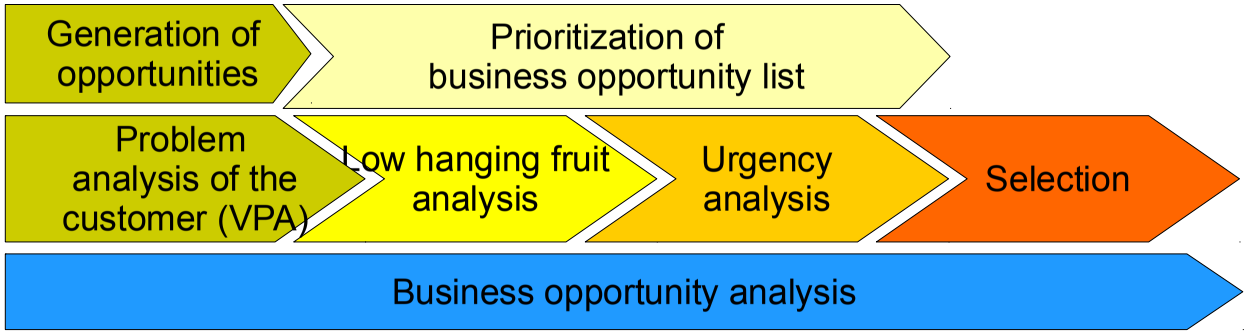




## 74.2.1. Business Opportunity Analysis (BOA) for Products and Services



- How to find interesting problems or objectives of a customer?
  - Aspect-oriented problem analysis such as SWOT-PROBLOSS or UCEW-PROBLOSS
  - Value-Proposition Analysis (VPA)
- This **business opportunity list** contains prospective opportunities to solve problems for the customer, and earn money
  - It must be prioritized according with other 2-D or multi-critiera analysis methods
- *Low-hanging-fruit analysis* finds out those products/services which are easiest reachable and are most business efficient
- *Eisenhower analysis (importance, urgency analysis)* finds out, how important or urgent the problems are for the customer.

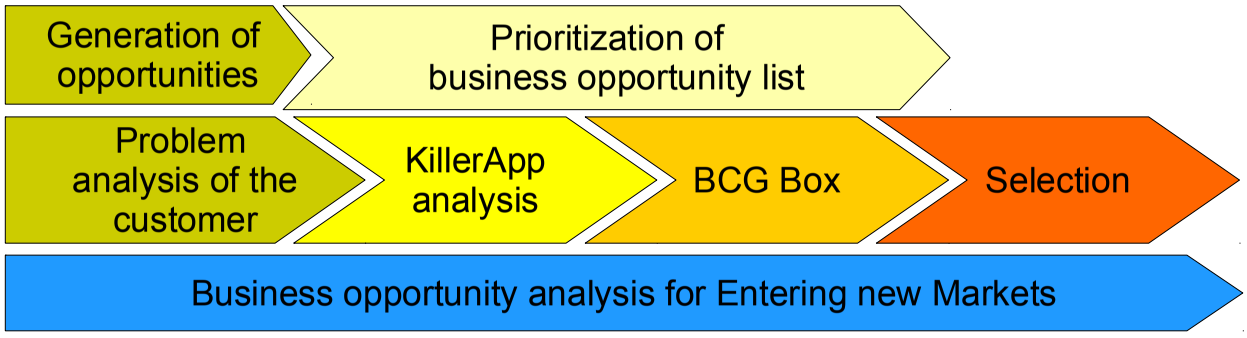


# Business Opportunity Analysis for Entering New Markets



- A **business opportunity lists** can also be constructed with
- *Killer-App analysis* finds out those products/services which are very attractive
- *BCB-Box analysis* finds out "cash cows" and "stars"



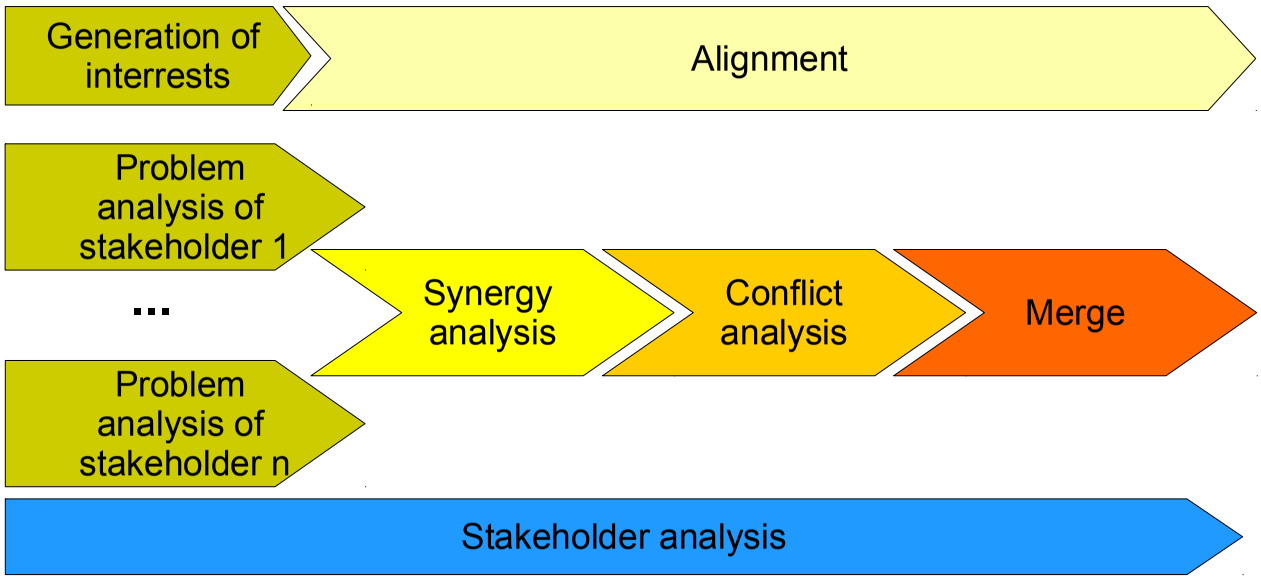



# Stakeholder Analysis in Requirements Engineering



- Also stakeholder analysis relies on aspect-oriented problem analysis.
- Here, the concerns (SWOT, UCEW, or Maslow) can be used to find **synergies and conflicts**. From these, a **merge** of the problem analysis result must be achieved





## Strategic Analysis

- For Start-Ups
  - Conduct AOPA with SWOT-PROBLOSS
  - Conduct a AOEA with UCEW-PROBLOSS
  - Do a Stakeholder analysis.
  - It will bring out new ideas for business and sort out conflicts between stakeholders.
  - Then do a business opportunity analysis for "low hanging fruits"
- For strategic project and product managers:
  - Do a regular aspect-oriented problem analysis for your markets.
  - After a certain time, re-check the success analysis.
- Companies entering new markets:
  - Identify in a business opportunity analysis with a KillerApp analysis the "Stars" and "KillerApps".
  - Avoid GoodJohns and TechnicalGoldenApps.





## 74.2.2 Business Cases (Geschäftsfall, -szenario)

Ein **Business Case (Geschäftsfall, Geschäftszenario)** plant betriebswirtschaftliche Kosten und Nutzen eines Geschäftsgelegenheit (business opportunity), sowie den Zeitpunkt der Wirtschaftlichkeit (Return-Of-Investment, ROI). [Wikipedia]

- Business Cases werden aus den Top-Level Business Opportunities entwickelt
- Synonyme:
  - Kosten-Nutzen-Analyse
  - Wirtschaftlichkeitsrechnung
  - Renditerechnung
  - Investitionsrechnung
- Ohne Wirtschaftlichkeitsrechnung tätigt man heute keine Investition

A **business case** captures the reasoning for initiating a project or task.
Whenever resources are consumed,
they should be in support of a specific business need.

# Inhalt einer Wirtschaftlichkeitsrechnung

in Form eines Papiers oder Präsentation

- Überblick (Thematik und Zielsetzung)
- Management Summary (kurz)
- Definition und Abgrenzung
- Kostenpositionen
- Wirtschaftliche Vorteile in Ressourcen und Geld
  - Kostenersparnis
  - finanzielle Vorteile der Handlung bzw. Entscheidung
- Nicht-monetäre Aspekte (Risiken und Nutzenaspekte)
- Bewertung
- Empfehlung, Entscheidungsvorlage





- Oft werden eingesetzt:
- SMART
- SWOT-Analyse
- UCEW-Analyse
- BSC

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- For writing of proposals, these analyses are very important:
  - relevance analysis
  - value proposition analysis
  - strategic analysis
  - innovation scorecard



# 74.3 Technology Transfer

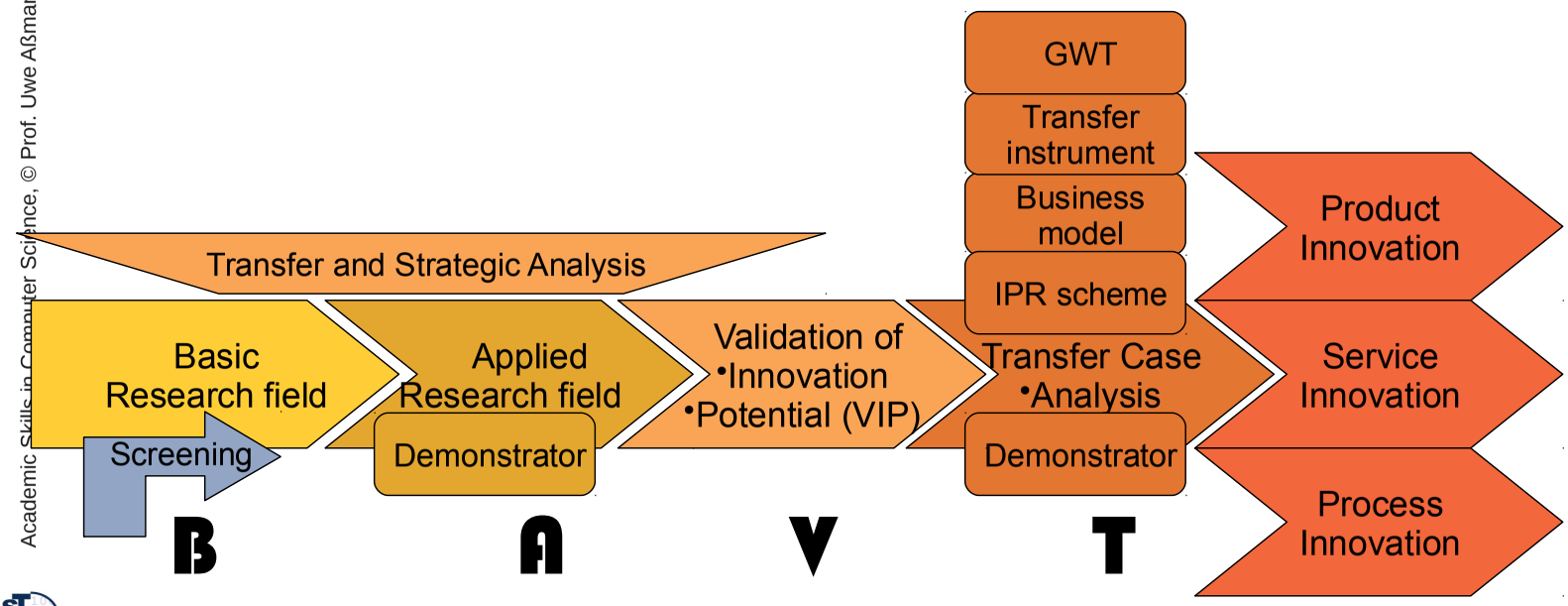


- How to organize transfer projects from which products can be commercialized

# The Generic Transfer Process



- Transfer fields must be *matchmaked* with applied and basic research fields
- So that a concrete transfer process can be installed

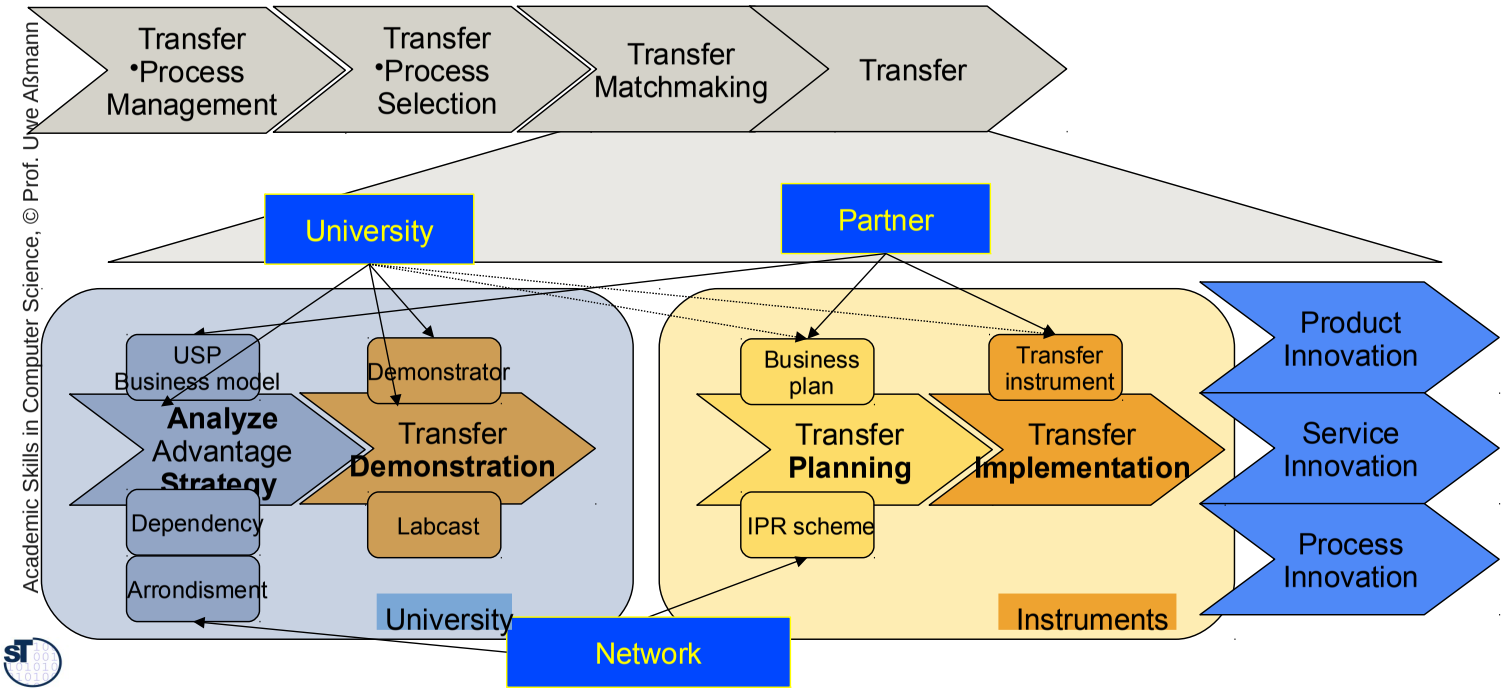





# 74.3.1. Push Technology Transfer Process

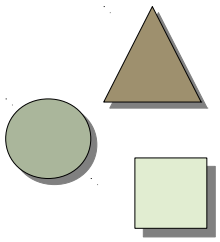


- **Push technology transfer process** operates in **phases** in concert with several partners.
- Companies are searched who realize innovation.



# 74.3.2. Specific Push Transfer Processes

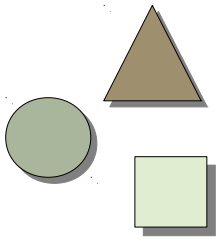






# 74.3.2.1. Push Transfer Process with VIP

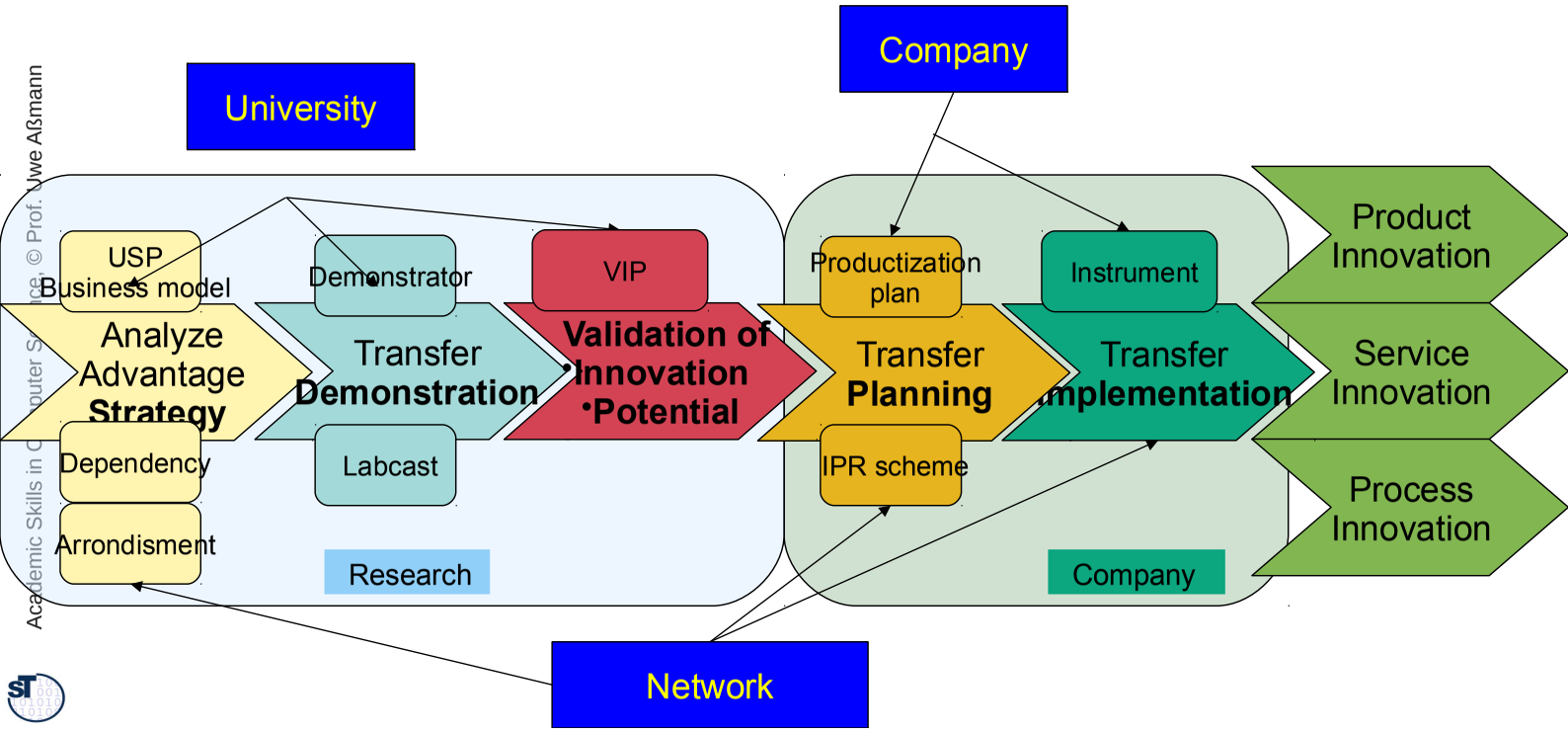




# Push Transfer Process with VIP



- University prepares transfer with VIP project; company waits






# VIP Unique Selling Points for Software Machine Tools



- For a Software Machine Tool (Software-Werkzeugmaschine) kann VIP
  - Neue Funktionalitäten erweitern
  - Neue Anwendungsdomänen erschließen (use cases)
- Es ergibt sich eine Kreuzmatrix von domänenspezifischen Anwendungsfunktionalitäten (Werkzeug-Use Cases)

| Tool Use Cases Domäne 1 | Domäne 2 | Domain 3 | |
|---|---|---|---|
| Function A | | Company b | |
| Function B | Company a | | |
| Function C | | Company c | |

# Wann wird ein Tool zu einer Plattform?



- Wenn der Nutzen, die Fremd-Komplemente aus ihm ziehen, groß ist
- Wenn man nicht nur Einzel-Komplemente hat, sondern ganze Ökosysteme (Märkte)
  - Viele Tools erzeugen keine Märkte, sondern einzelne Anwendungen, die isoliert verwendet werden.

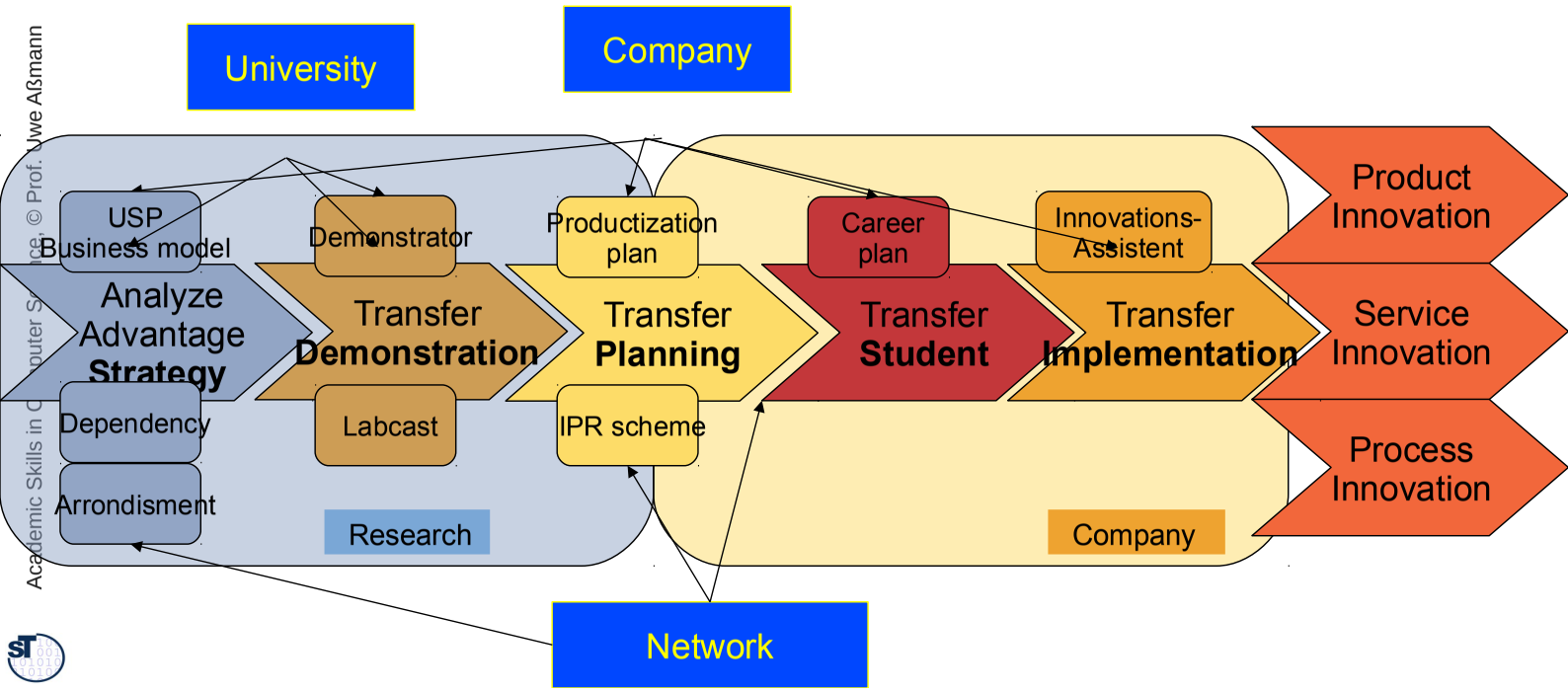


# 74.3.2.2. Personal Transfer Process (PTP)

# Personal Transfer Process



- **Personal transfer process** transfers students into existing business fields
- Light-weight process
- Advantage: extending a product

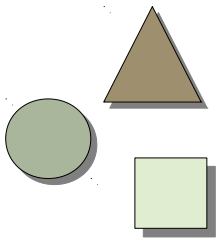





# ESF Innovationsassistent

# 74.4 Pull Transfer Processes







## 74.6.1 Industriepromotion (Industrial PhD), z.B. Europäischer Sozial Fond ESF)



- PhD student gets a topic relevant for a company
  - works part time for the company
  - is paid 50% by the company
- Examples
  - Georg Püschel

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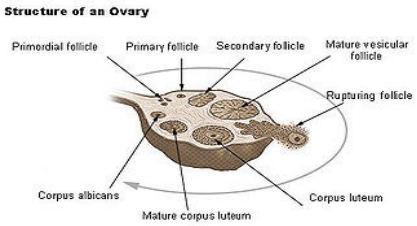
# Pull Cell Transfer Processes



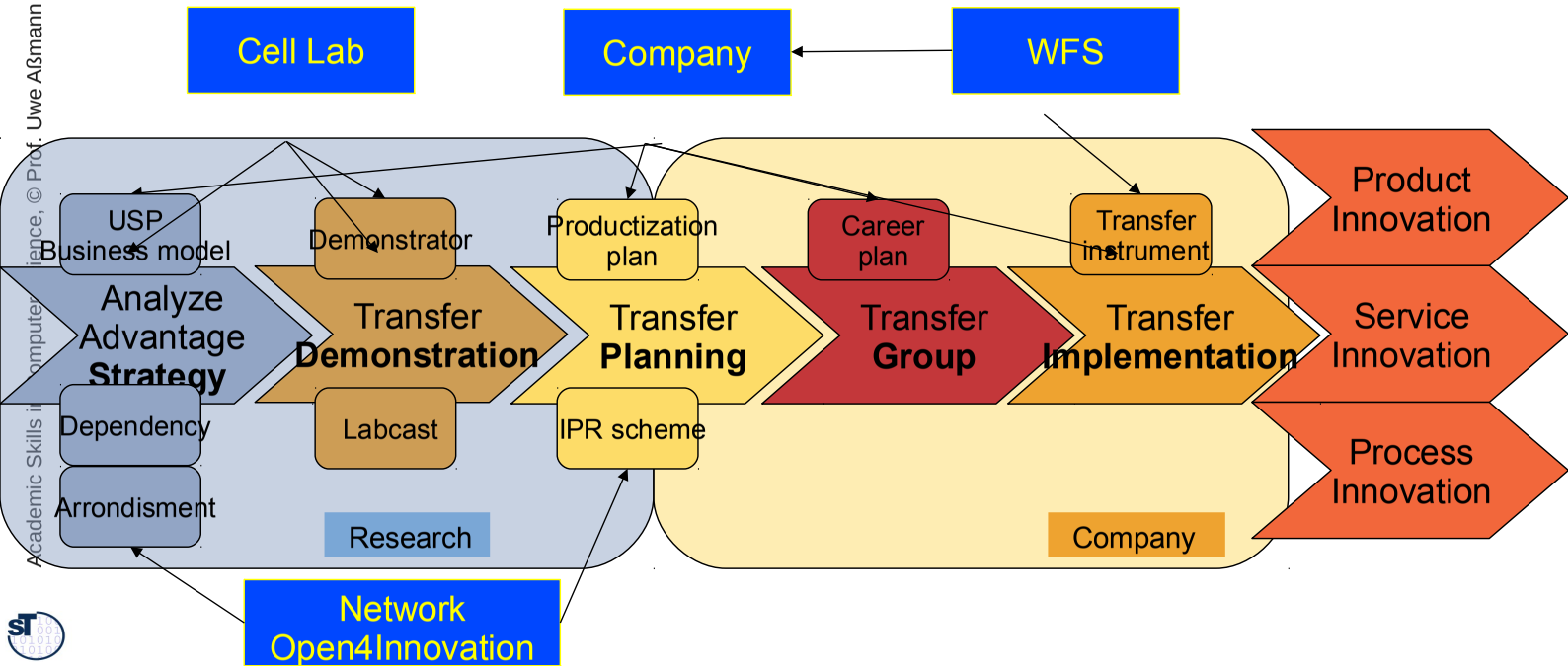





## 74.6.2 Pull Cell Transfer Process

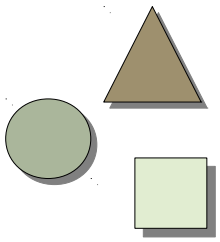


- Cell transfer process creates new fields for companies
- Transfers focussed junior research groups together with topic („Cell")



# 74.6.3 Common Research Projects (Verbundprojekte)







## EU, BMBF



- Horizon 2020 mit Innoprozess
- Beispiele erfolgreichen Transfers

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# Overview Transfer Instruments



- Sächsische Instrumente
  - Master's thesis with Innovationsassistent
  - InnoPrämie (10kEuro pro Jahr)
  - ESF Industriepromotion
  - Innovationsberatung für KMU
- BMWI
  - ZIM
- BMBF
  - KMU-initiativ
  - VIP
  - BMBF exist





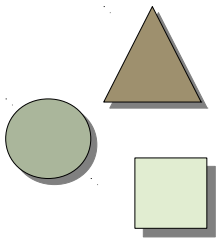
# Example: Software Productization Center for Transfer



- Millersville Software Productization Center Pennsylvania
  http://www.millersville.edu/spc/
- The mission of the Software Productization Center (SPC) at Millersville University is to provide emerging technology-focused entrepreneurs within the Central Pennsylvania region with assistance in advancing software products from concept to marketable product. The Center will accomplish this mission utilizing faculty expertise, the assistance of student interns from various disciplines, and support from community business leaders and technology experts. The Center will:
  - Serve regional economic and community development needs
  - Enhance the quality of instruction and learning resources available to students
  - Link the University community to regional business, government, and nonprofit resources

# 74.5 Coopetition and Collaborative Networks

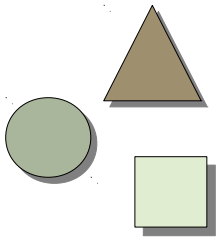






# 74.5.1 Innovation Clusters aggregate Clustered (Colored) Value Chains

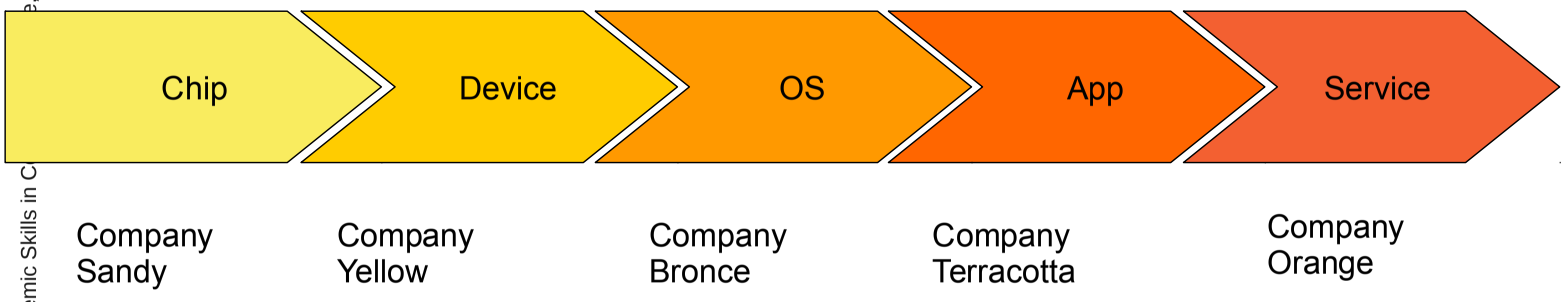




# Innovation Clusters aggregate Colored Value Chains



- An **innovation cluster aggregates** a **colored value chain** with companies grouped to an application field
  - Product-structured colored value chain
  - Process-structured colored value chain



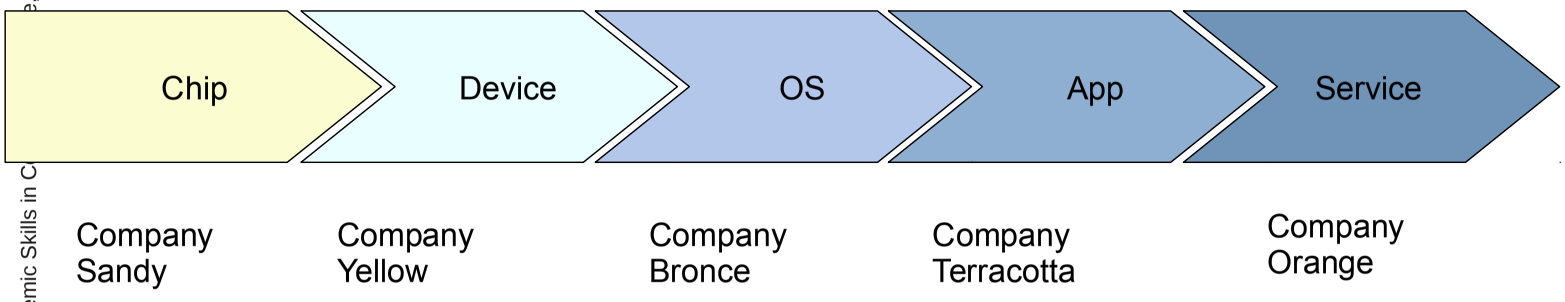



# Creating Colored Value Chains



- Blueprints for Colored Value Chains should be asked in Delphi studies
  - Web community
  - Matchmaking system

» Wie erzeugt man Benefit für alle? (Motivationssystem)



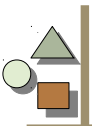
# A Process to Create Innovation Clusters



- The process needs matchmaking of the cluster partners for the value chain
- **Cluster leader**: drums cluster together
  - Starting from a blueprint of a CVC
  - Does Delphi studies for innovation field
- Clustering IT-system
  - Simplifies Delphi studies
  - Fragebogenaktionen mit Review-System
  - Web 2.0 community a la itsax.de
- Cluster leader drums together a CVC for companies
  - Company as cluster leader
  - O4I as cluster leader




# 74.8. Founding Startups

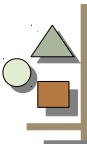


## Dresden EXISTS



- Beispiele





## Working with GWT



- As a bridge to industry contacts



# The End