71. Diffusion of Research - Demonstrating of the Technology of a PhD

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http://st.inf.tu-dresden.de/teaching/asics

1) Technology Dossiers of the group
2) Demo Booths
3) Demonstration and Technology Transfer
4) Demonstration at Transfer Workshops

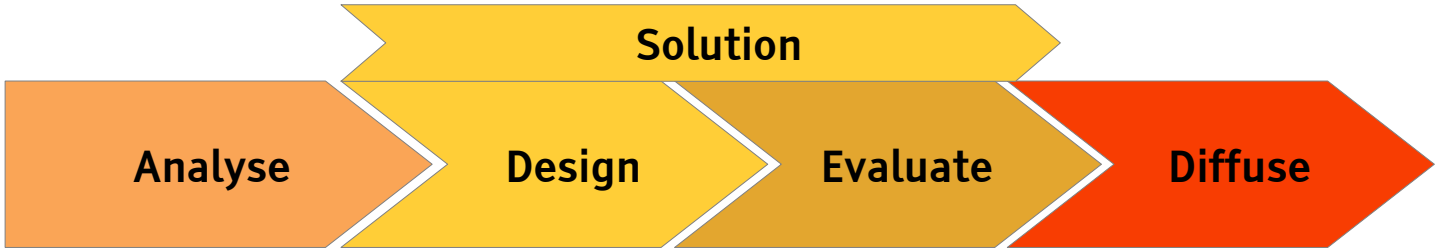
DRESDEN concept
Exzellenz aus Wissenschaft und Kultur

Literature

- [Carlson-Wilmot] Curtis R. Carlson, William W. Wilmot. Innovation. The Five Disciplines for Creating what Customers Want SRI International. Crown Business, US, 2006 !Excellent!
- [Maurya] Ash Maurya. Running Lean. Iterate from Plan A to a Plan That Works. O'Reilly. Excellent for Startup Founding.

Remember:
Standard Research Process ADED [Österle/Otto]

- [Hubert Österle, Boris Otto. A Method For Consortial Research. Report No. BE HSG/ CC CDQ/ 6, University of St. Gallen http://works.bepress.com/hubert_oesterle/196/]
- **Analyse** existing technologies, literature, background, problems
- **Design** new technologies (new solution)
  - Think, Research and develop
- **Evaluate** technologies (new solution)
  - Show why the new technology is superior; use success criteria
- **Diffuse** (publish and demonstrate)
  - Demonstration for creating a vision
  - Find out for whom your research is relevant
  - Popularize (position) your research results
  - Be a „visible scientist“



Why Is It Important to Diffuse and Demonstrate?

Satisfaction
Nothing is more rewarding than people who are interested

Maturity

Maturity of software
Maturity of concept and idea
Clearification of relevance

Publications
Demo can be a start of a paper

•**For the PhD student**

•**For the group**

Collaborative Research

• Demonstrating the ability to collaborate in integrated projects

Validation of innovation potential (VIP)
• is my research result really relevant for customers?
•which Need does it fill (NABC)?
•is it a pain killer?

Building up a trademark

showing long-term competence
Improve ability to get grants

71.1 Relevance of Research and Value Proposition Analysis

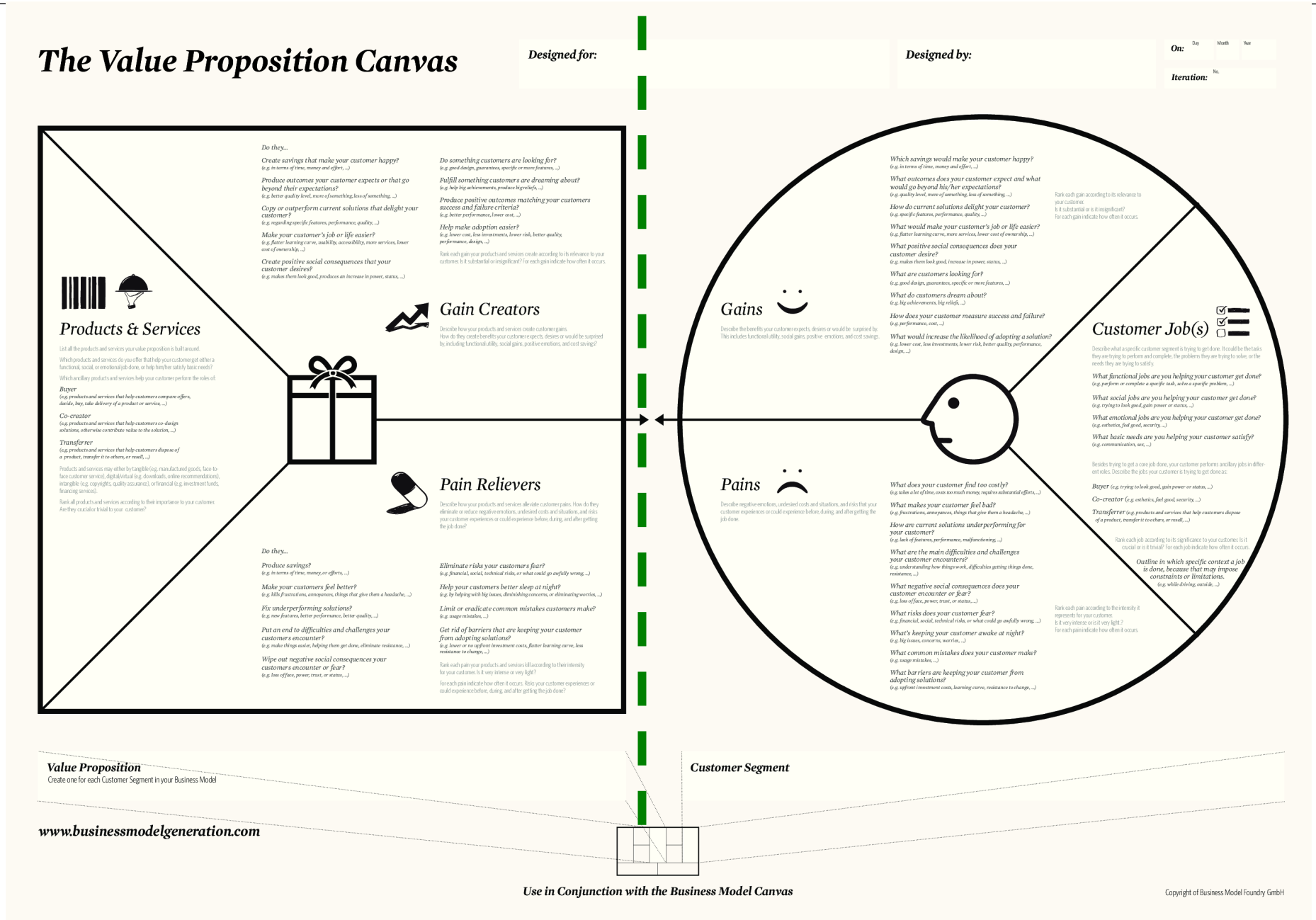
- "Why should I spend 10000 bucks for your research result?"

How Relevant is a Research Problem?

- For researchers:
  - How large is the community that will be interested in your results?
- For selling:
  - How large is the distance to commercialization and product or service
- For startup founders:
  - How *viral* (sticky) is the idea?
- How well-studied is the research area?
  - Age of problem
  - Maturity of field: how long it has been investigated?

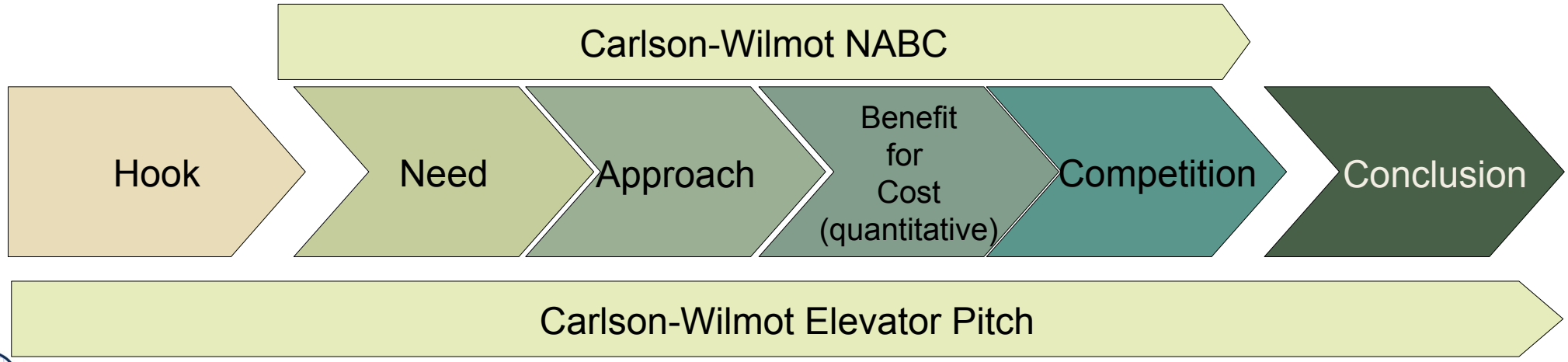
Value Proposition Analysis (VPA)

- VPA is a specific Problem/Goal Analysis for the users, customers and clients of your technology
- 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 for *scoping:*
  - in the beginning, in the middle, and also after a Master's or PhD process,
  - it helps to clearify the scope of the work.
- For VPA, you may use
  - Value Proposition Canvas of Osterwalder
  - Pain-Gain-ZOPP
  - B-POPP
  - Innovation Scorecard
  - NABC from Carlson/Wilmot


The Value Proposition Canvas
Designed for:
Designed by:
On: Day Month Year
Iteration: No.
Products & Services
List all the products and services your value proposition is built around.
Which products and services do you offer that help your customer get either a functional, social, or emotional job done, or help him/her satisfy basic needs?
Which ancillary products and services help your customer perform the roles of:
Buyer
(e.g. products and services that help customers compare offers, decide, buy, take delivery of a product or service, ...)
Co-creator
(e.g. products and services that help customers co-design solutions, otherwise contribute value to the solution, ...)
Transferrer
(e.g. products and services that help customers dispose of a product, transfer it to others, or resell, ...)
Products and services may either by tangible (e.g. manufactured goods, face-to-face customer service), digital/virtual (e.g. downloads, online recommendations), intangible (e.g. copyrights, quality assurance), or financial (e.g. investment funds, financing services).
Rank all products and services according to their importance to your customer. Are they crucial or trivial to your customer?
Do they...
Create savings that make your customer happy?
(e.g. in terms of time, money and effort, ...)
Produce outcomes your customer expects or that go beyond their expectations?
(e.g. better quality level, more of something, less of something, ...)
Copy or outperform current solutions that delight your customer?
(e.g. regarding specific features, performance, quality, ...)
Make your customer's job or life easier?
(e.g. flatter learning curve, usability, accessibility, more services, lower cost of ownership, ...)
Create positive social consequences that your customer desires?
(e.g. makes them look good, produces an increase in power, status, ...)
Gain Creators
Describe how your products and services create customer gains.
How do they create benefits your customer expects, desires or would be surprised by, including functional utility, social gains, positive emotions, and cost savings?
Do something customers are looking for?
(e.g. good design, guarantees, specific or more features, ...)
Fulfill something customers are dreaming about?
(e.g. help big achievements, produce big reliefs, ...)
Produce positive outcomes matching your customers success and failure criteria?
(e.g. better performance, lower cost, ...)
Help make adoption easier?
(e.g. lower cost, less investments, lower risk, better quality, performance, design, ...)
Rank each gain your products and services create according to its relevance to your customer. Is it substantial or insignificant? For each gain indicate how often it occurs.
Pain Relievers
Describe how your products and services alleviate customer pains. How do they eliminate or reduce negative emotions, undesired costs and situations, and risks your customer experiences or could experience before, during, and after getting the job done?
Do they...
Produce savings?
(e.g. in terms of time, money, or efforts, ...)
Make your customers feel better?
(e.g. kills frustrations, annoyances, things that give them a headache, ...)
Fix underperforming solutions?
(e.g. new features, better performance, better quality, ...)
Put an end to difficulties and challenges your customers encounter?
(e.g. make things easier, helping them get done, eliminate resistance, ...)
Wipe out negative social consequences your customers encounter or fear?
(e.g. loss of face, power, trust, or status, ...)
Eliminate risks your customers fear?
(e.g. financial, social, technical risks, or what could go awfully wrong, ...)
Help your customers better sleep at night?
(e.g. by helping with big issues, diminishing concerns, or eliminating worries, ...)
Limit or eradicate common mistakes customers make?
(e.g. usage mistakes, ...)
Get rid of barriers that are keeping your customer from adopting solutions?
(e.g. lower or no upfront investment costs, flatter learning curve, less resistance to change, ...)
Rank each pain your products and services kill according to their intensity for your customer. Is it very intense or very light?
For each pain indicate how often it occurs. Risks your customer experiences or could experience before, during, and after getting the job done?
Gains
Describe the benefits your customer expects, desires or would be surprised by. This includes functional utility, social gains, positive emotions, and cost savings.
Which savings would make your customer happy?
(e.g. in terms of time, money and effort, ...)
What outcomes does your customer expect and what would go beyond his/her expectations?
(e.g. quality level, more of something, less of something, ...)
How do current solutions delight your customer?
(e.g. specific features, performance, quality, ...)
What would make your customer's job or life easier?
(e.g. flatter learning curve, more services, lower cost of ownership, ...)
What positive social consequences does your customer desire?
(e.g. makes them look good, increase in power, status, ...)
What are customers looking for?
(e.g. good design, guarantees, specific or more features, ...)
What do customers dream about?
(e.g. big achievements, big reliefs, ...)
How does your customer measure success and failure?
(e.g. performance, cost, ...)
What would increase the likelihood of adopting a solution?
(e.g. lower cost, less investments, lower risk, better quality, performance, design, ...)
Rank each gain according to its relevance to your customer. Is it substantial or is it insignificant? For each gain indicate how often it occurs.
Customer Job(s)
Describe what a specific customer segment is trying to get done. It could be the tasks they are trying to perform and complete, the problems they are trying to solve, or the needs they are trying to satisfy.
What functional jobs are you helping your customer get done?
(e.g. perform or complete a specific task, solve a specific problem, ...)
What social jobs are you helping your customer get done?
(e.g. trying to look good, gain power or status, ...)
What emotional jobs are you helping your customer get done?
(e.g. esthetics, feel good, security, ...)
What basic needs are you helping your customer satisfy?
(e.g. communication, sex, ...)
Besides trying to get a core job done, your customer performs ancillary jobs in different roles. Describe the jobs your customer is trying to get done as:
Buyer (e.g. trying to look good, gain power or status, ...)
Co-creator (e.g. esthetics, feel good, security, ...)
Transferrer (e.g. products and services that help customers dispose of a product, transfer it to others, or resell, ...)
Rank each job according to its significance to your customer. Is it crucial or is it trivial? For each job indicate how often it occurs.
Outline in which specific context a job is done, because that may impose constraints or limitations.
(e.g. while driving, outside, ...)
Pains
Describe negative emotions, undesired costs and situations, and risks that your customer experiences or could experience before, during, and after getting the job done.
What does your customer find too costly?
(e.g. takes a lot of time, costs too much money, requires substantial efforts, ...)
What makes your customer feel bad?
(e.g. frustrations, annoyances, things that give them a headache, ...)
How are current solutions underperforming for your customer?
(e.g. lack of features, performance, malfunctioning, ...)
What are the main difficulties and challenges your customer encounters?
(e.g. understanding how things work, difficulties getting things done, resistance, ...)
What negative social consequences does your customer encounter or fear?
(e.g. loss of face, power, trust, or status, ...)
What risks does your customer fear?
(e.g. financial, social, technical risks, or what could go awfully wrong, ...)
What's keeping your customer awake at night?
(e.g. big issues, concerns, worries, ...)
What common mistakes does your customer make?
(e.g. usage mistakes, ...)
What barriers are keeping your customer from adopting solutions?
(e.g. upfront investment costs, learning curve, resistance to change, ...)
Rank each pain according to the intensity it represents for your customer. Is it very intense or is it very light ? For each pain indicate how often it occurs.
Value Proposition
Create one for each Customer Segment in your Business Model
Customer Segment
www.businessmodelgeneration.com
Use in Conjunction with the Business Model Canvas
Copyright of Business Model Foundry GmbH

Rpt. From Ch. POA) NABC Elevator Pitches

- An **elevator pitch** is a 2-minute speech about the nABC of your project
- You should be able to tell it
  - an important investor in an elevator (2 min)
  - your professor
  - your grandmother
- It combines a problem solving scheme with a hook, a gripping introductory remark.
- Very good: use nABC with a hook and quantitative benefit-for-cost.
- my solution is 30% better than the competitors'



71.2 How to Organize a Demonstration (Demo) at a Demo Booth

Demos at Reviews

- Many research projects conduct *reviews,* regular investigations about the status of the project
  - EU: usually every year
  - BMBF: as a final reviews
  - DFG: most often written
    - Sonderforschungsbereiche: every 4 years
- At these reviews, the research results of the project have to be demonstrated at demo booths
  - together with a A0 poster

Storyboards

- A good demo is carefully planned because it has a firm deadline to fit into the pressed agenda of the review day
- It does not have to waste a minute and must be carefully
  - exercised
  - pedagocically elaborated
- A **storyboard** is a linear outline of what to show when in the demo (with minutes)
  - Min. 0-2: explain slide 1
  - MIn 2-5: rund shell script run.bat and explain the window 1 which appears
  - Min 6-8: edit file dat.out, color it with emacs and show pattern
  - Min 8-9: execute modified dat.out with tool
  - Min 10: show image generated by tool
- Training phase 1: run demo
- Traning phase 2: run demo with watch to measure time and train wording to meet the time

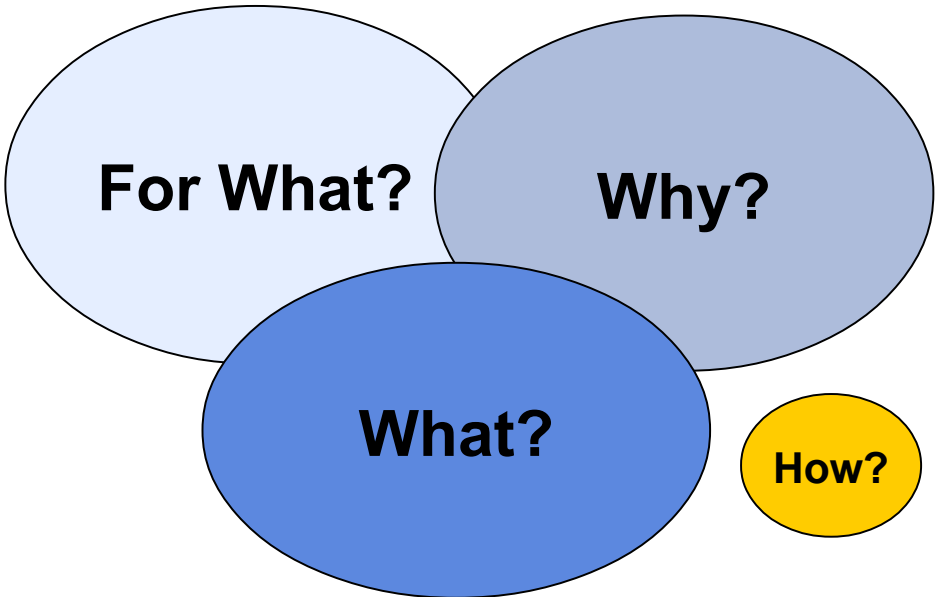
Example of Demo Storyboard in Markdown [René Schöne]

- ### The actual demo (format: Markdown .md)
- a) Explain the SLAM example -- takes 4 to 6 min
  - a.1 Show hardware setup (CB+Switch+USB_charging_hub) at **?**
  - a.2 Show what is happening at **slam-vis** and what can be seen in visualization at **slam-vis**
- b) Using mquat-vis/qBench -- takes 7 min
  - b.1 Explain kinds of models used (structure, variant, behaviour) at **BackupSlides**
  - b.2 Show SW structure model at **qBench or maybe mquat-vis**
  - b.3 Show HW variant model at **mquat-vis: Available Resources**
  - b.4 Show impl at **mquat-vis: Code**
  - b.5 Show contract template at **mquat-vis: Contract Template**
  - b.6 Show benchmark at **mquat-vis: Benchmark**
  - b.7 Show contract (after benchmark) at **mquat-vis: Contract**
- c) Using THEATRE (console) -- takes 2 min
  - c.1 Show architecture/parts of THEATRE (as of the poster) at **poster**
  - c.2 Show console, and what is happening upon a request at **console** and **poster**

71.4 Poster

Posters - The EPFL 4-step Process

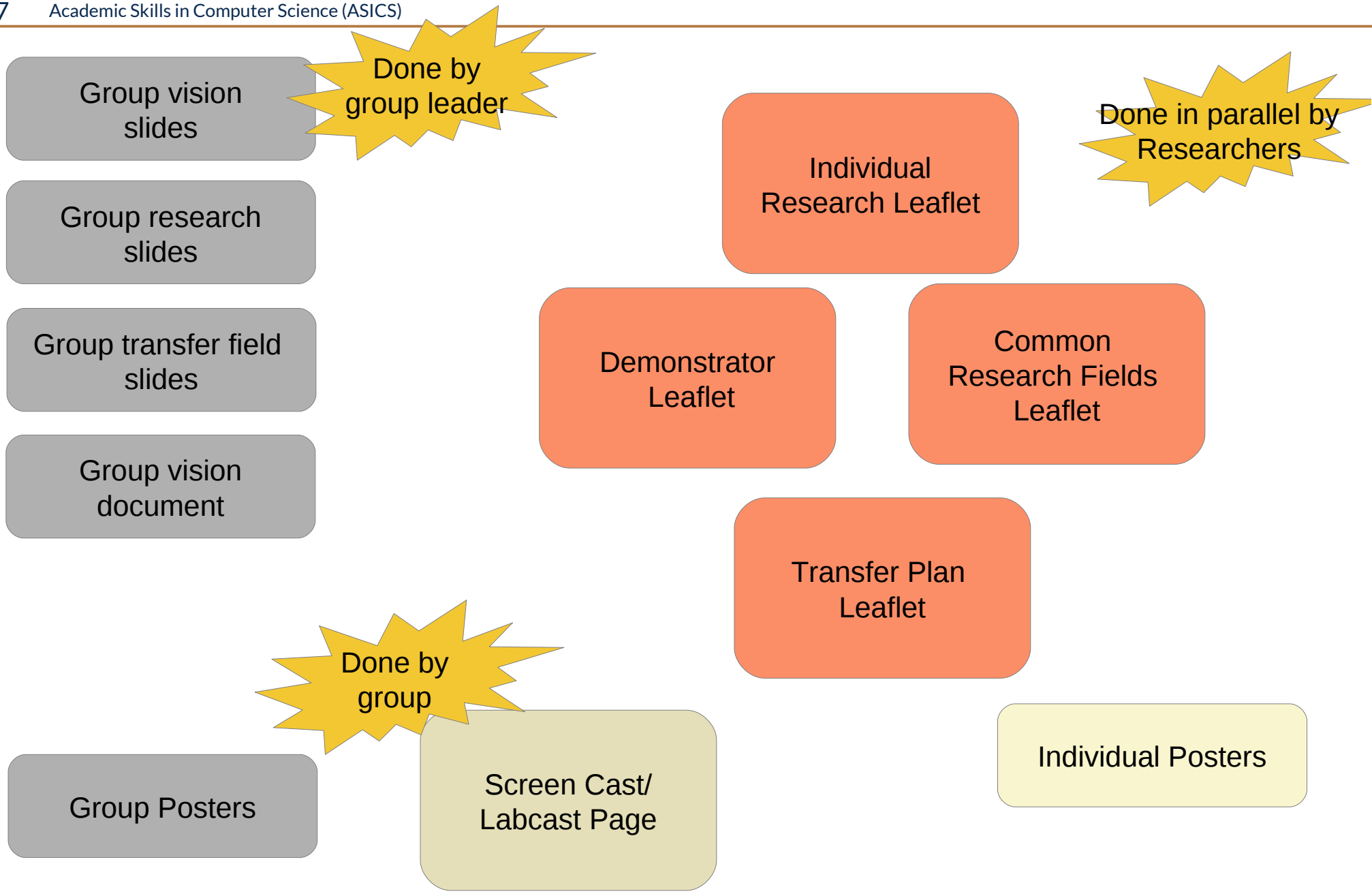
- http://en.wikipedia.org/wiki/Poster_session
- [G. Regev, A. Oberlin, G. P®coud, A. Wegmann. EPFL Poster Guidelines. Dec. 2005.]
  - Source: http://www.upc.edu/gessi/re08/DOCUMENTS/poster_guideline.pdf
- The EPFL 4-step process:
- 1. Message and its audience
  - Separate the WHAT? From the WHY? and the FOR WHAT? From the HOW?
  - And the HOW? Is technically interesting, but for many visitors unimportant
- 2. Comprehensible structure with structure patterns:
  - 7 wise servants in a 7 step
  - 4 step nABC
  - 5 step ZOPP
- 3. Visualizing the text
- 4. Testing the poster



71.5 The Technology Dossiers of the Researcher's Group

- For Master's and PhD students

Technology Dossiers of Your Research Group



Requirements for Researchers

- Every group needs to produce some **technology dossiers (Leaflets):**
  - **Individual Research Summary Leaflet (research summaries)** with 1-page research summary per PhD student and Masters student
  - **Demonstrator Leaflet** with 1-page description per demonstrator
  - **Transfer Plan Leaflet** with 1-page transfer plan per PhD student (internal and for industry; to be done in year 3)
- Every PhD and Master's student needs to produce in-lets for technology dossiers of the group (1-page research descriptions)
- These are produced in parallel with the same outline and assembled automatically into a dossier (by LaTex compilation)
- Others:
  - **Poster** set for exhibitions, poster sessions, and the hallway
- This dossier is done by subgroups, i.e., by people who team up for a project in the group:
  - **Project Research Fields Leaflet:** 1-page description of common research field between people in the group, usually in a research project.
    - This can also be arranged together with collaborating partners

Pattern for 1-page Description of Research Summary

- Name
- Comprehensible Figure or Image of the Problem or Technology
- Problem description
- Objective
- Solution (approach)
- Showcase summary (Story)
- Economic Value
-
- Contact Information: email, telephone, web, QR code, ...

- ST group template available as LaTex
- Example: ResUbic Lab Research Summary Dossier

Pattern for 1-page Description of Technology Demonstrator

- Name
- Comprehensible Figure or Image of the Problem or Technology
- Showcase summary (Story)
- Economic Value
- Contact Information

Pattern for 1-page Poster

- Name, Project, Foto of Author
- Comprehensible Figure or Image of the Problem or Technology
- Showcase summary (Story)
- Economic Value

- HAEC template available as LaTeX
- Example: HAEC posters, cfAED posters
- Poster guideline of EPFL
-
- http://www.uts.edu.au/sites/default/files/guidelines-for-posters.pdf
-
- http://www.lib.uts.edu.au/sites/default/files/attachments/page/Academic%20Writing%20Guide%20Part%204%20-%20Research%20Writing.pdf

Screencasts for Demoing Tools

- Screencasts are good ways how to show running tools, case studies, experiments.
- They can be set up on the web and disseminate your research results.
- Screencasts
  - stay valid for several years, longer than a software prototype
  - can be collected easily on the web site of your project or your group, to show the activity of the group
- Example
  - http://www.emftext.org/index.php/EMFText_Getting_Started_Screencast

- http://en.wikipedia.org/wiki/Comparison_of_screencasting_software

Labcasts

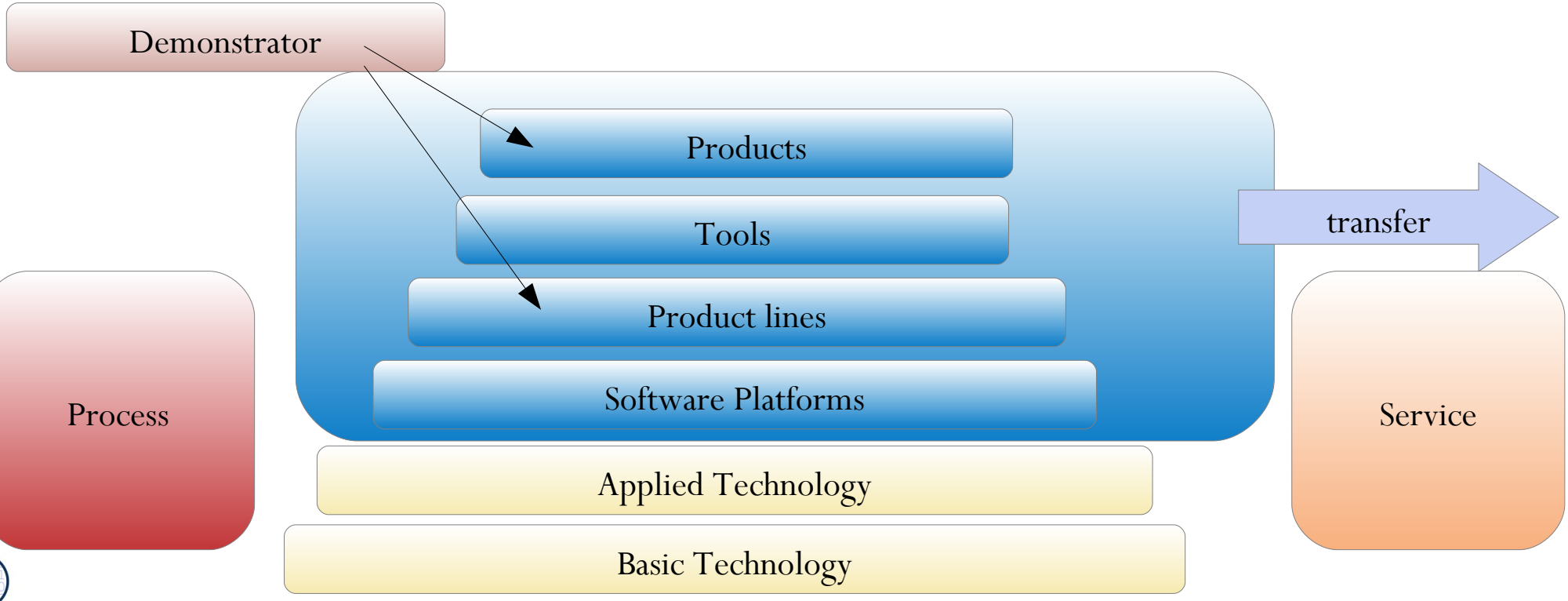
- Some groups manage to create “labcasts”, lab videos.
- http://labcasts.media.mit.edu has a wonderful collection
- http://resubic.inf.tu-dresden.de/?page_id=465 is the current state of the labcast page of the ResUbic Lab

71.3. Demonstration and Technology Transfer

- For a defense, you must demonstrate your technology, your research results
- You should prepare this carefully during the entire thesis process

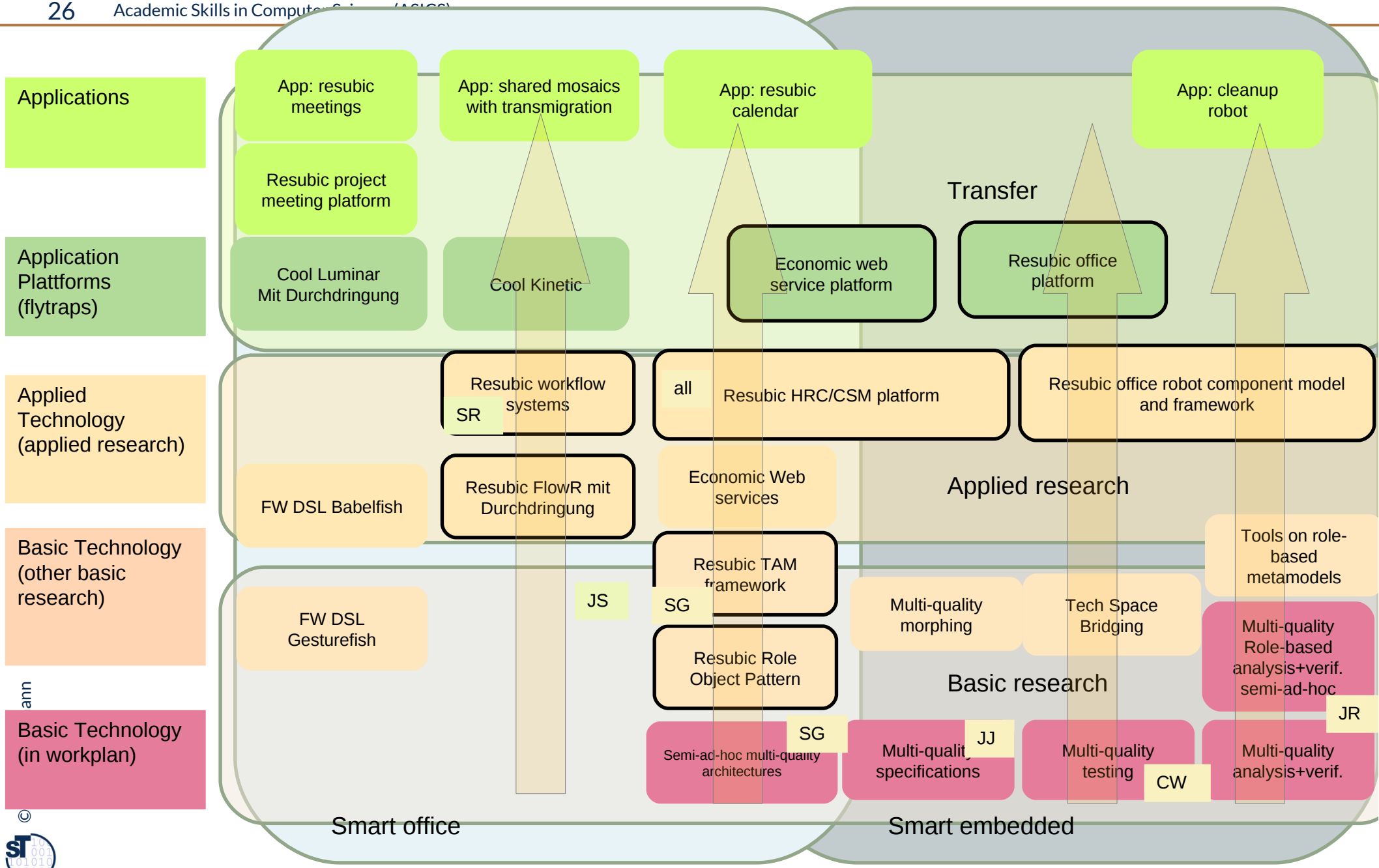
Demonstrator and Transfer Planning

- A research group, like the Chair of Software Engineering, develops technology on several levels of abstraction
- Demonstrators of technologies can hook in into several different levels – not everything is a technology for software platforms or basic technology
  - Farms, cows, milk, yourt, yourt service
- Only some technologies have a chance to be transferred to industry



Ex.: Strategic, Mid-Term Planning of Transfer in Group ZESSY-ST

(framed topics may become a vendor lock-in)



71.4. Demonstration and Transfer Workshops with Industrial Partners

Objectives of Screening Workshops

- **Discover**
  - Presentation of research strategy
  - Presentation of Analysis of Advantage Strategies
- **Demonstrate**
  - Demonstration for creating vision
  - Presentation of demonstrators
  - Collect new ideas for demonstrators
  - Collect interesting labcast videos and web sites on an inspiration site

Objectives of Transfer Workshops

- University presents all the process blueprints for
  - Research
  - Transfer
  - Innovation
- University Lab demonstrates technologies
  - Demonstration for creating vision
  - Presentation of demonstrators
  - Collect new ideas for demonstrators
  - Collect interesting videos and web sites on an inspiration site
- Presentation of possible transfer processes
  - Presentation of business advantage strategy
  - Detect industrial needs („pull“)
  - Presentation of concrete transfer instruments
  - Presentation of VIP process
- Analyzing Value Propositions e.g., with NABC
  - Finding out Needs and Pains of companies
  - Finding out Needs and Pains of their customers

Diffusion at OUTPUT Day

- The yearly demonstration day of the department
- Every PhD student of technical science should exhibit and demonstrate her technology to the industry, pupils, politicians, and the public
  - Use demo booths to show your stuff
- A successful presentation of a research software prototype is very encouraging!

The Story of the DSL-o-MAT

- Mirko Seifert, Jendrik Johannes, Florian Heidenreich, Christian Wende
- Demo of tool EMFText at OUTPUT 2010
- Applications of EMFText (emftext.org)
- Resulted in the EMFText Zoo of more than 100 parsers for domain-specific languages
- Ended up in company DevBoost in 2012
- Founder stipend “BMBF exist” in 2012
- www.devboost.org
- That was a long way....

The End