„We have only started on our development of our country—we have not as yet, with all our talk of wonderful progress, done more than scratch the surface.“

„One who fears the future, who fears failure, limits his activities.”
Henry Ford. My Life and Work. [www.gutenberg.org EBook #7213].

Part IV.
03. The Lean Startup Innovation Process

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Fakultät Informatik
Technische Universität Dresden
2020-0.4, 11/17/20
http://st.inf.tu-dresden.de/teaching/saab

1) What is „Lean Startup”?
2) On the Way to the MVP
3) Triple SCRUM in a Lean Startup
4) Assessing Maturity of Canvases
5) Determining Minimal Viable Feature Set, Key Features and the MVP with Feature Trees
6) Canvas Cactus and Triple SCRUM

Obligatory Literature

- http://theleanstartup.com/
- http://www.gruenderszene.de/lexikon/begriffe/lean-startup
- https://en.wikipedia.org/wiki/Lean_startup
- [Blank-HBR] Steve Blank. Why the Lean Start-Up Changes Everything. Harvard Business Review, May 2013. Free to read here:
  - https://hbr.org/2013/05/why-the-lean-start-up-changes-everything

Eric (Ries) dubbed the combination of customer development and agile practices the „lean start-up".

[Steve Blank in Blank-HBR]

…. 75% of all start-ups fail.

[Steve Blank in Blank-HBR]

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Internet Links

- Course with videos on startup foundation
  - http://startupclass.samaltman.com/
- http://www.whiteboardmag.com/confessions-of-a-lean-startup-how-i-got-my-first-customers-without-having-a-product/

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Literature

- Henry Ford. My Life and Work. [www.gutenberg.org EBook #7213].
- [Osterwalder/Pigneur] Alexander Osterwalder. Ives Pigneur. Business Model Generation. Wiley. !Fantastic!
- Ash Maurya. How to Create Your Lean Canvas. http://leanstack.com/LeanCanvas.pdf
- [Oddoy] Manuel Oddoy. Softwareentwicklung mit natürlicher Sprache (“Lean Modelling”), Belegarbeit, TU Dresden, Jan. 2014. Supervised by Christian Wende, www.devboost.de
- [Korger] Christina Korger. Organisierte Software-Startups mit kollaborativen Canvases. Großer Beleg. Technische Universität Dresden, 2014.
  - http://nbn-resolving.de/urn:nbn:de:bsz:14-qucosa-160539
- Chris Rupp. Dirk Schüpferling. Warum Sie in Interviews nie die ganze Wahrheit erfahren. Artikelreihe, http://jaxenter.de
  - https://jaxenter.de/warum-sie-in-interviews-nie-die-ganze-wahrheit-erfahren-fragen-und-antworten-3-3477

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Books

- [BlankDorf] Steve Blank, Bob Dorf, Nils Högsdal, Daniel Bartel. Das Handbuch für Startups – die deutsche Ausgabe von 'The Startup Owner's Manual'. Deutsche Übersetzung von Kathrin Lichtenberg. 2014. O'Reilly.
  - http://www.daniel-bartel.de/das-handbuch-fuumlr-startups.html
- [Ries] Eric Ries. Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. O'Reilly, 2011
- [Maurya] Ash Maurya. Running Lean. Iterate from Plan A to a Plan That Works. O'Reilly, 2012.
- Ash Maurya. How to Create Your Lean Canvas. http://leanstack.com/LeanCanvas.pdf
- [LeanAnalytics] Alistair Croll, Benjamin Yoskowitz. Lean Analytics. O'Reilly, 2013
- [LeanUX] Jeff Gothelf, Josh Seiden. Lean UX: Applying Lean Principles to Improve User Experience. O'Reilly, 2013.
- [LeanCD] Cindy Alvarez. Lean Customer Development: Building Products Your Customers Will Buy. O'Reilly, 2014
- [LeanAML] Lutz Finger, Soumitra Dutta. Ask Measure Learn. Using Social Media Analytics to Understand and Influence Customer Behavior. O'Reilly 2014
- [SW-Industry] Peter Buxmann, Heiner Diefenbach, Thomas Hess. The Software Industry. Economic Principles, Strategies, Perspectives. Springer 2012

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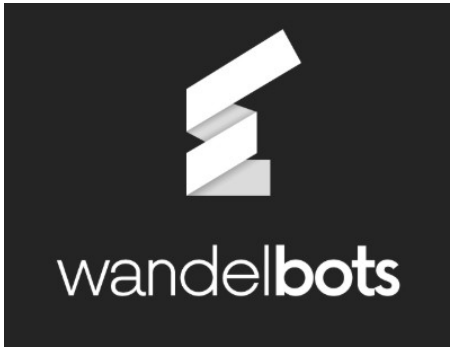
Mentorings of Software Start-Ups

- Ubigrate 2008-2012: Boxes with RFID-Tags to automate logistics

- Mentalmotive (2008-2015): Environment for multimedia exchange

  - Www.mentalmotive.de
- DevBoost (2012-today): Software quality management tools

  - Consulting
  - Domain-specific languages
  - Www.devboost.de
- Wandelbots (2017-today): Co-working robotics



  - Www.wandelbots.de
  - Demonstration-based teaching of robots
- AppAxy (2020-): collaborative apps
- Mainteny (2020-): IoT-based maintenance of elevators
  - https://mainteny.com/en
    https://www.youtube.com/watch?v=tDp_IRTNosw

Startup of the Day: SeedForward

- https://seedforward.com/de/
- Development of protective wrappers of seeds (Saatgutbeizen), GrainGuard ®
  https://www.kfw.de/stories/umwelt/naturschutz/seedforward/

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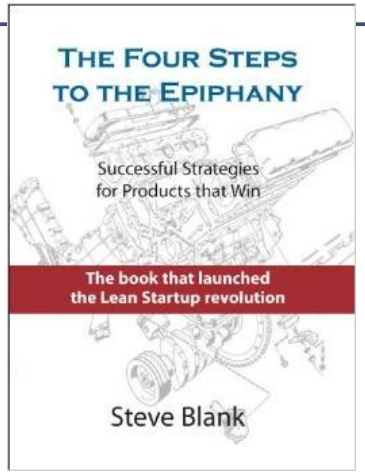
03.1 What is „Lean Startup”?

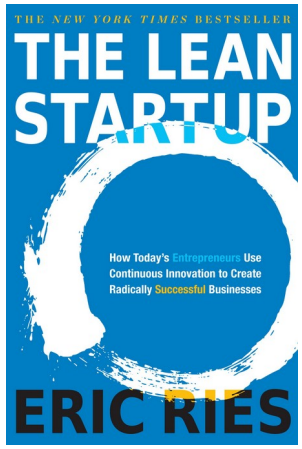
Lean Startup = Lean Customer Modeling + BMC development + Lean Software Development

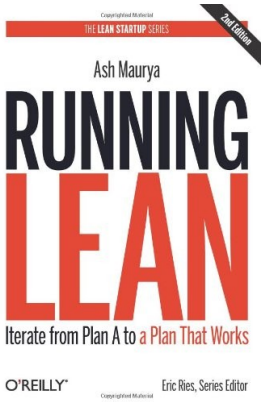
Lean Startup is a form of Agile Modeling and Agile Software Development.

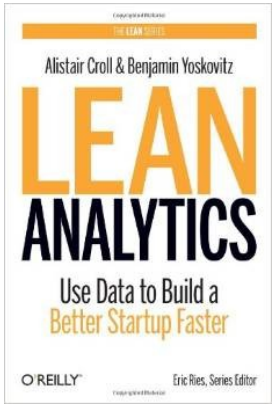
The Proponents

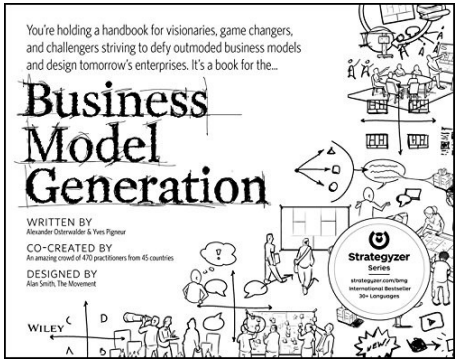
- Steve Blank http://steveblank.com/
- Eric Ries
- Ash Maurya
- Alex Osterwalder
- Ives Pigneur











Lean Startup develops the business model of a startup with lean development techniques

Lean Startup, Lean Innovation, and Startup Maturity Level (SML)

The **Lean Innovation Process** is a stage-gate process (Phasenmodell).

The **Lean Innovation Process** measures the **innovation maturity level (IML)** of the business model **by metrics**, to take in feedback to the process (**agility**).

The **Lean Innovation Process** maintains a canvas cactus and improves the maturity of the canvases with **hypothesis testing** about several fits - the problem-solution fit, the product-market fit (customer model fit) and scale fit.

The **Lean Startup,** the **Lean Productization,** and the **Lean Service Definition** are lean innovation processes with
Startup Maturity Level, Product Maturity level, Service Maturity Level.

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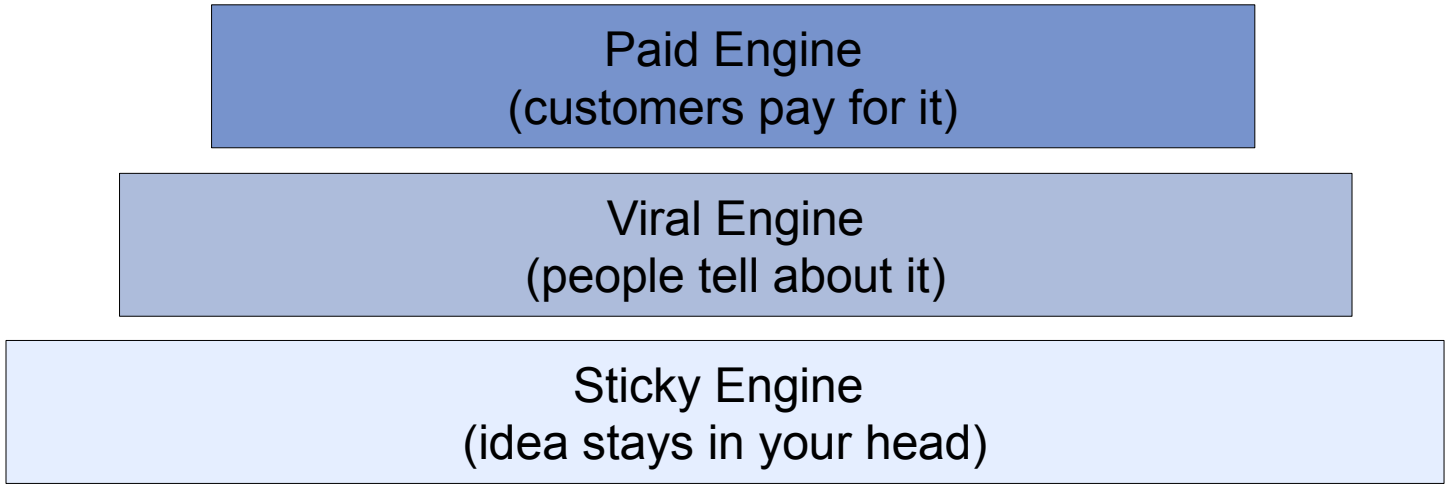
„If you can't measure it, you can't manage it.”
Peter Drucker [LeanAnalytics]

Lean Startup Phases acc. To Ries

- [Ries] defined three “engines of growth” a startup can use to accelerate: First, the product must be sticky; then viral; then people will pay.



http://larslofgren.com/marketingbasics/the-three-engines-of-growth-with-eric-ries

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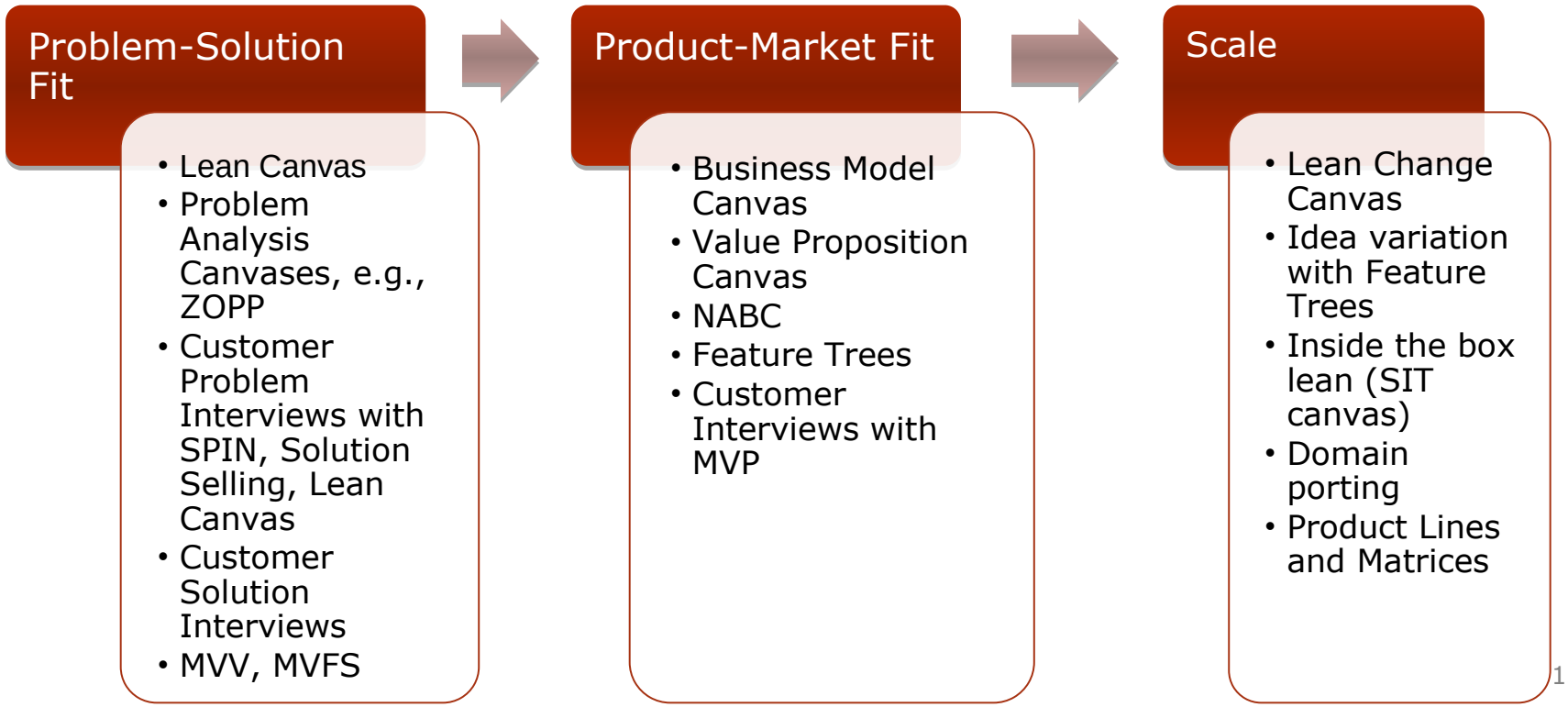
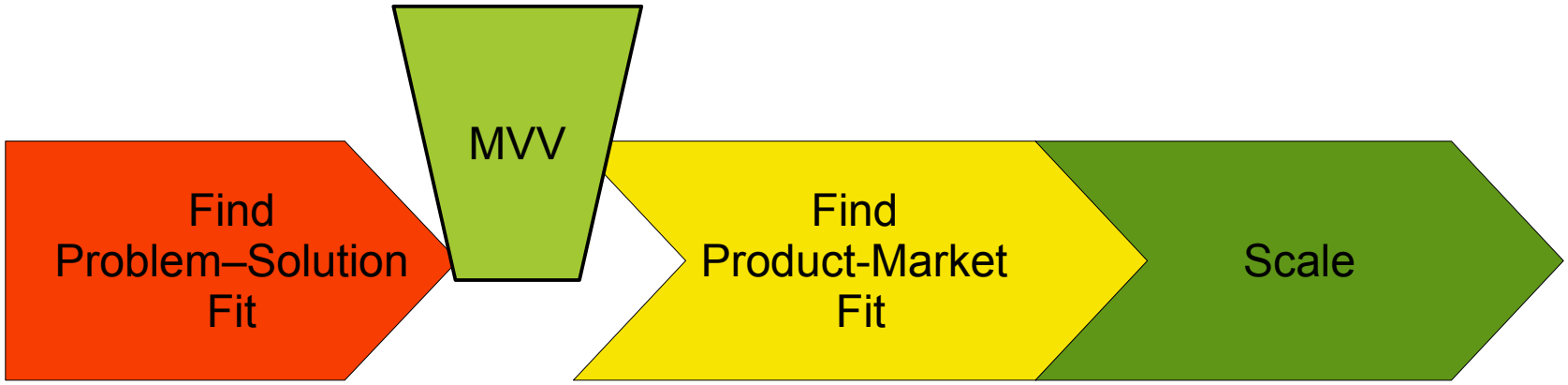
Lean Startup acc. To Maurya and its Lean Models in the Incubation Process

- Startups have to work on several flat Lean Canvases, in a canvas cactus (with evolution canvas megamodel)
- Three phases in [Maurya]



Phase 1 “Problem-Solution Fit”

- Working out a **“minimal viable vision (MVV)”**, i.e., a value proposition and business model in a MAPE-loop (Measure, Analyze, Predict, Evaluate)
- MVV-MAPE runs in several iterations and is driven by customer interviews
- **Input**: Cloudy idea
- **Result**: MVV - low-fidelity Business Model Canvas 0.1



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Phase 2 “Product-Market Fit”

- Working out a **minimal viable product (MVP)** in a MAPE-loop (Measure, Analyze, Predict, Evaluate)
- MVP-MAPE loop runs in several iterations and is driven by customer MVP interviews and other metrics
- **Input**: Minimal viable vision (MVV) in form of green VPC, BMC
- **Result**: Feature Tree of Product with one configuration being implemented (MVP)
  - All other variants are postponed, but ranked

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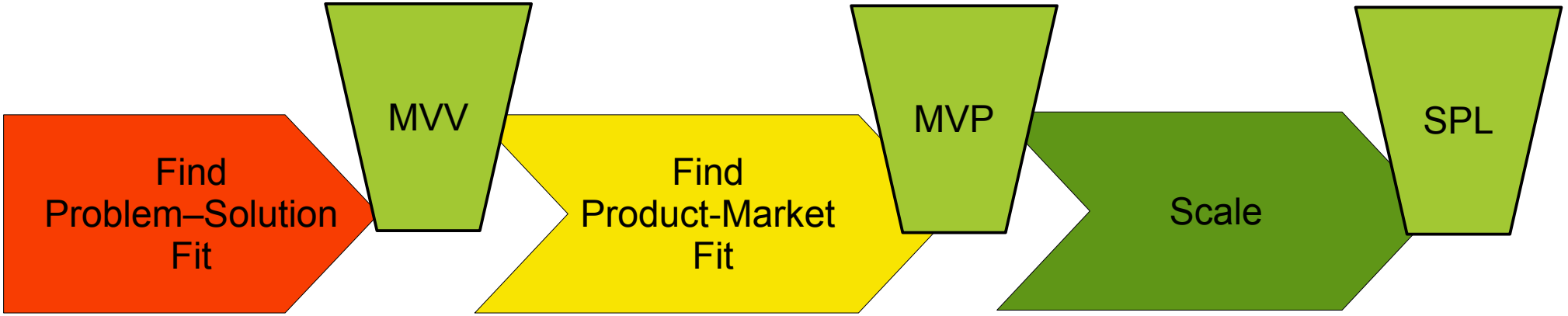
Phase 3 “Scale”

- Working out scaling business model and product or product line in a MAPE-loop
  - Work on stickiness (pressure * awareness)
  - Work on virality (pressure * awareness * UCA)
- Input:
  - MVP
  - Feature tree of product
- Result:
  - Feature Tree of Product Line with Business Model
  - Horizontally ported Product Matrix
  - Software or service ecosystem



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Other Stage-Gate Processes for Lean Innovation

[Dresden|exists]

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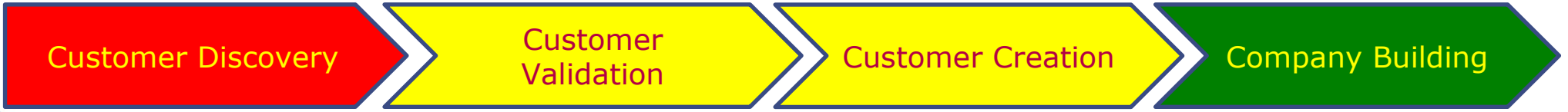
Customer Development, a company-centric process [Blank/Dorf] 2008



Investment Readiness Level (IRL) Process of Blank

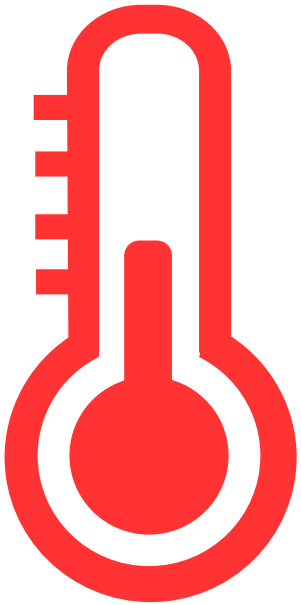
1. **First-Pass BMC (Investment Readiness Level 0.1)**

2. Market Size and Compatitive Analysis
3. Validate Problem-Solution-Fit
4. **Low Fidelity Prototype MVP (IRL 0.5)**

5. Validated Product-Market Fit
    1. Customer Development
6. Validated Right Side of BMC
7. **High Fidelity Prototype MVP (IRL 0.9)**

8. Validate Left Side of Canvas
9. Validate other Metrics

Investment Readiness Level



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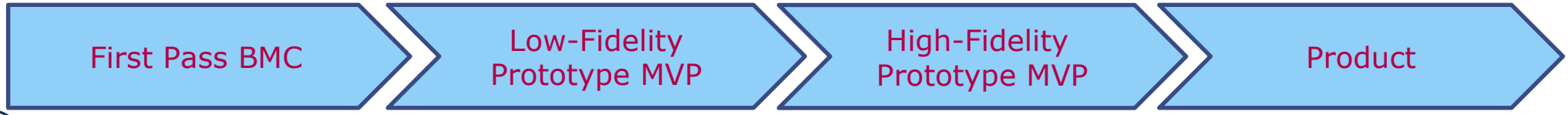
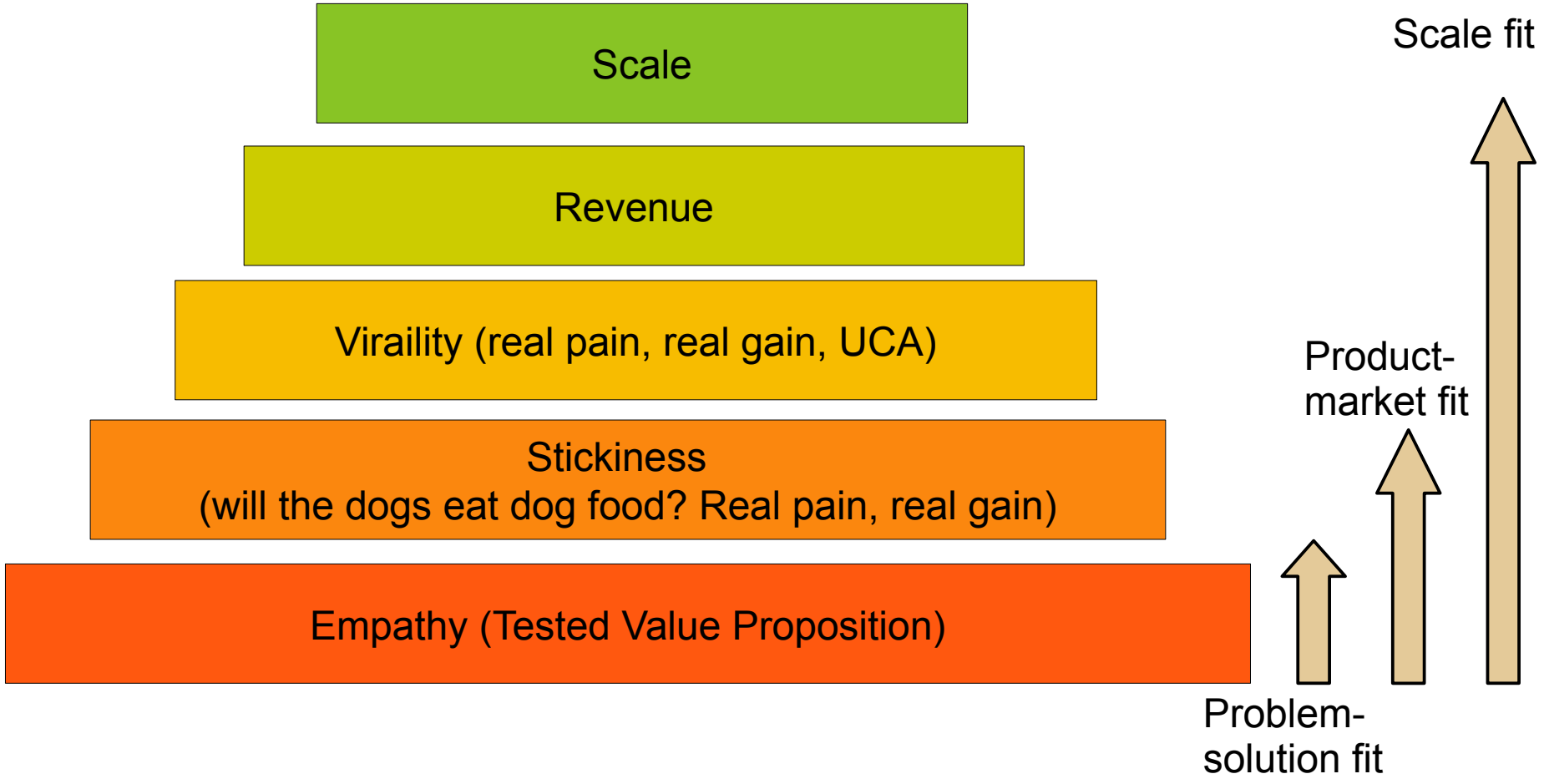
MVP Development, a company-centric process [www.steveblank.com, Nov. 2013]



The “Lean Analytics” Stages and Their Metrics

- The Lean Analytics Stages are a simple stage system for product/service product-market fit. (this a variant of Ries’ Engines)
- [LeanAnalytics] contains metrics for every stage



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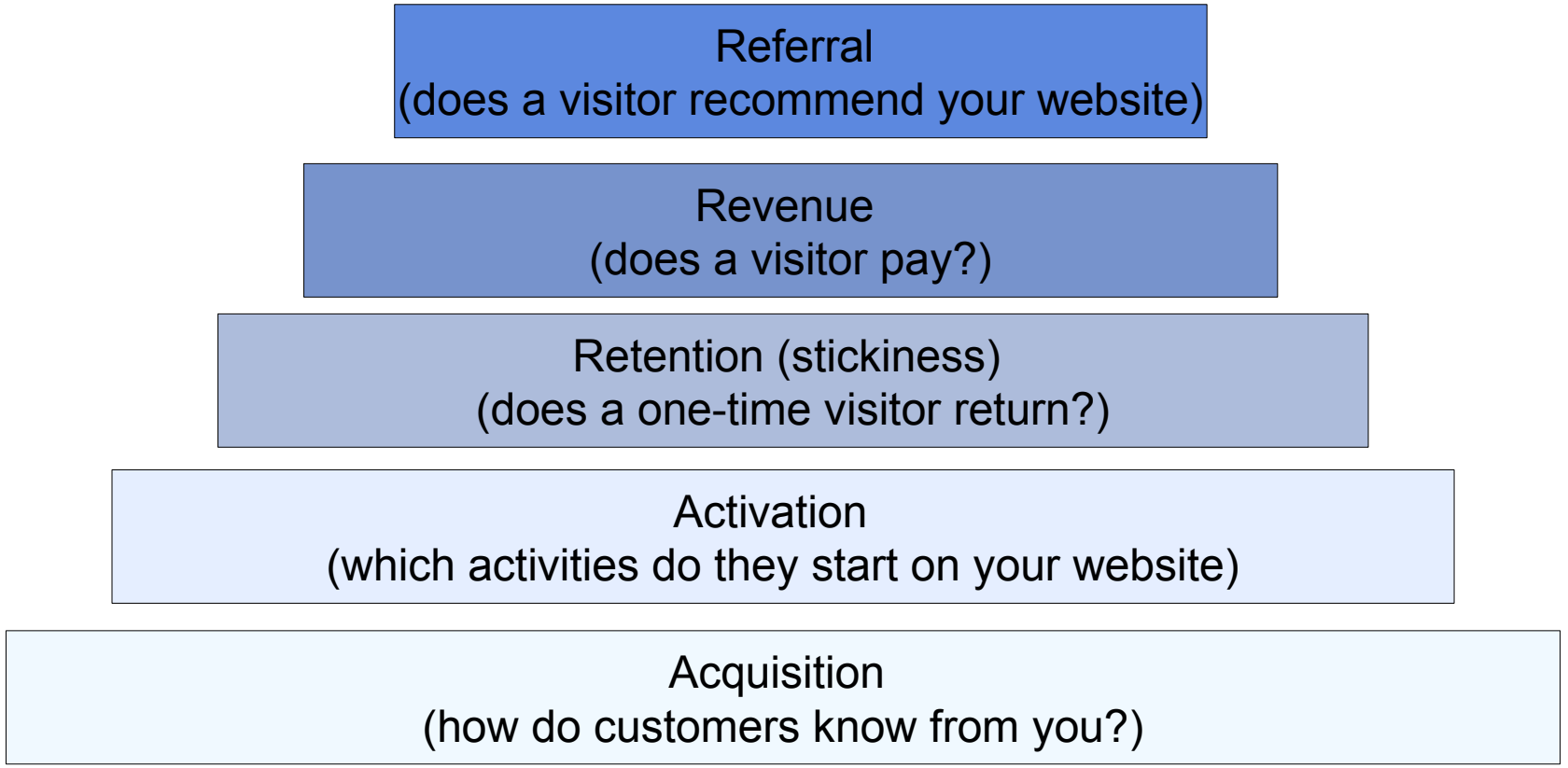
McClure Pirate (Web) Metrics can be used as Stage-Gate Process

- Stage-inconsistent startups mix activities from different stages.



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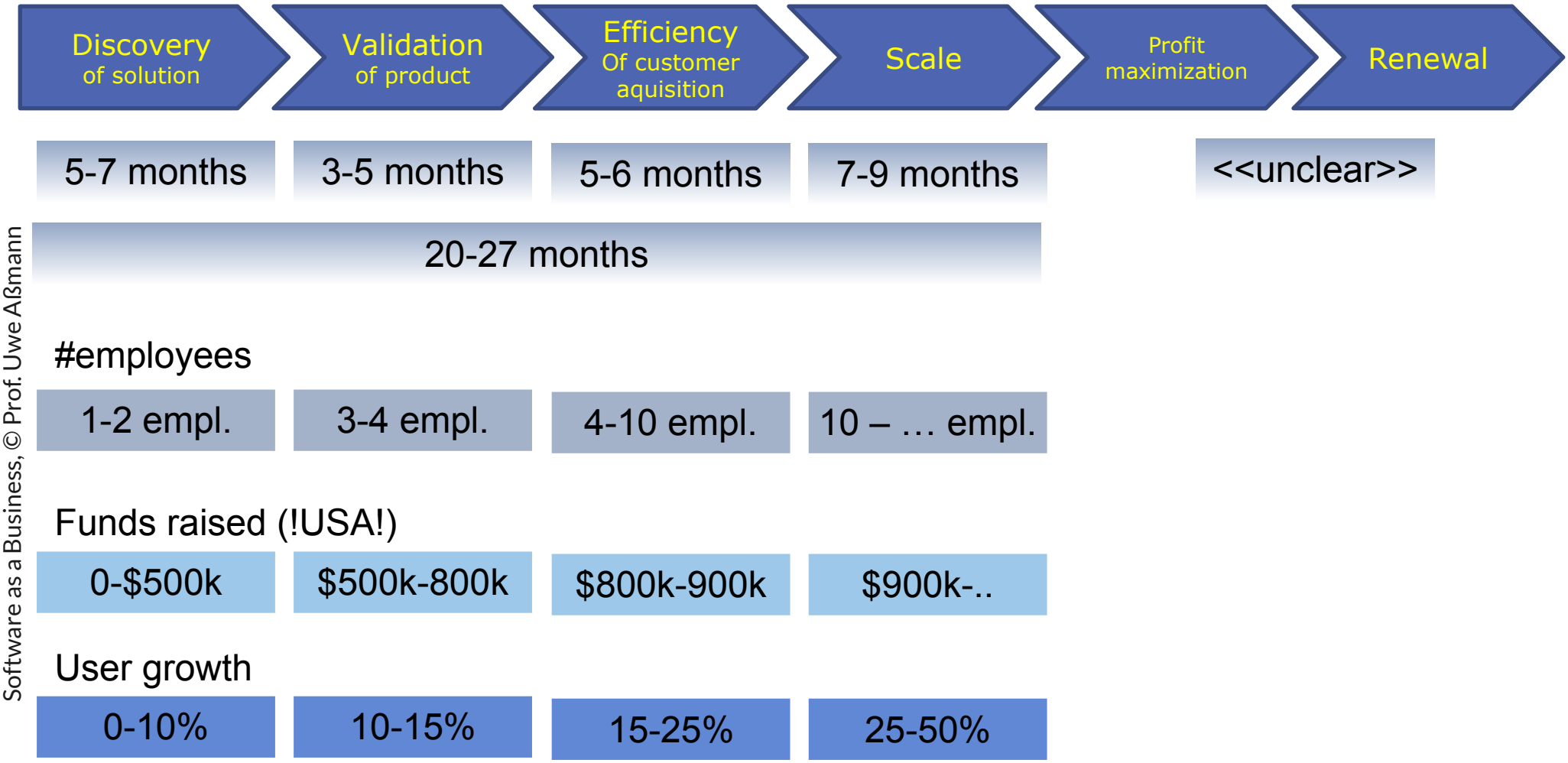
[LeanAnalytics]
[Dave McClure http://www.slideshare.net/dmc500hats/startup-metrics-for-pirates-long-version]

Marmer Report Stages

Marmer Stages from the Startup Genome Report, a product-centric process [Marmer-Genome]



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Max Marmer and Steve Blank in 2010

- http://steveblank.com/2011/05/29/tune-in-turn-on-drop-out-the-startup-genome-project/
- “The email closed by saying, “The project is a hybrid between academic and entrepreneurial circles and I’d really love to begin a dialogue with people in the academic world also interested in solving this problem. Your name has come up a lot in that regard. Let me know if this interests you and if you have any time to speak.”
- It was signed Max Marmer.
- I set up a meeting and at Cafe Borrone some kid who looked 18-years old came up to me and introduced himself as Max. “How old are you? I asked. “18,” he replied.
- Holy sx!t.”

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Marmer Principle of Stage-Consistency

Stage-inconsistent startups mix activities from different stages.

- Therefore, it is advised to always know exactly in which phase a startup is
- Clear milestones should mark the transition between the stages

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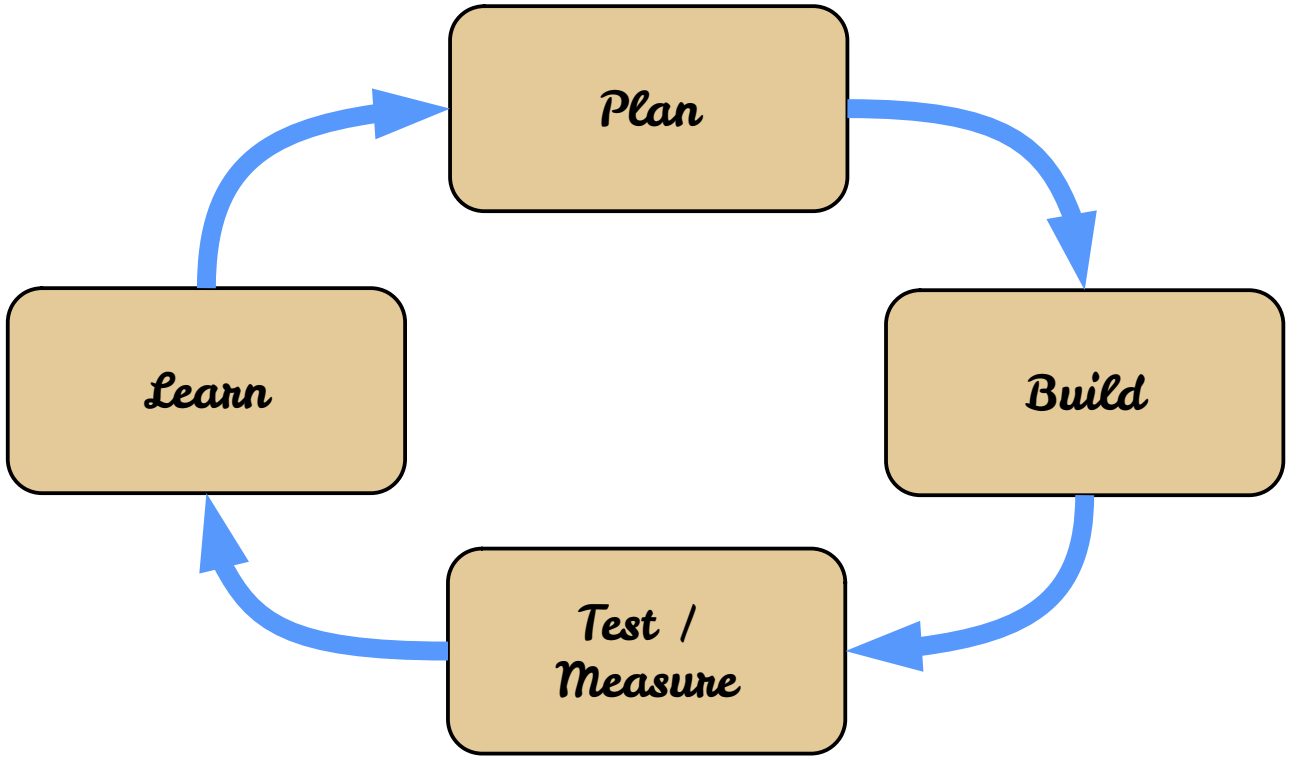
The Lean Innovation (Startup) Spiral Model

- Instance of “Scientific Method” of Bacon and PDCA (Plan-Do-Check-Act)
- Plan - Build – Measure / Test – Learn – cycle [Maurya, Ries]
- Developing “Business Model Canvases” containing “Customer Hypotheses”



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Henry Ford about Service, Fear of the Future, and That the Whole is More than the Parts

- Henry Ford. My Life and Work. [www.gutenberg.org EBook #7213].

The institution that we have erected is performing a service. That is the only reason I have for talking about it. The principles of that service are these:

1. **An absence of fear of the future and of veneration for the past.** One who fears the future, who fears failure, limits his activities. Failure is only the opportunity more intelligently to begin again. **There is no disgrace in honest failure; there is disgrace in fearing to fail.** What is past is useful only as it suggests ways and means for progress.

2. **A disregard of competition.** Whoever does a thing best ought to be the one to do it. It is criminal to try to get business away from another man—criminal because one is then trying to lower for personal gain the condition of one's fellow man—to rule by force instead of by intelligence.

3. **The putting of service before profit.** Without a profit, business cannot extend. There is nothing inherently wrong about making a profit. Well-conducted business enterprise cannot fail to return a profit, but profit must and inevitably will come as a reward for good service. It cannot be the basis—it must be the result of the service.

4. Manufacturing is not buying low and selling high. It is the process of buying materials fairly and, with the smallest possible addition of cost, **transforming those materials into a consumable product and giving it to the consumer**. Gambling, speculating, and sharp dealing, tend only to clog this progression.

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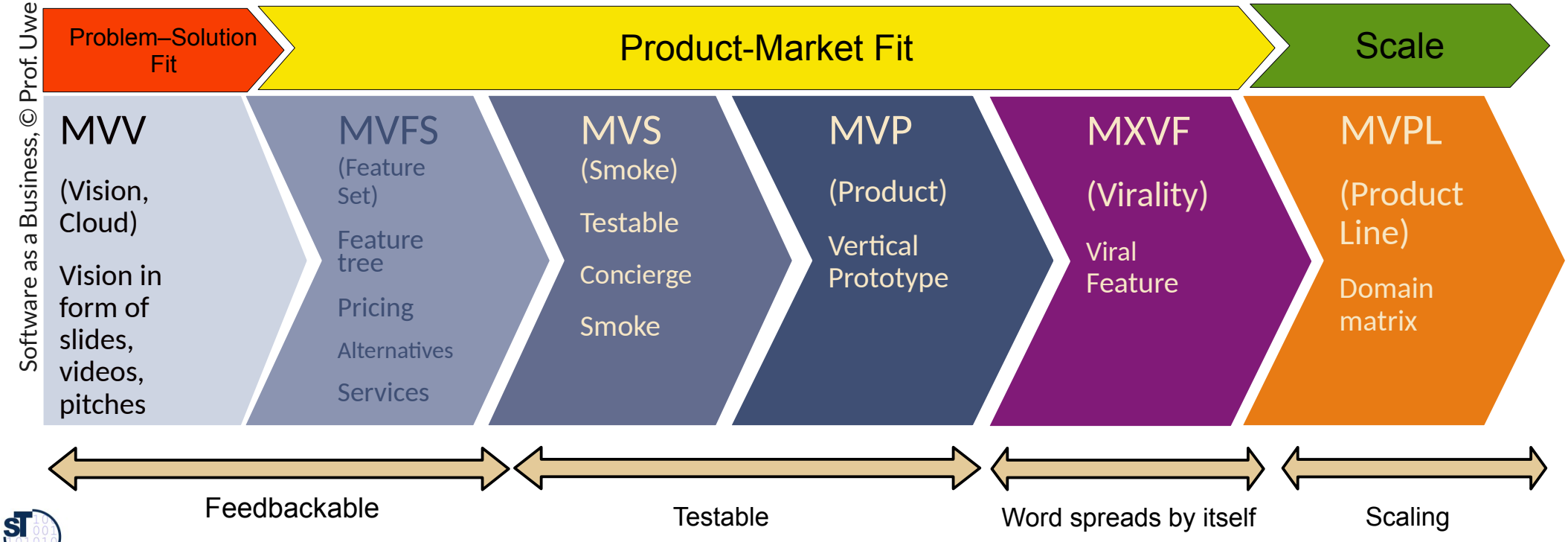
03.2 On the Way to the MVP

- Minimal Viable Feature Set (MVFS) and Minimal Viable Smoke (MVS)

Finding the Customer's Needs: Different Forms of MVP (From MVV to MVPL)

- Minimal viable Vision (MVV)
- Minimal viable feature set (MVFS), aka low-fidelity MVP, with a feature tree in which only one configuration is selected
- Minimal viable smoke (MVS)
- Minimal viable products (MVP), a vertical prototype
- MaXimally viral feature (MXVF)
- Minimal viable Product Line (MVPL, with Feature Tree)



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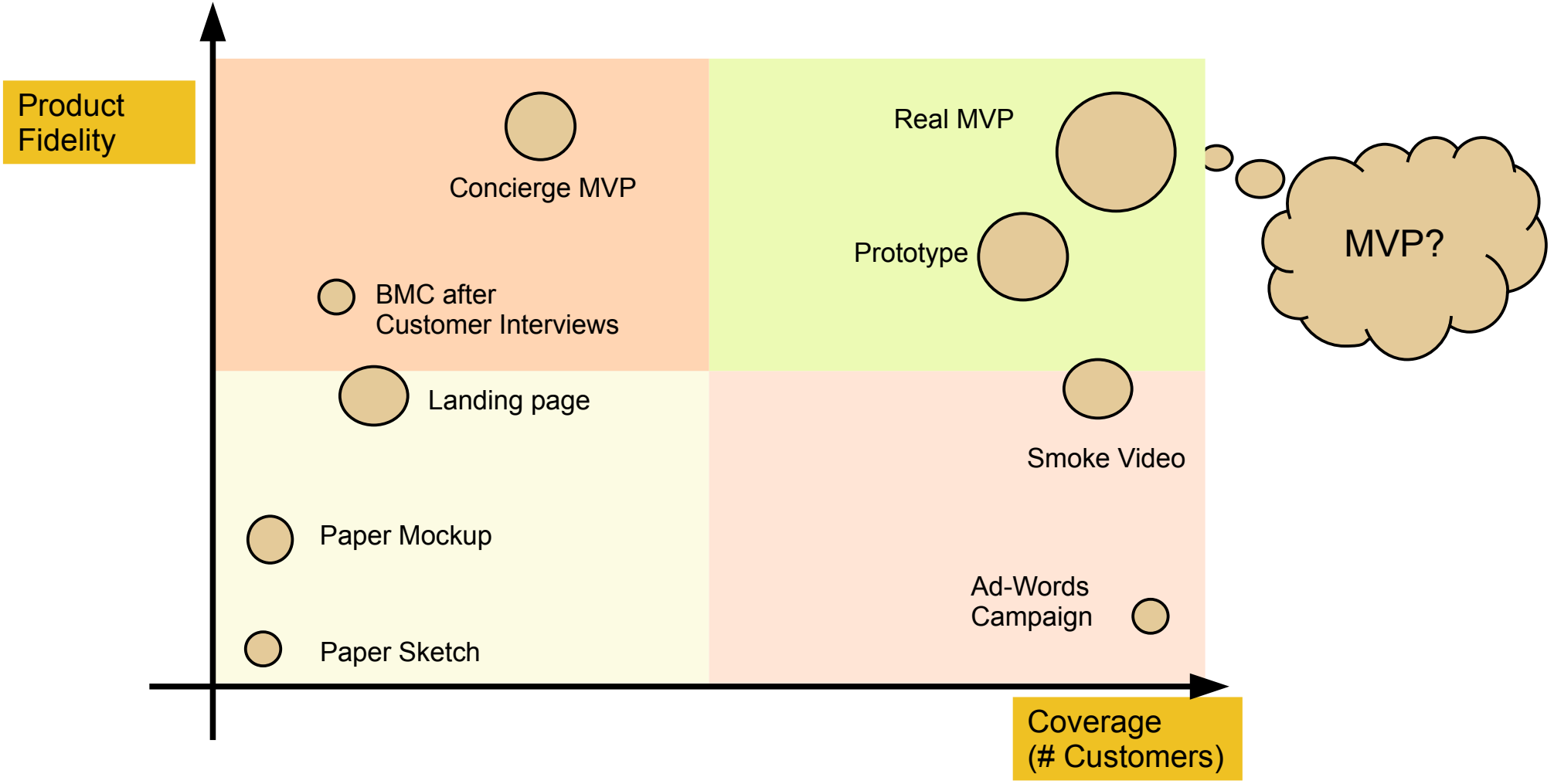
03.2.1 Smoke Testing on the Way to the MVP

- Minimal Viable Smoke

Smoke Test Portfolio

https://stefanroock.wordpress.com/2012/08/05/lean-startup-a-classification-of-mvps/
https://stefanroock.files.wordpress.com/2012/08/mvps-010.png?w=487

- All the other tests to find out an MVP, from MVV to MVP
- Compares *product fidelity* with *customer coverage*. *Real MVP* is best in both dimensions
- Size of circle: length of feedback cycle



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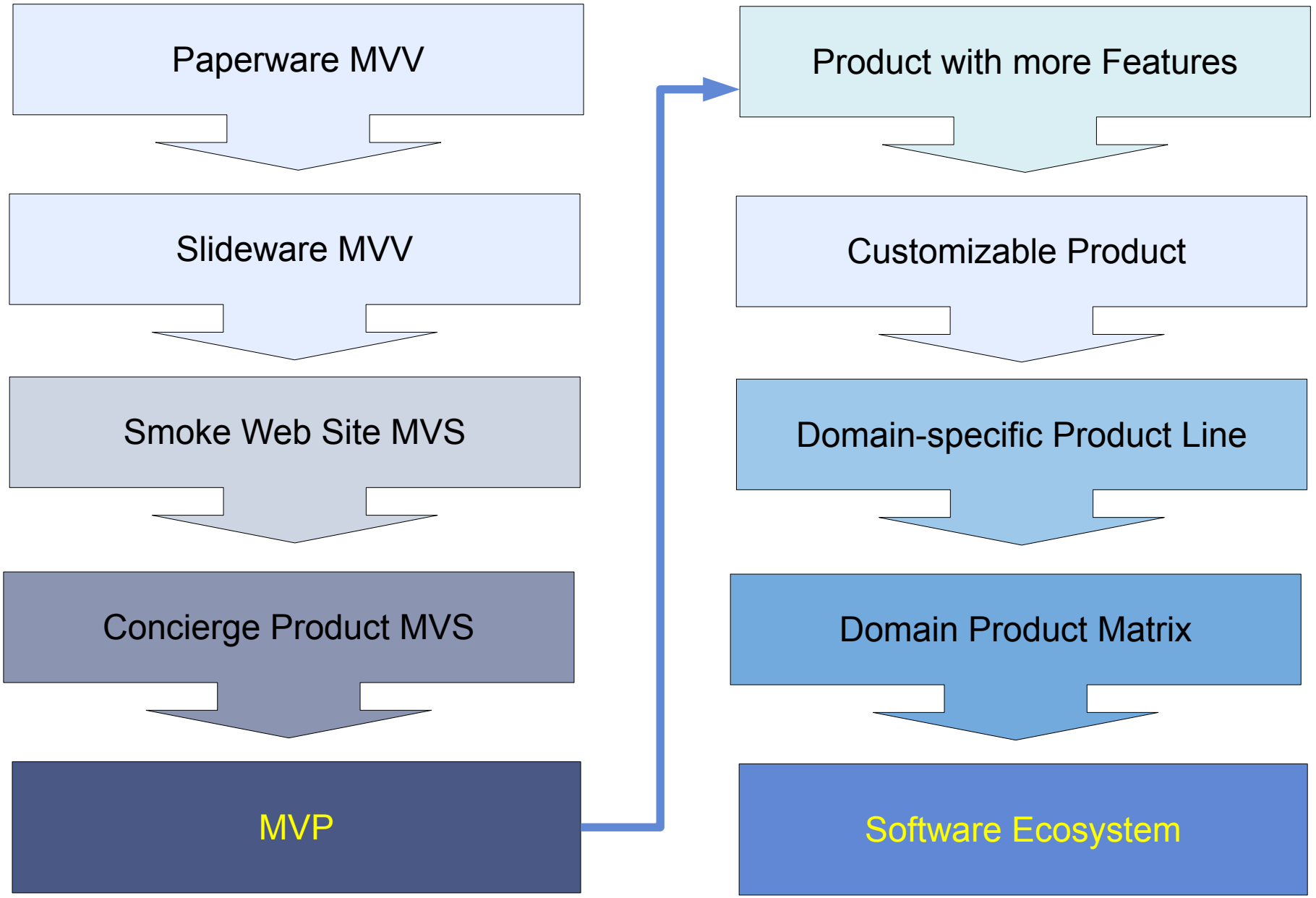
Example on the Way to the MVP – And Beyond



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From MVV over MVFS to MVP

- **Slideware MVV vs. MVFS**: A set of slides showing the value proposition of the MVV, and may be the MVFS
- **NABC MVV:** An NABC elevator pitch to tell the MVV to everybody in 2 min
- **Feature Tree MVFS:** a feature tree modeling the minimal viable feature set
- A **smoke video** is a video that shows customers how the MVP will behave.
  - [Dropbox]
- **Smoke Website MVS:** A smoke website is a website that shows customers how the MVP will behave
- **Concierge MVP (better: Concierge MVS):** A ***concierge MVP*** is a product that is not automated but **performed by hand.**
  - Ex.: AirBnb uses photos to show the flat they rent out [Lean Analytics p 6]
  - Initial hypothesis for MVP: use professional photography to attract more customers
  - Buiding a Concierge MVP (website) resulted in three times more bookings
- **Minimal viable product (MVP), Minimal viable service (MVS):** real product, but minimal vertical prototype

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Basic Web Metrics on Smoke MVS, Concierge MVP, and MVP

- **Landing page web metrics**: (smoke web site)
  - Number of hits and pageviews
  - Number of unique visitors
  - Time of visitor on page
  - **Churn** measures the number of people that turn away from your website, stop using the service, never login again [LeanAnalytics p 95]
- Number of **followers** on twitter and friends on facebook
- Number of **members** of mailing list
- Number of **downloads** of test version or teaser version

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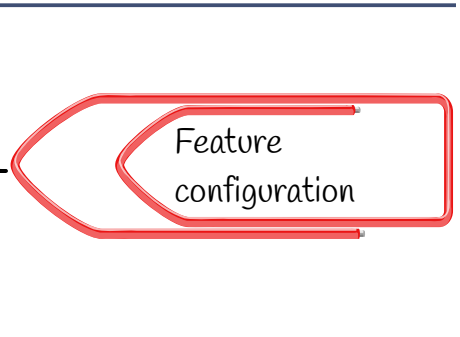
MVP Development with Minimal Viable Feature Sets (Feature-based MVP Development)

- First design a ***feature model (feature tree)*** as the *possible features of the MVP*
- Design the ***Minimal Viable Feature Set (MVFS)***
- Select the ***Minimal Viable Feature (MVF)***
  - The MVP will be the implementation of the MVF
  - **Vertical prototyping** means to implement one feature of the MVFS, and to incrementally increase feature mapping and implementations
  - Later other features of the MVFS will be added to the MVP



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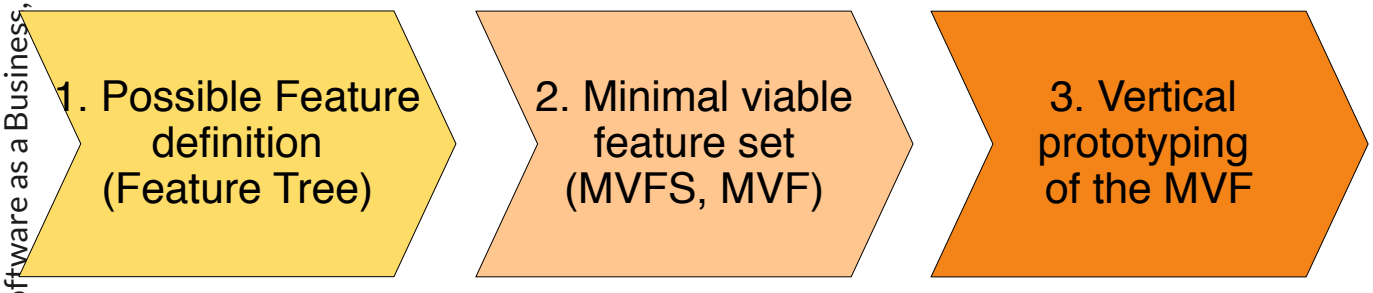
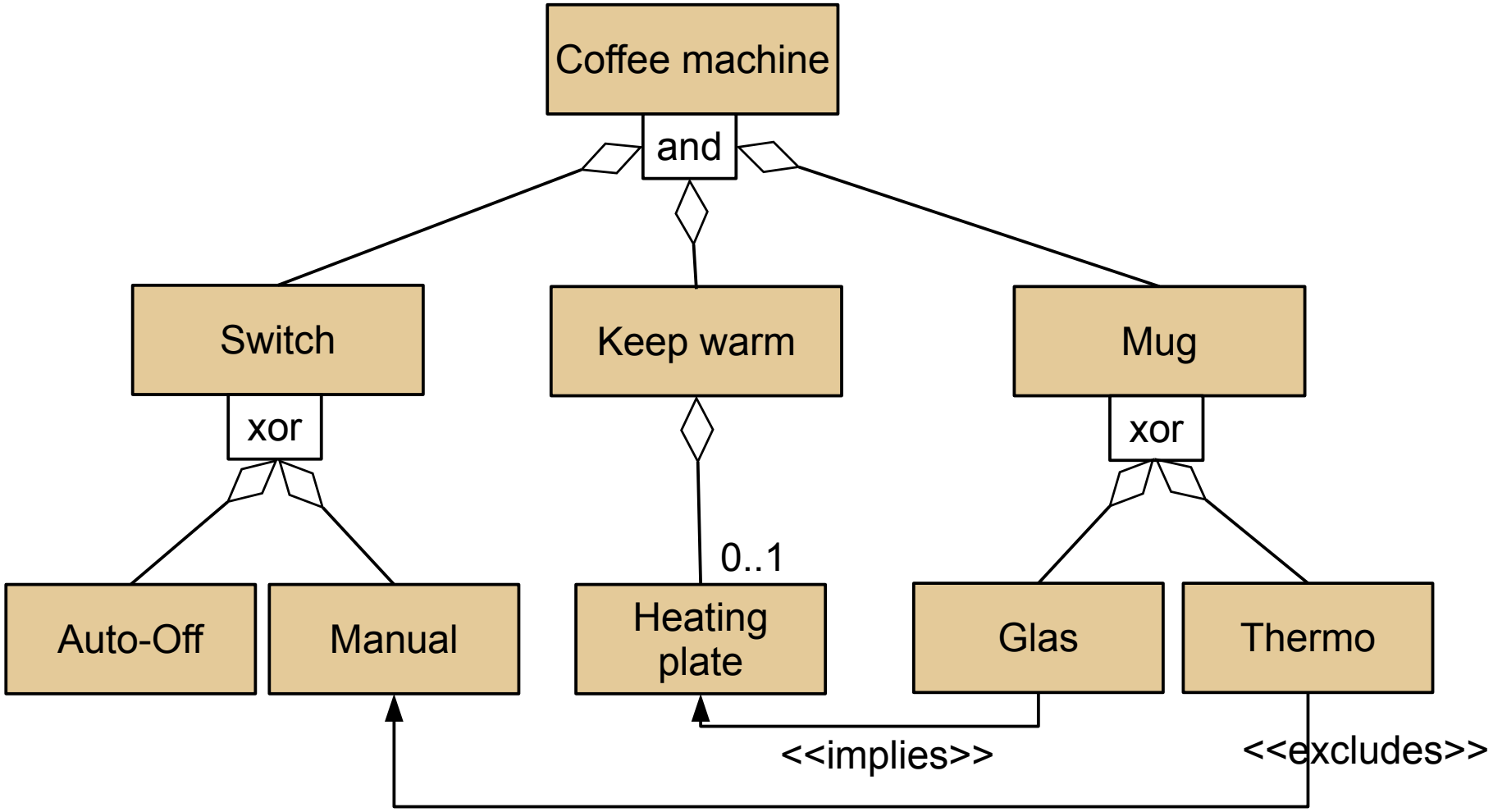


Feature Model Encapsulates Possible Features

- A **feature model** is a and/or link tree with options, inclusion and exclusion constraints.
- It describes a combinatorial variant space and can be mapped to propositional logic.
  - All possible features of the product or service



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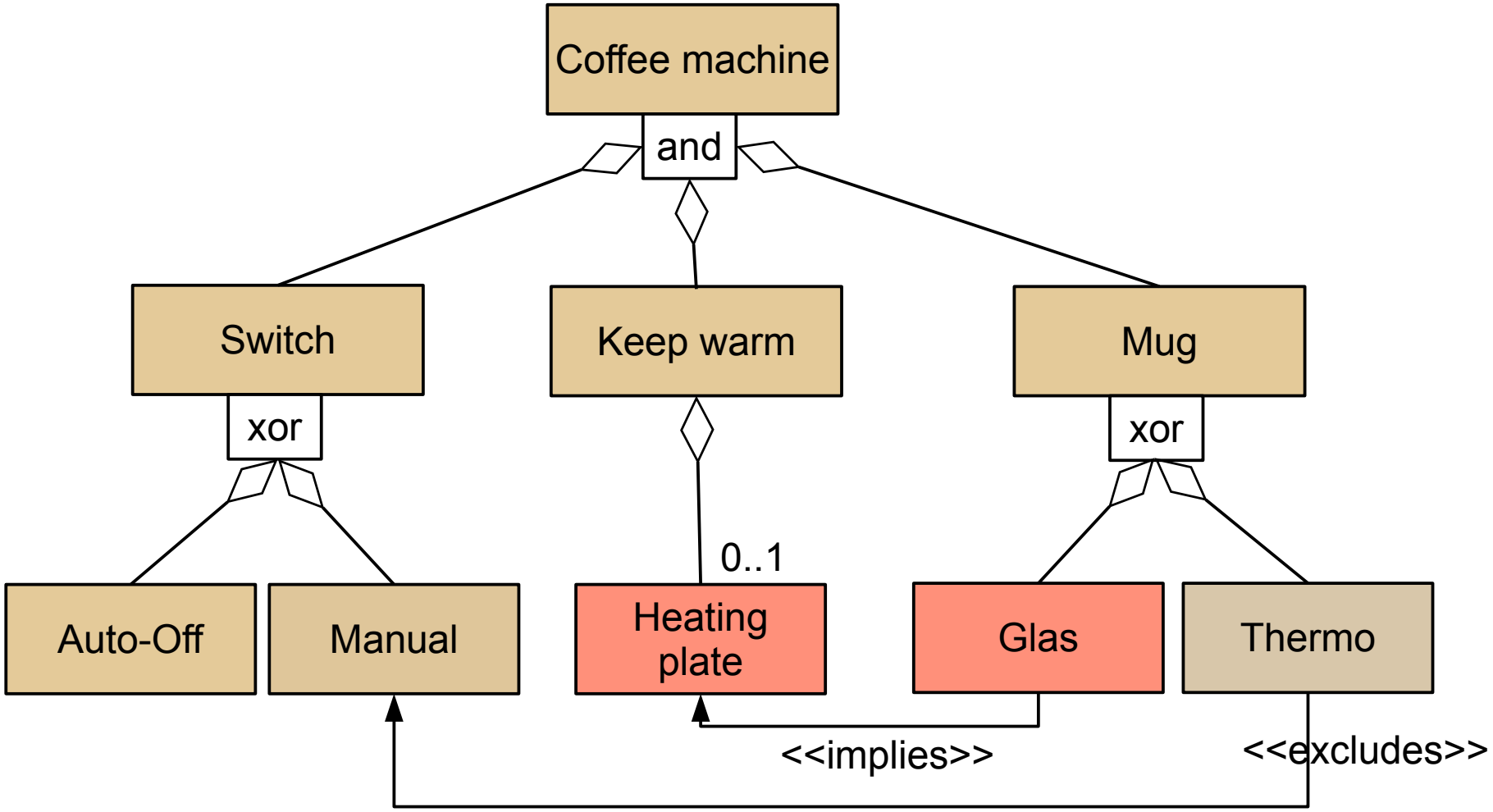
The MVP in the MVFS Feature Model

- The Minimal Viable Feature Set (MVFS) is characterized by a feature model
- The MVP is a subset of paths in the feature model, selecting a subset of OR and XOR subtrees (a *variant selection* or *configuration*)



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MVP Development Processes

- Assess the configurations of the MVFS Feature Model with SWOT assessment of deep BMC
  - With customer interviews (problem interviews, solution interviews)
  - with Smoke Tests, Web metrics to measure customer behavior
  - with Pirate metrics on the landing page
  - With concierge service
  - with an Easychair-like reviewing portal in which MVP can be discussed by reviewers
  - with an MVP readiness level metric

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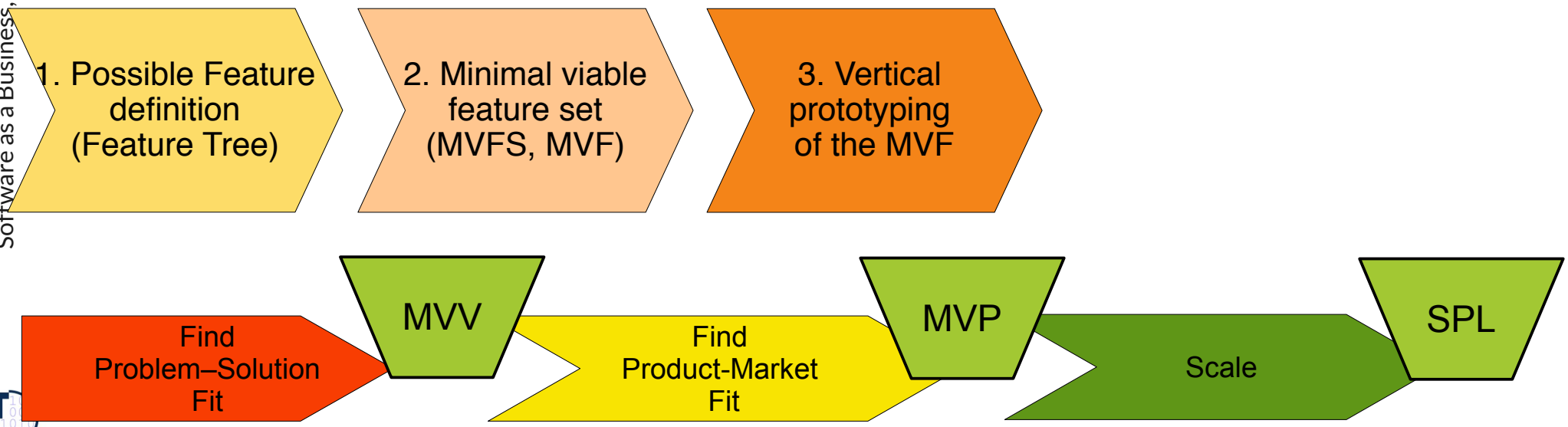

03.2.2. Customer Interviews as Simple Hypothesis Tests

much more in Part II

Customer Interviews... with Question-Based Canvases

Customer Problem Interviews

run in the phase “Problem-Solution Fit”

focus on problems of the customer

VPC lower right part is about pains

SPIN canvas (left part) to reveal hidden problems

Solution selling canvas matrix (left part) reveals reasons and implications of needs

Pain canvas classifies pains; pain priorities help to find the most important

Customer Solution Interviews

run in all phases

VPC left part (pain killers, gain creators, and products/services)

talk about solutions and their fit to pains and gains

SPIN canvas (right part) to reveal hidden problems

Solution-selling canvas matrix (right part) reveals capabilities

Customer problem-solution-fit interview

Customer interview canvas

Pain-Gain Banana

SPIN Canvas

Solution Selling Canvases

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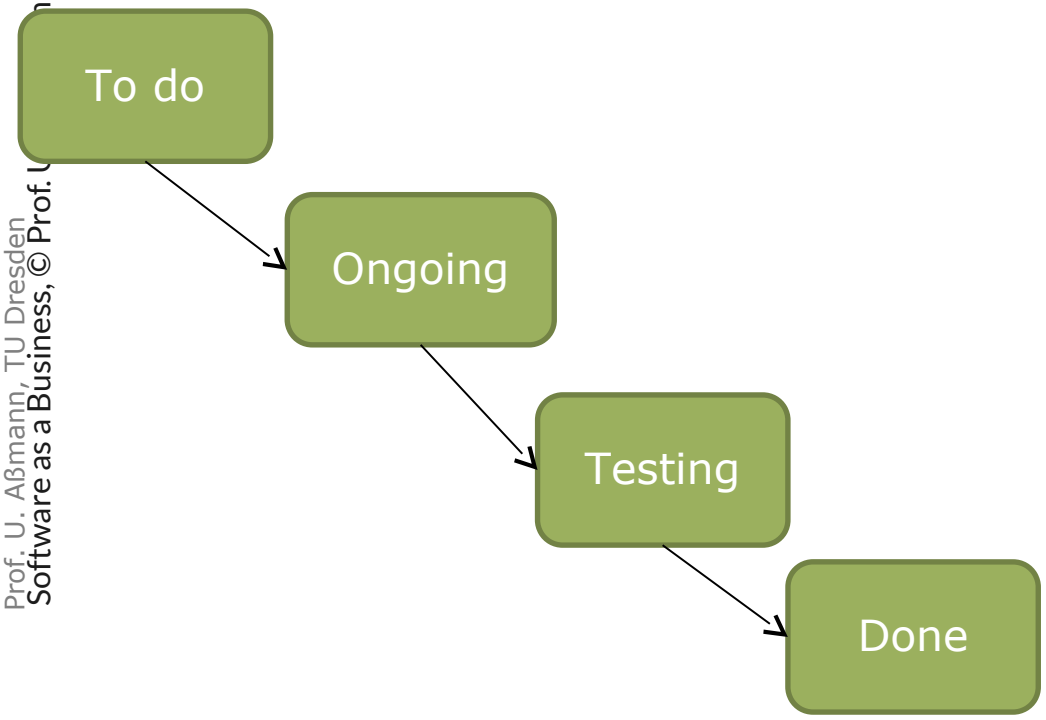
03.3. Planning the Daily Work in Lean Startup – The Triple SCRUM

- Three SCRUM processes are intertwined
  - Software development (of the MVP)
  - Service development (of the MVS)
  - Business model development

A Day in the Life of a SCRUM Software Developer

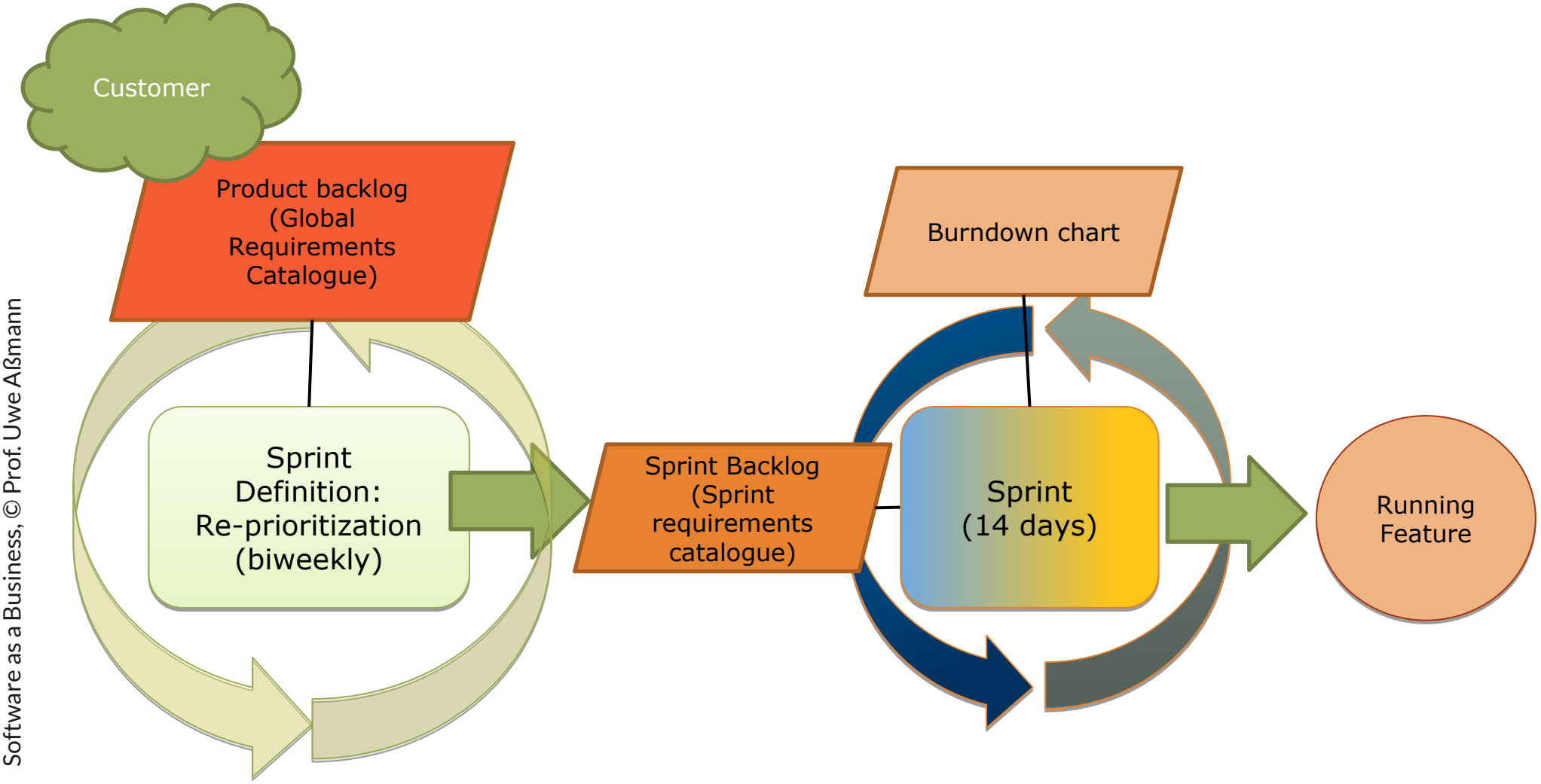
- Time boxes (sprints) to reach a new running new product version
- SCRUM board with state monitoring from left to right



http://en.wikipedia.org/wiki/Scrum_(development)
http://en.wikipedia.org/wiki/File:Scrum_task_board.jpg

SCRUM Burns Down Requirements in *Sprints*

41



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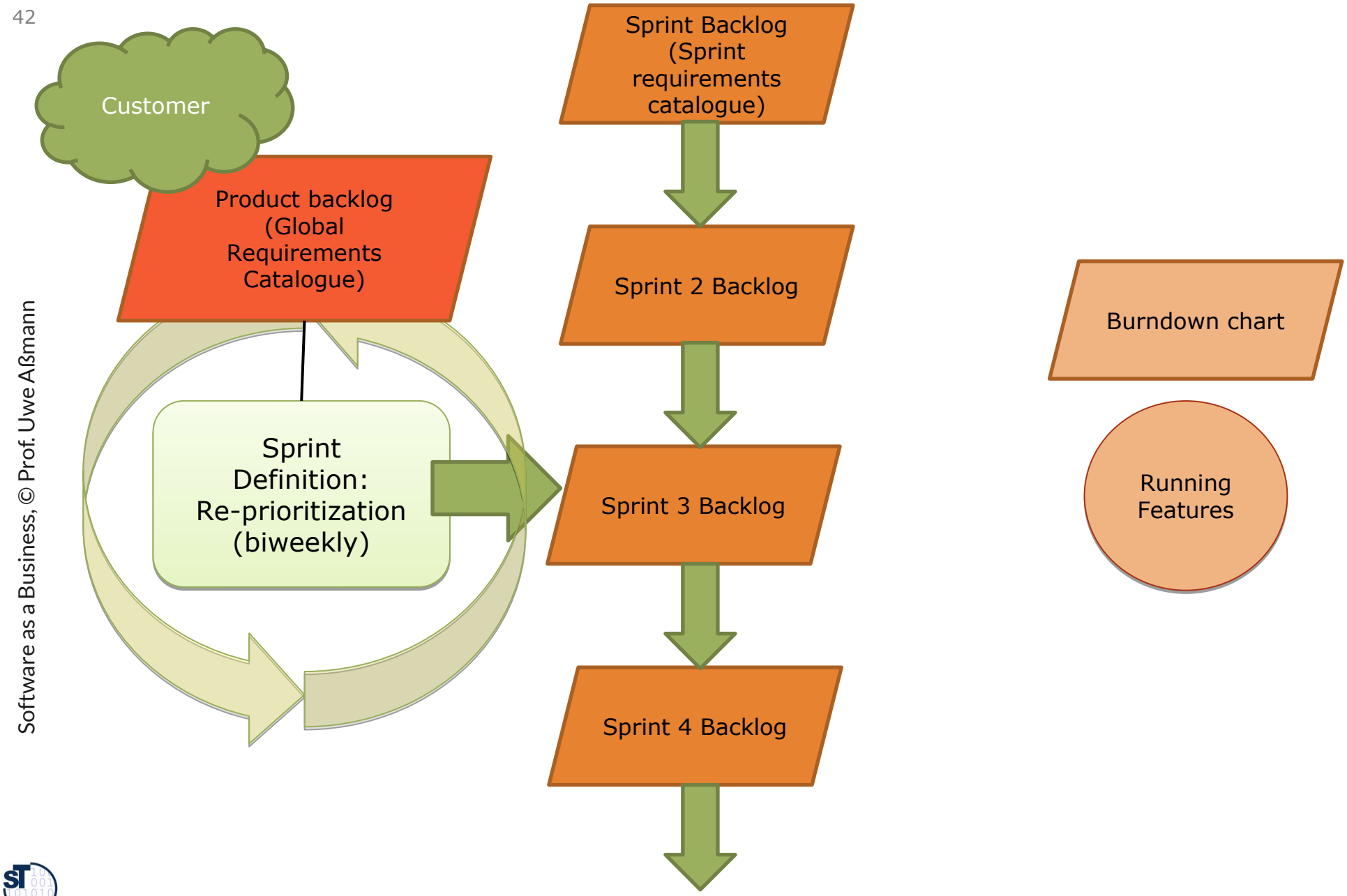
Unrolled SCRUM Milestones

42



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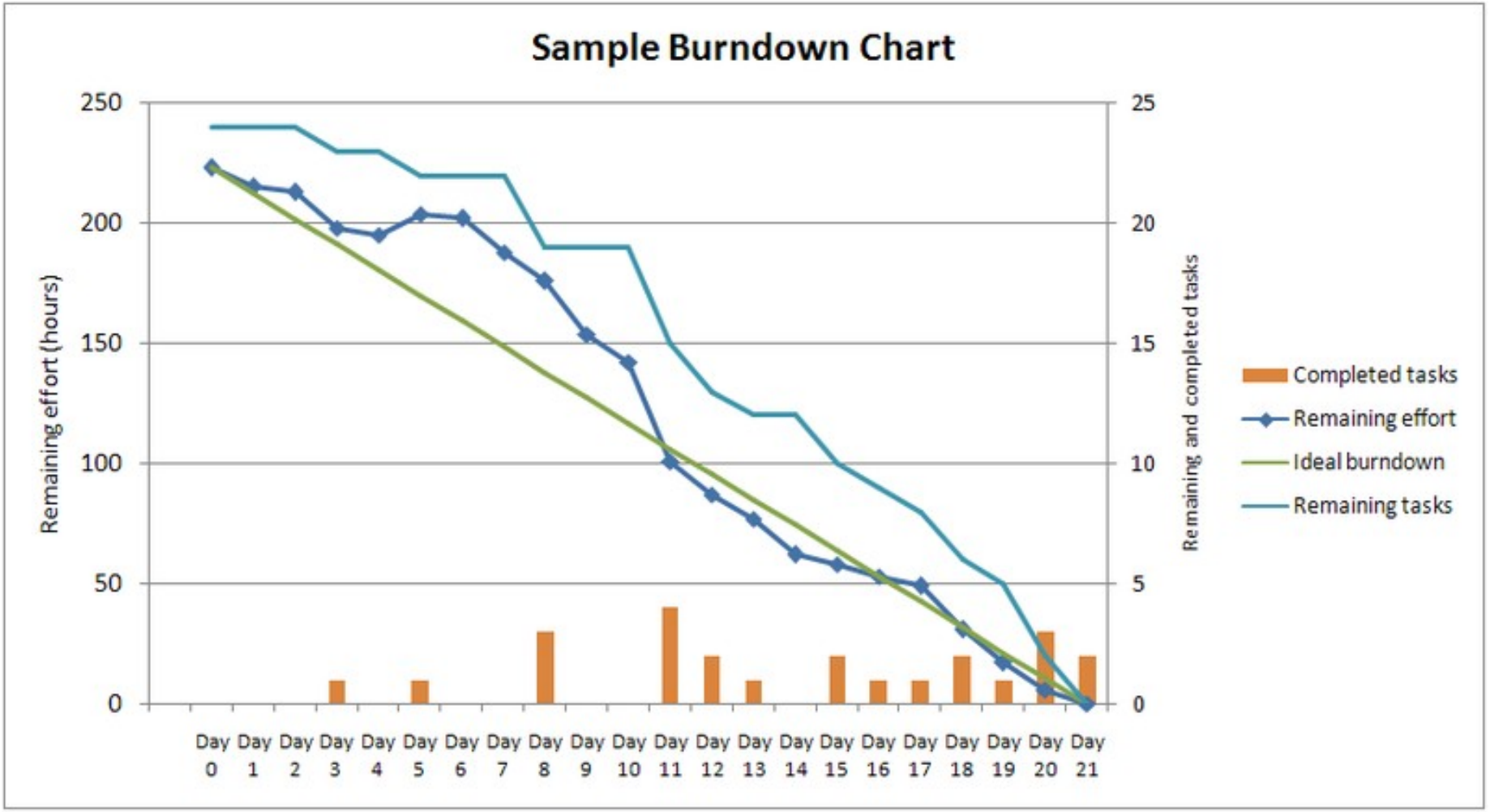
Burndown Charts - Reality Check during the Sprints

- A **burndown chart** measures the progress of the sprint in terms of running features



http://en.wikipedia.org/wiki/File:SampleBurndownChart.png

Prof. U. Aßmann, TU Dresden
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SCRUM is Very Popular

Controllability
fixed time-box of 14 days

Quality-gates
SCRUM offers simple quality gates (burndown chart of product backlog)

Customer-driven
Customers are interviewed for repriorizations of requirements (agility)

Agile
Repriorisation in the sprint definition before the start of a sprint

Appr. 50% of all software companies use SCRUM

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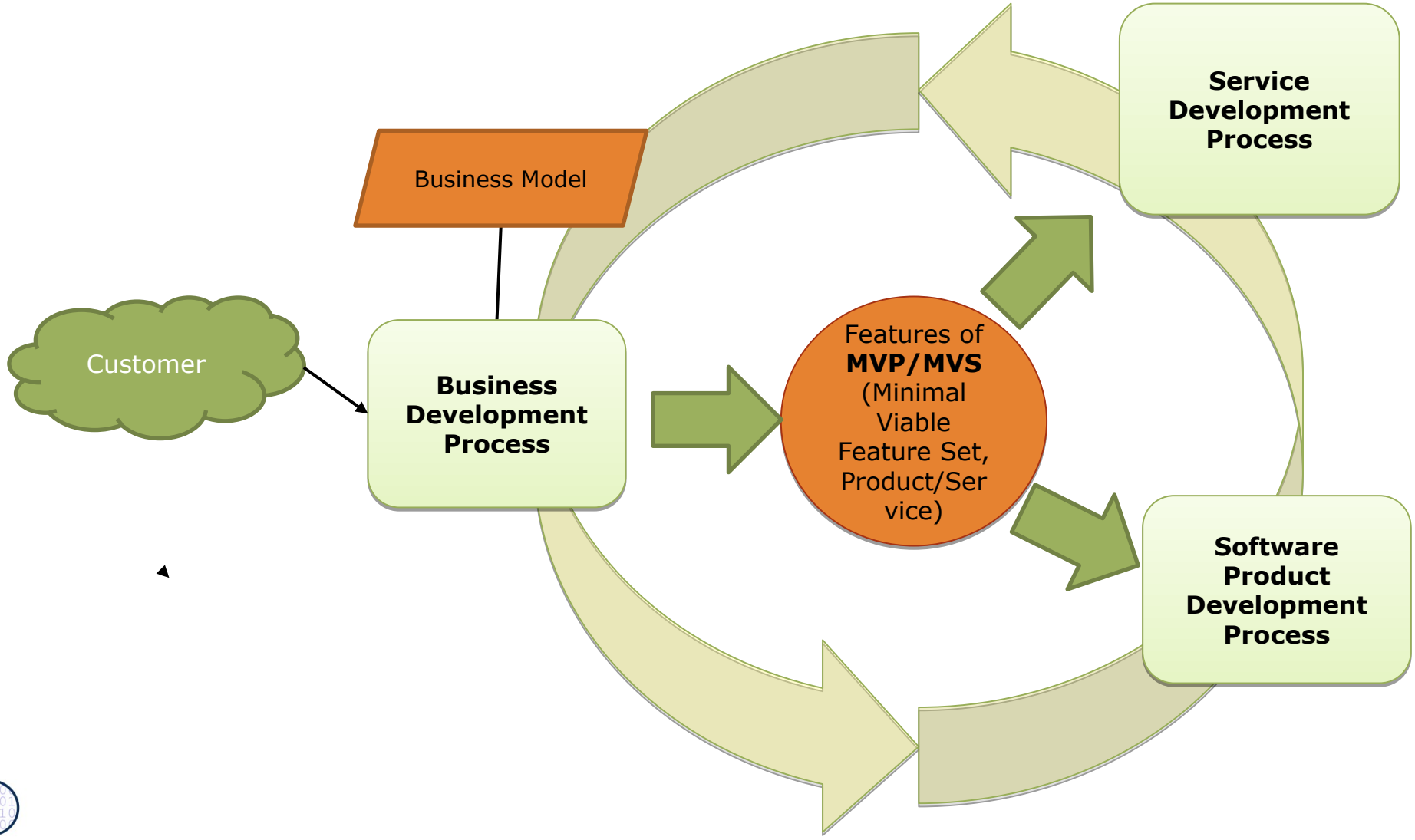
03.3.2. Agenda Planning in a Sprint of the Triple SCRUM

- Customer-Centric Development, Customer available for discussions
  - Continuous Integration, Test-driven development
  - Self-organizing team

Three SCRUM Processes in the Life of a Software Startup

- Interface: Features of Minimal Viable Product (MVFS) and vertical prototype (MVP)



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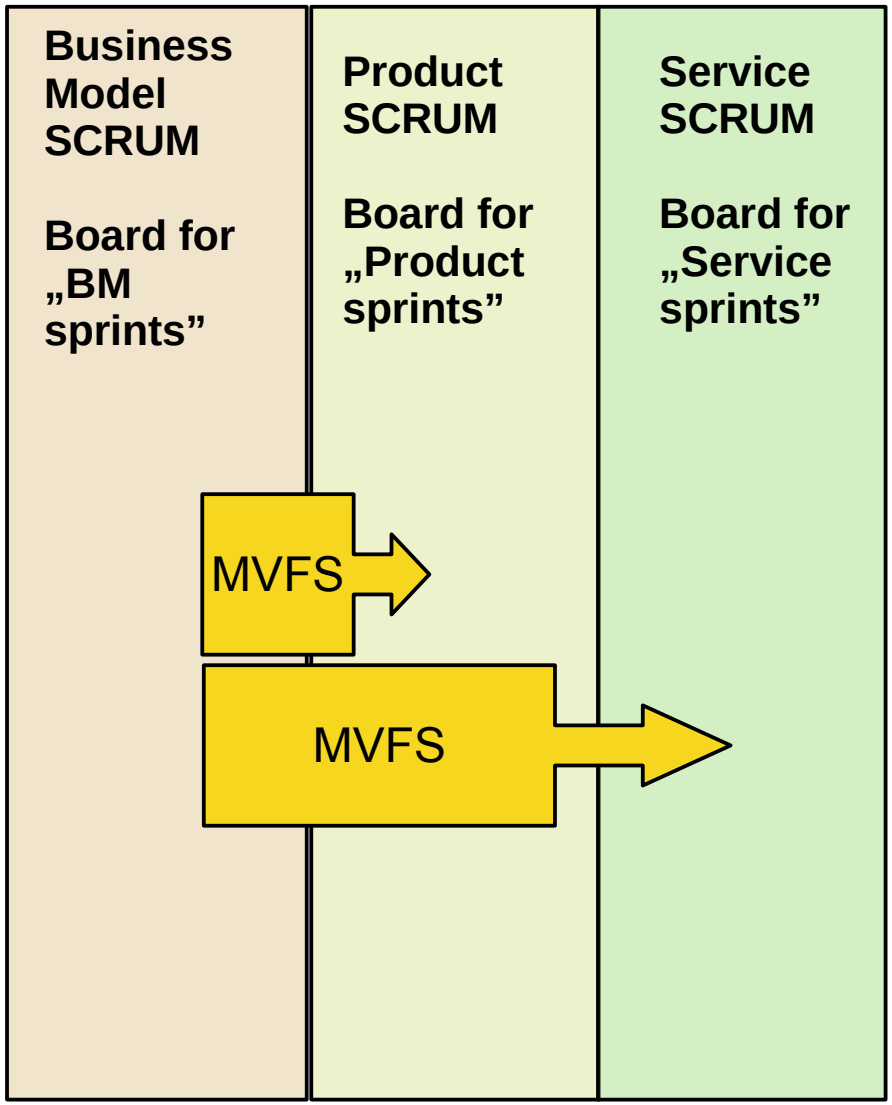
Triple SCRUM links Three SCRUMs

- On the Way to the MVP a startup has to master 3 SCRUM processes together
- MVFS (feature model) and MVF are the interface between the boards



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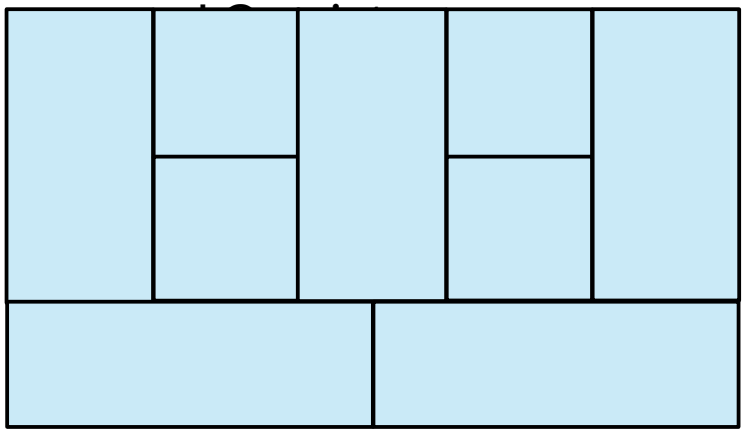
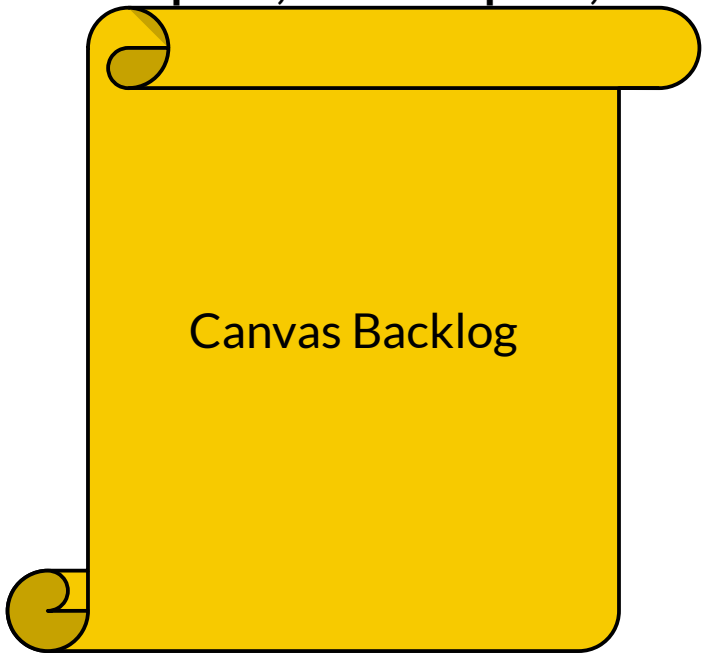
Agile Working on the Business Model: Sprints with Canvases

- BM Sprints manage customer interview task over canvases.
- Every canvas is linked to a **backlog of agenda (to do) items**
  - Empty fields to be filled (Initial filling of the backlog, in filling order)
  - New questions to be answered
  - New answers to be discussed
  - Evaluation questions to be answered
  - Problems noted
- Backlogs are burned down in **canvas sprints (question sprint, answer sprint, valuation sprint)**
  - BMC sprint





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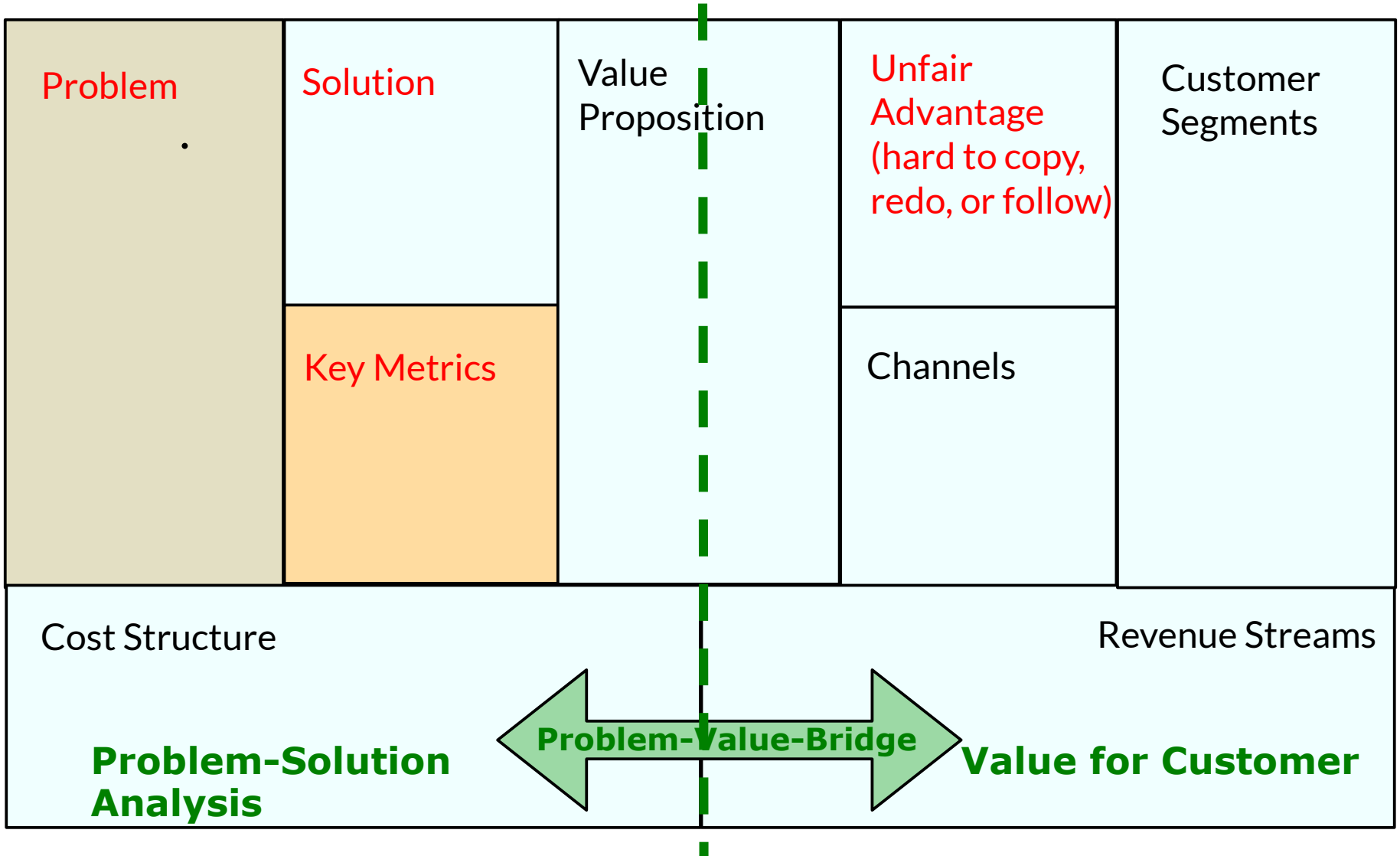
Remember:
Lean Canvas [Maurya] [http://leancanvas.com/]

- The Lean Canvas supports Problem-Objective-Solution-analysis (POA) during sprints



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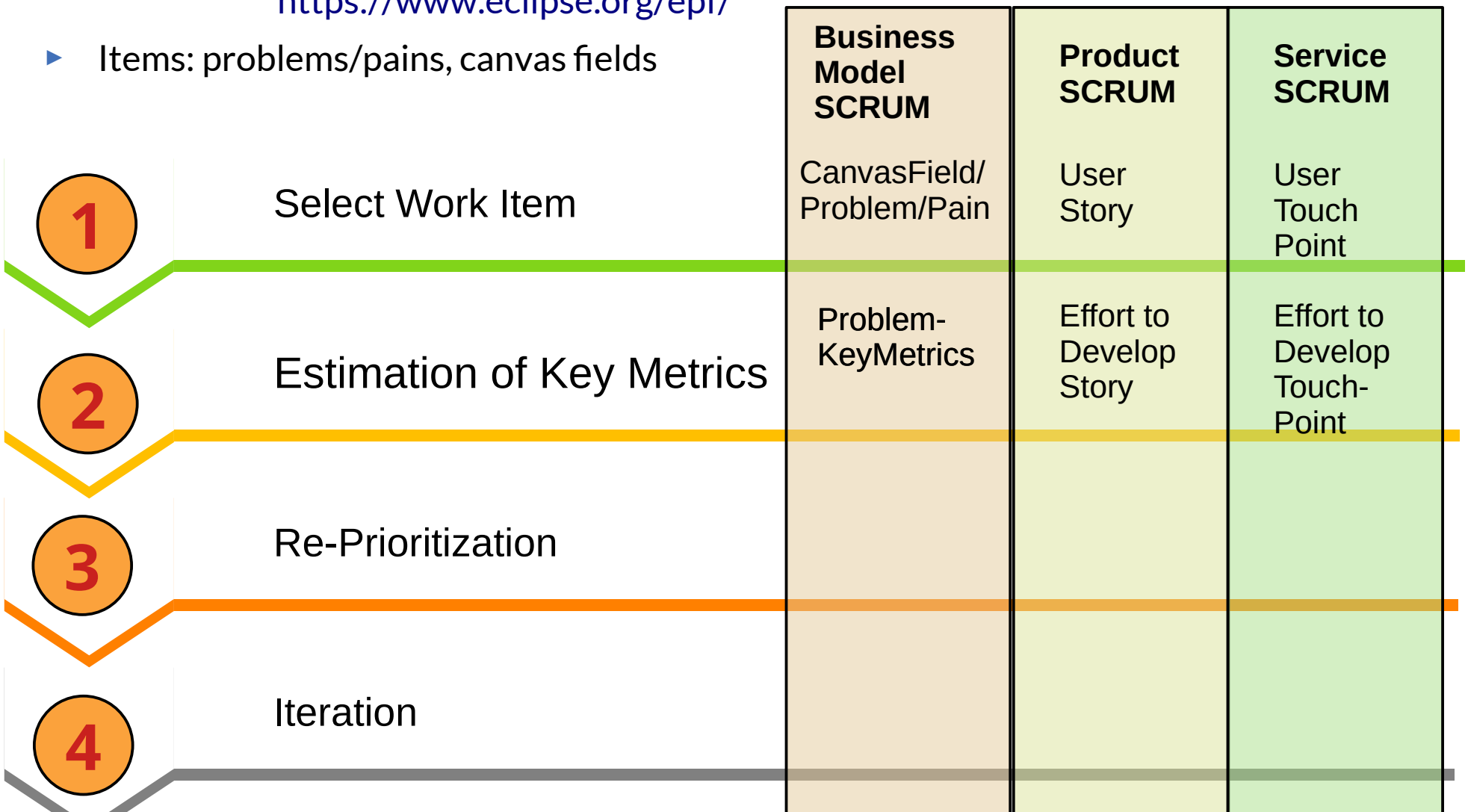
Iteration Planning for Triple-SCRUM Sprint Planning

- Project planning in iterations with "***Planning Game***" from Extreme Programming
  - Guideline: Planning Game. Eclipse Process Framework, https://www.eclipse.org/epf/
- Items: problems/pains, canvas fields



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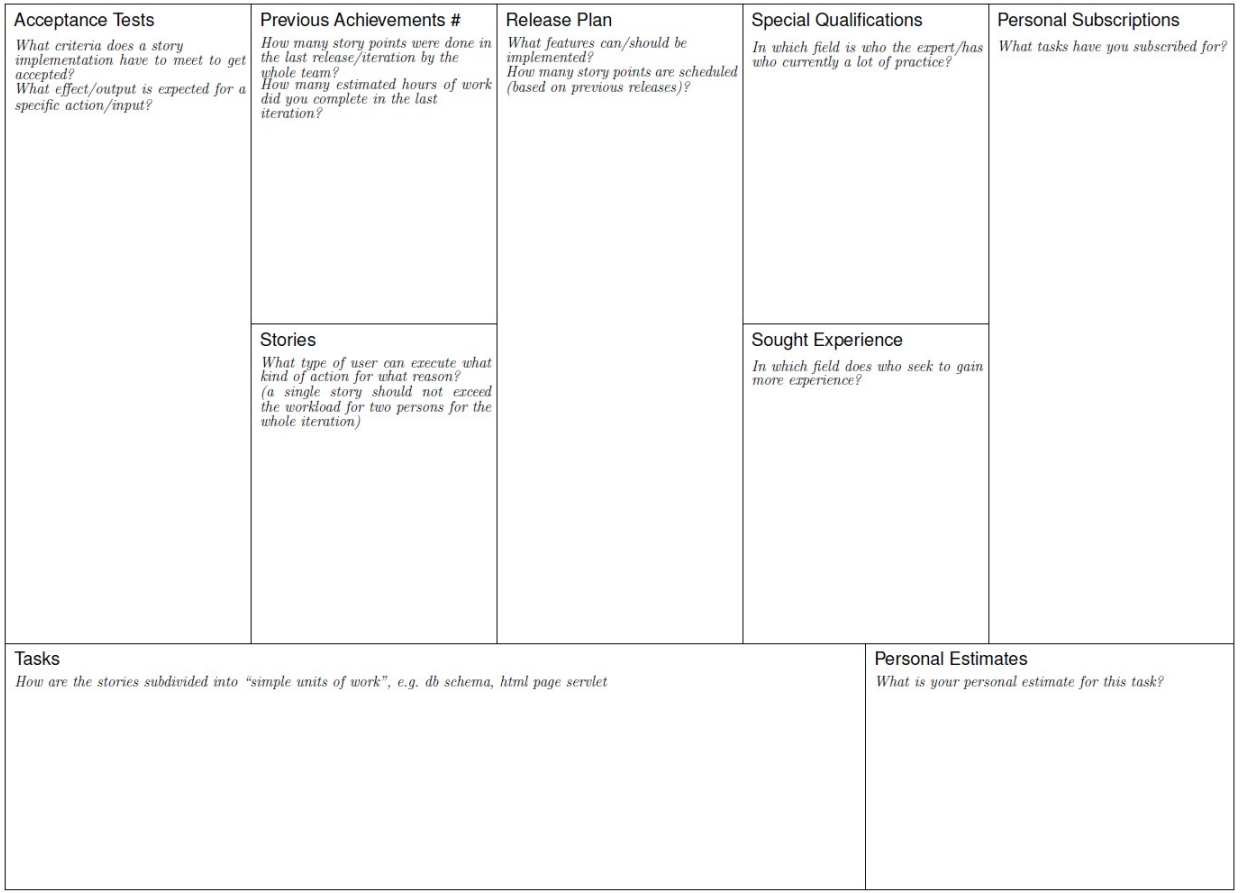
Example: Iteration Planning Canvas

[Korger]

- Iteration Planning Canvas can drive the Product and Service SCRUMs, working on Customer Feedback and TouchPoints



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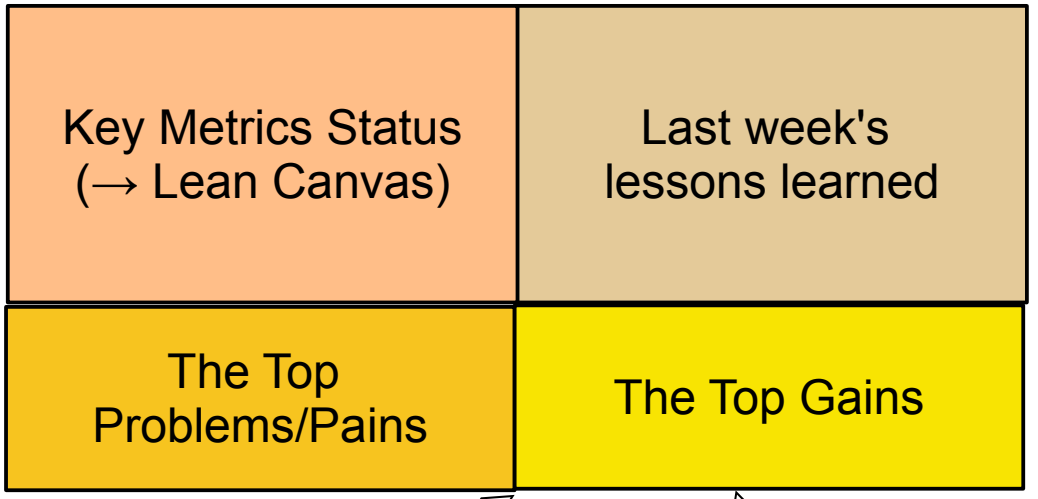
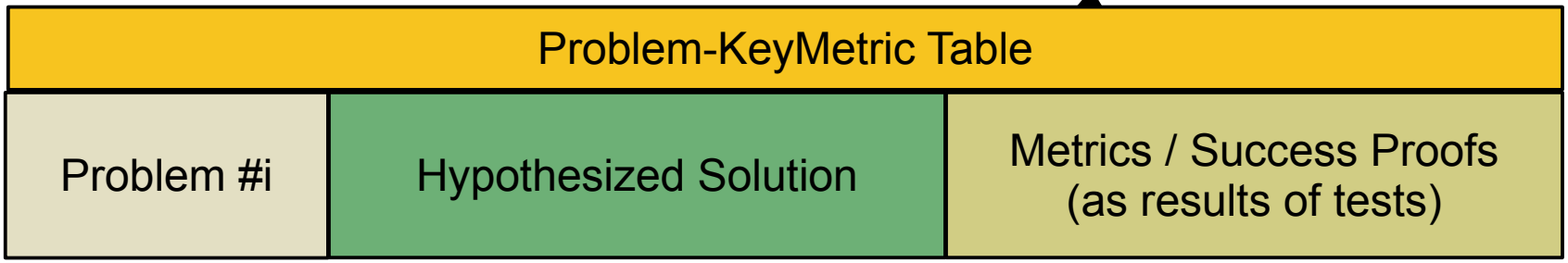
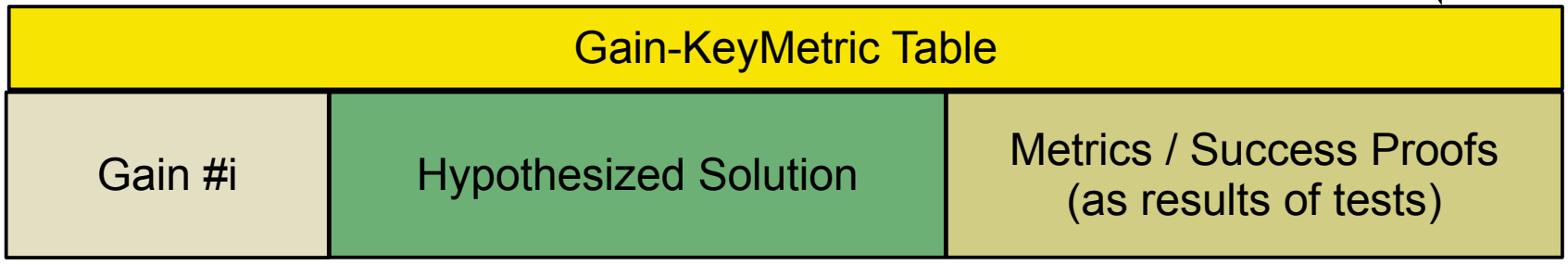
Lessons Learnd Canvas (LLC) Works as Subcanvas of VPC and LC: Problems with KeyMetrics

[Lean Analytics, Chapter Stickyness, p 220]

- The work items in the Lean-Measure Incubation Sprints are Problem items, arranged in an LLC
- 1-Week sprint with hypothesis testing as task
- The objective is to learn about the customer
- LLC maintains a ranked list of problems with hypotheses, their tests, and their key metrics status
- LLC can be arranged in Kanban boards







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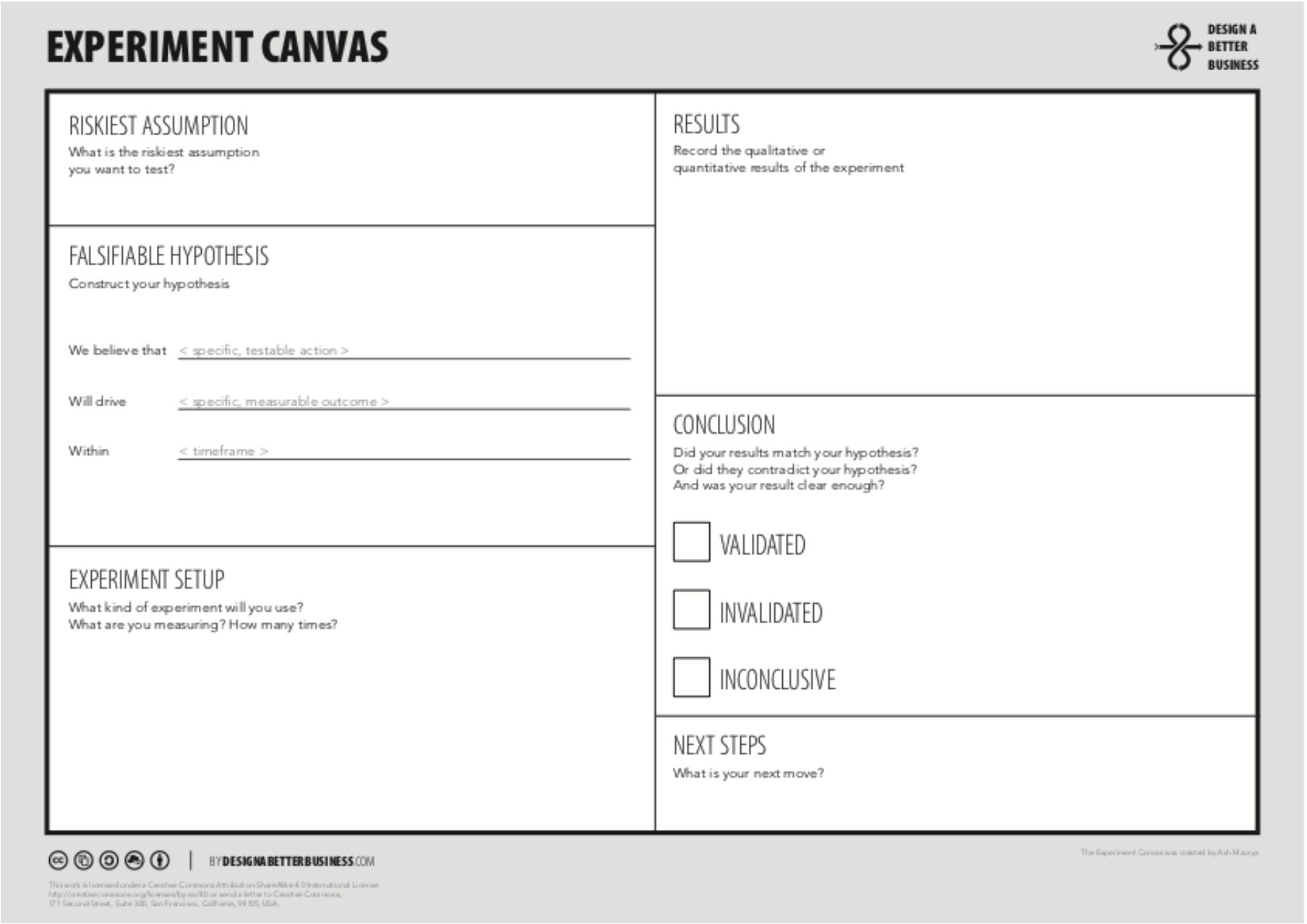
Experiment Canvas for Backlog Items



EXPERIMENT CANVAS

DESIGN A BETTER BUSINESS

RISKIEST ASSUMPTION

What is the riskiest assumption you want to test?

FALSIFIABLE HYPOTHESIS

Construct your hypothesis

We believe that < specific, testable action >

Will drive < specific, measurable outcome >

Within < timeframe >

EXPERIMENT SETUP

What kind of experiment will you use?
What are you measuring? How many times?

RESULTS

Record the qualitative or quantitative results of the experiment

CONCLUSION

Did your results match your hypothesis?
Or did they contradict your hypothesis?
And was your result clear enough?

☐ VALIDATED

☐ INVALIDATED

☐ INCONCLUSIVE

NEXT STEPS

What is your next move?

BYDESIGNABETTERBUSINESS.COM

The Experiment Canvas was created by Ash Maurya

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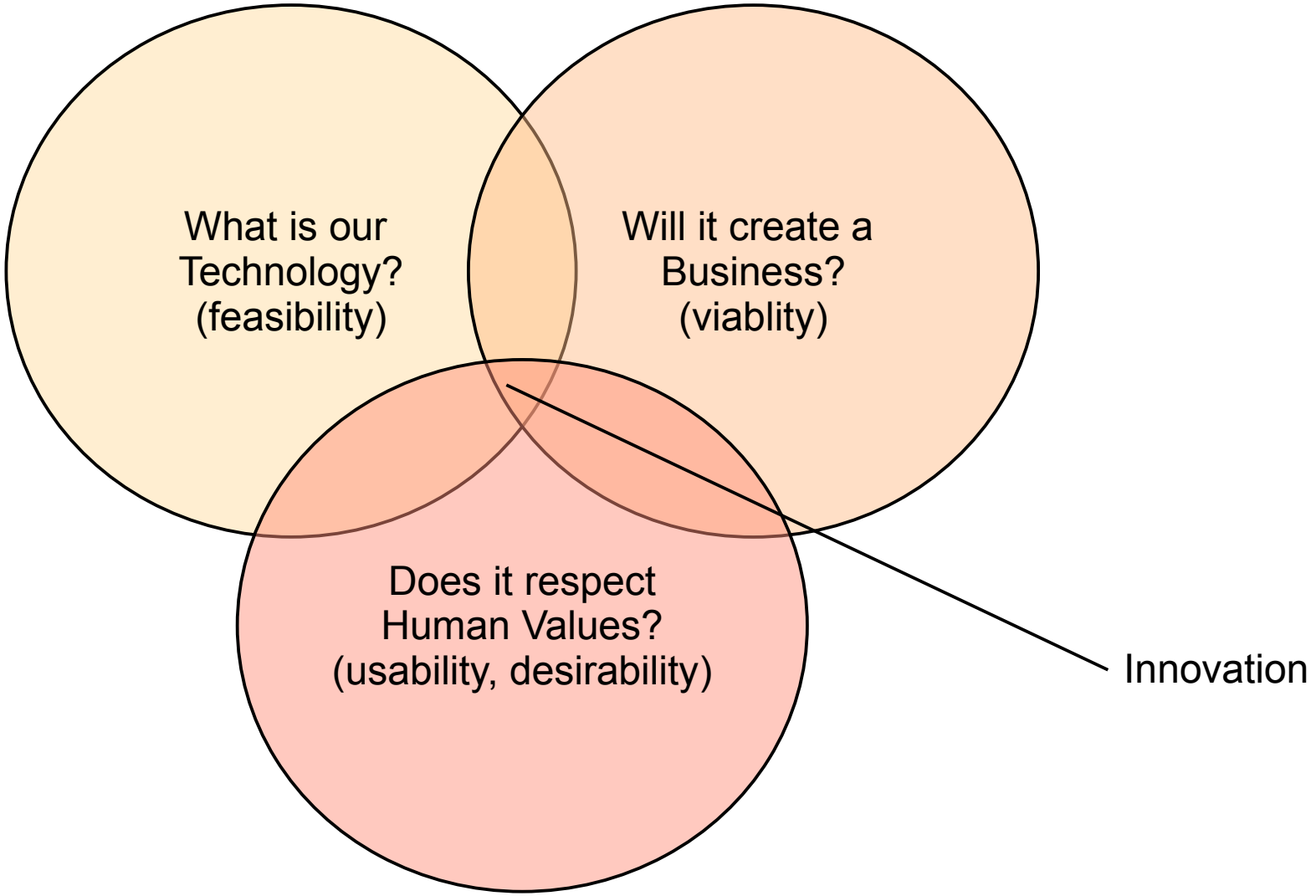
03.4 Assessment of the Maturity of Canvases (and Customer Interviews) in the BM Sprint

- At the end of every sprint, the canvases must be *assessed and graded*
- How to Evaluate the Maturity of a Value Proposition in a Canvas with Assessment Questions

Assessing with Assessment Questions from the Stanford Triple Match for Innovations



http://dschool.stanford.edu/our-point-of-view/

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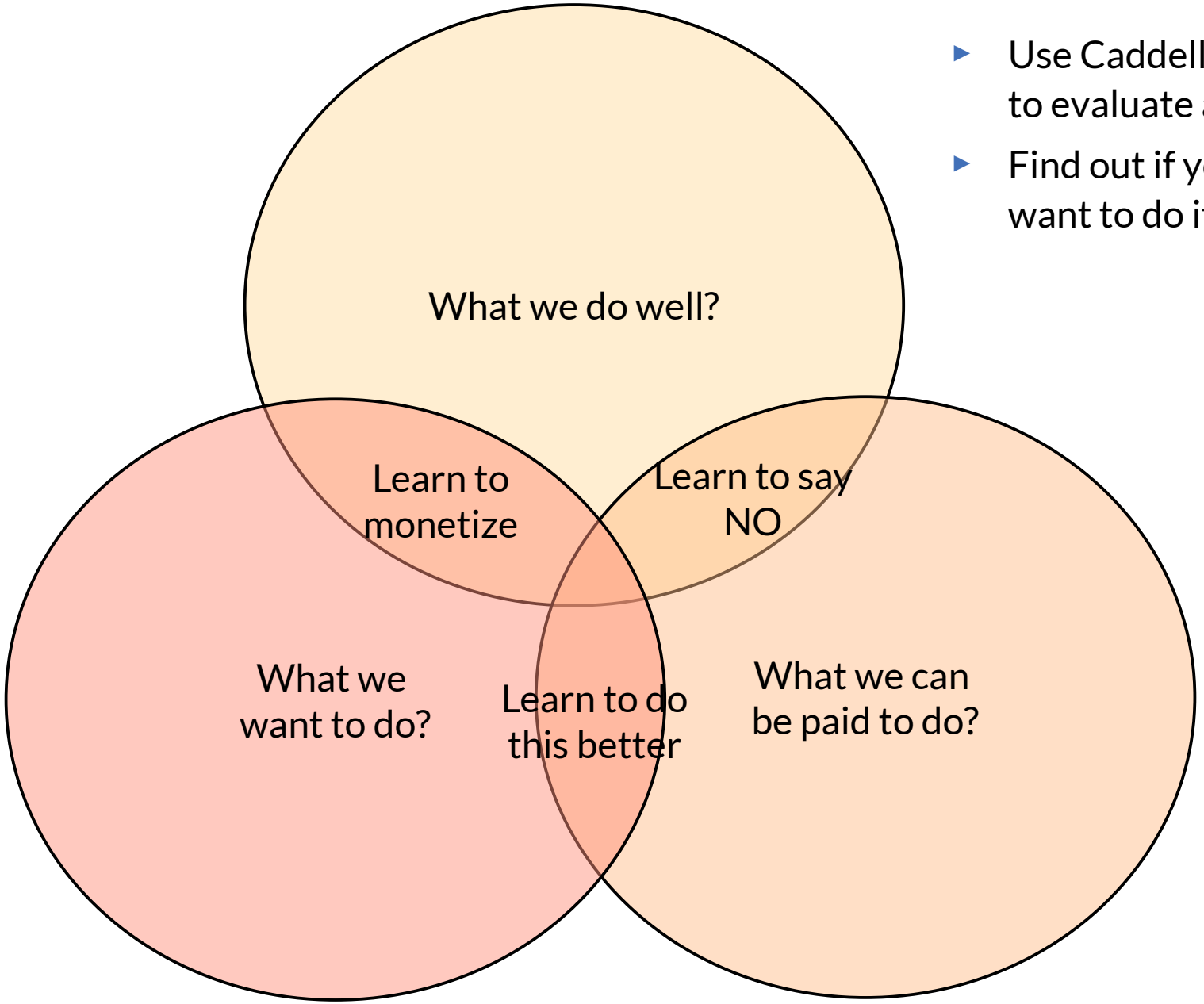
Assessment Questions from Bud Caddell's Triple for Innovators

http://www.whatconsumesme.com
https://www.flickr.com/photos/bud_caddell/3592960452

- Use Caddell's Questions to evaluate a canvas
- Find out if you really want to do it



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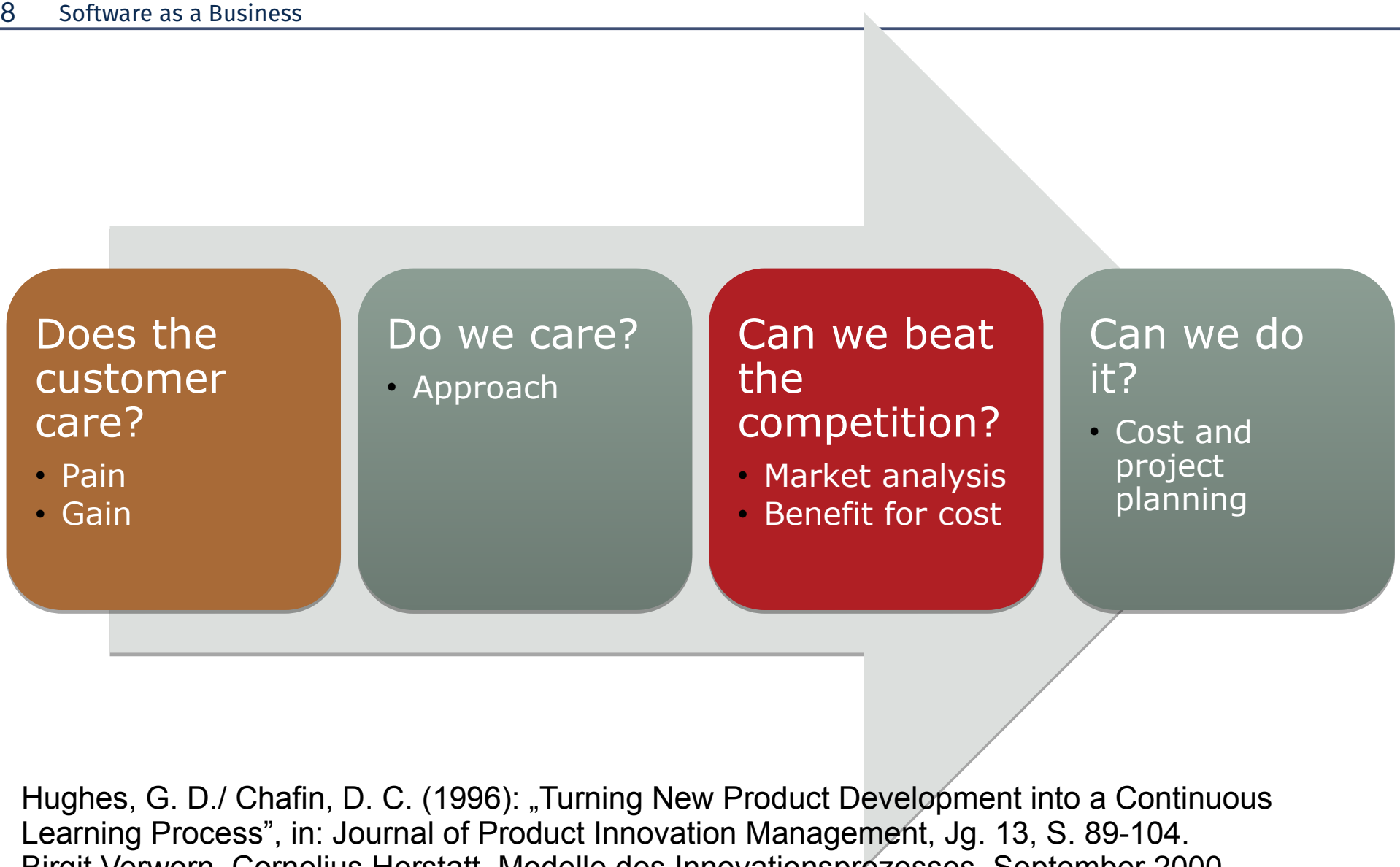
Assessment Questions with the Value Proposition Cycle (Hughes-Chafin)



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Hughes, G. D./ Chafin, D. C. (1996): „Turning New Product Development into a Continuous Learning Process", in: Journal of Product Innovation Management, Jg. 13, S. 89-104.
Birgit Verworn, Cornelius Herstatt. Modelle des Innovationsprozesses. September 2000. Arbeitspapier Nr. 6.
TU Hamburg-Harburg. http://www.tuhh.de/tim/downloads/arbeitspapiere/Arbeitspapier_6.pdf

Grading by SWOT-Matrix 4dim. Grading Analysis for SWOT-BMC

- For a **strategic canvas assessment analysis**, create a table (matrix canvas), brainstorm and grade on the crossproduct (**multi-dimensional analysis/grading)**
- For instance, give school grades of 0..5, 0..10, or 0..15 (worse..better)
- [BMG] suggest to give positive grades (1..5) and negative grades (1..5)

	Key Partners	Key Activities	Key Resources	Costs	Value Propositions	Customer relationships	Channels	Customer Segments	Revenues
What are the Strengthes?	1..5					1..5			
What are the Weaknesses?									
What are the Opportunities?								1..5	
What are the Threats/Risks?									1..5

[BMG p.216ff]

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4-dim. Grading Questions SWOT-LeanCanvas

- Lean Canvas can also be crossed with SWOT and evaluated

	Problems	Solution	Key Metrics	Cost structure	Value Proposition	Unfair Advantage	Costumer Segments	Revenue Streams
What are the Strengthes?								
What are the Weaknesses?					1..5			
What are the Opportunities?	1..5							
What are the Threats/Risks?								

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How to Find Assessment Questions for the Matrix Analysis SWOT-BMC

 [BMG p.216ff]

The questions for assessment can be found by inspecting the following categories (3rd dimension):

- **BeNiSiLo: Better – Nicer – Simpler – Longer-lasting**
- **SMART**: Simple – measurable – achievable – realistic - timable
- **CCC**: Checkable/Measurable – consistent – complete
- **CoTiQQ**: Cost – time – quality - quantity
- Predictability – efficiency – effective - imitable – transparent

BeNeSiLo	Key Partners	Key Activities	Key Resources	Costs	Value Propositions	Customer relationships	Channels	Customer Segments	Revenues
How much is it better?			1..5						
How much is it nicer?							1..5		
How much is it simpler?									
How much is it longer-lasting?									

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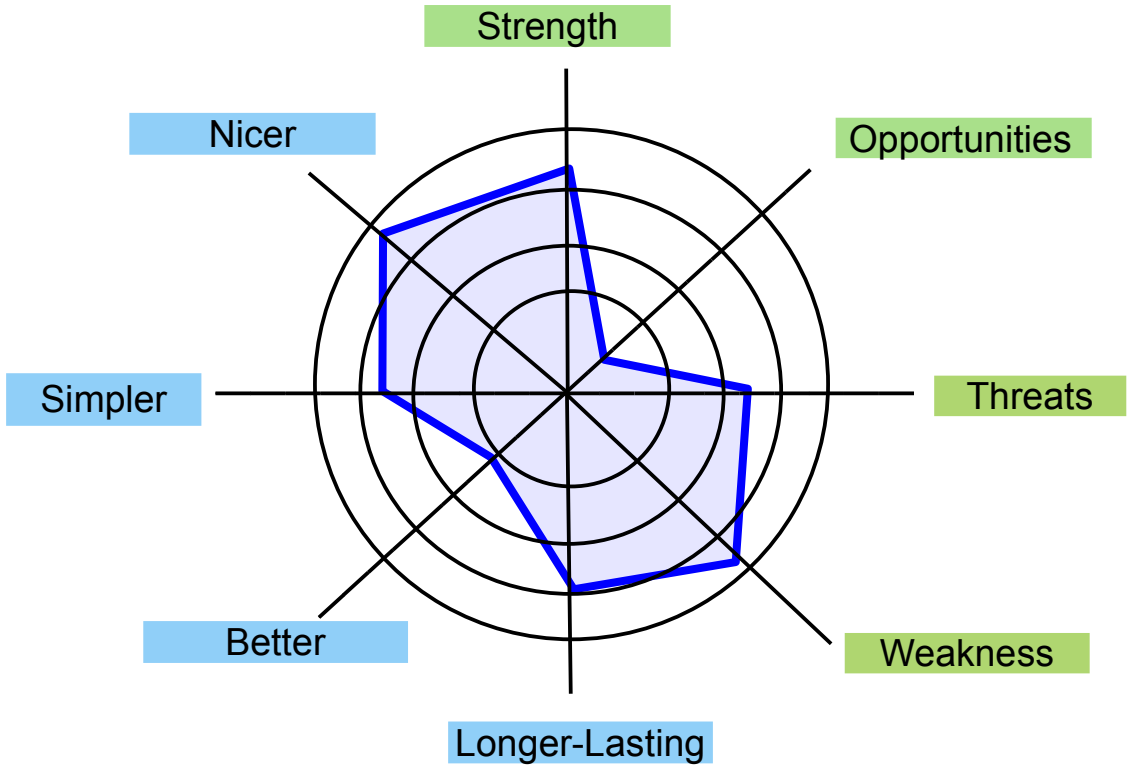
Radar Charts (Kiviat Charts) for Multidimensional Analysis



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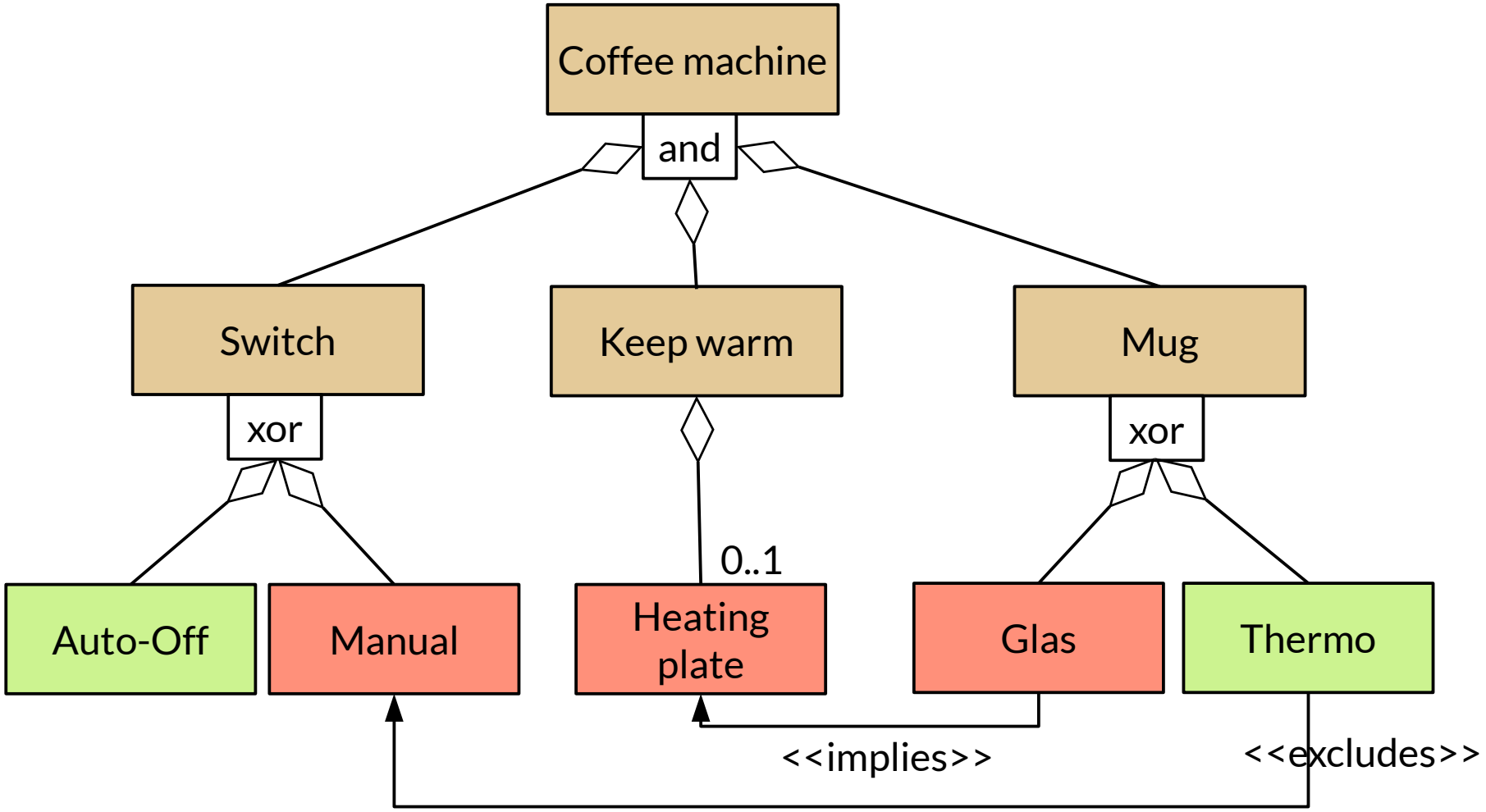
03.5 Determining Minimal Viable Feature Set, Key Features and the MVP with Feature Trees

- „Features" are „High-Level Functions" of the product

Re-Selecting the MVP in the MVFS Feature Model ("Features are High-Level Functions")

- If a customer interview changes the metrics of the deep BMC, the MVP has to be checked and eventually, re-selected (from red to green)
- From the many possible features, the *minimal viable feature with the highest metric value* must be selected (which is implemented)



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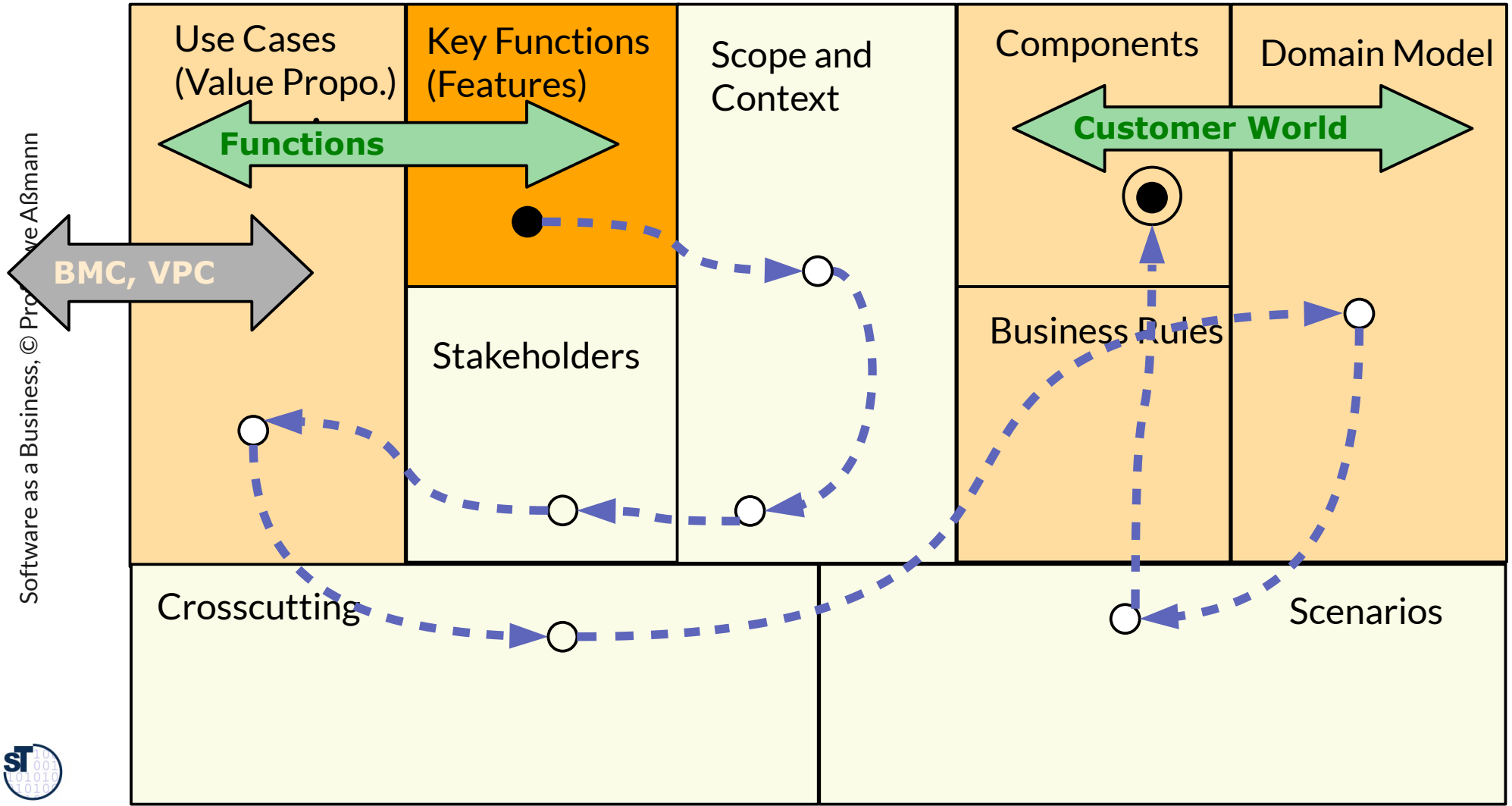
Requirements Engineering Canvas (ReqEC)

- [Oddoy] suggested a canvas to engineer requirements and functions for the MVP
- The ReqEC takes the feature model and derives many other models; it is the start of a software project
- This is a bridge to the design of the vertical prototype (MVP) as well as to the feature tree of the MVFS



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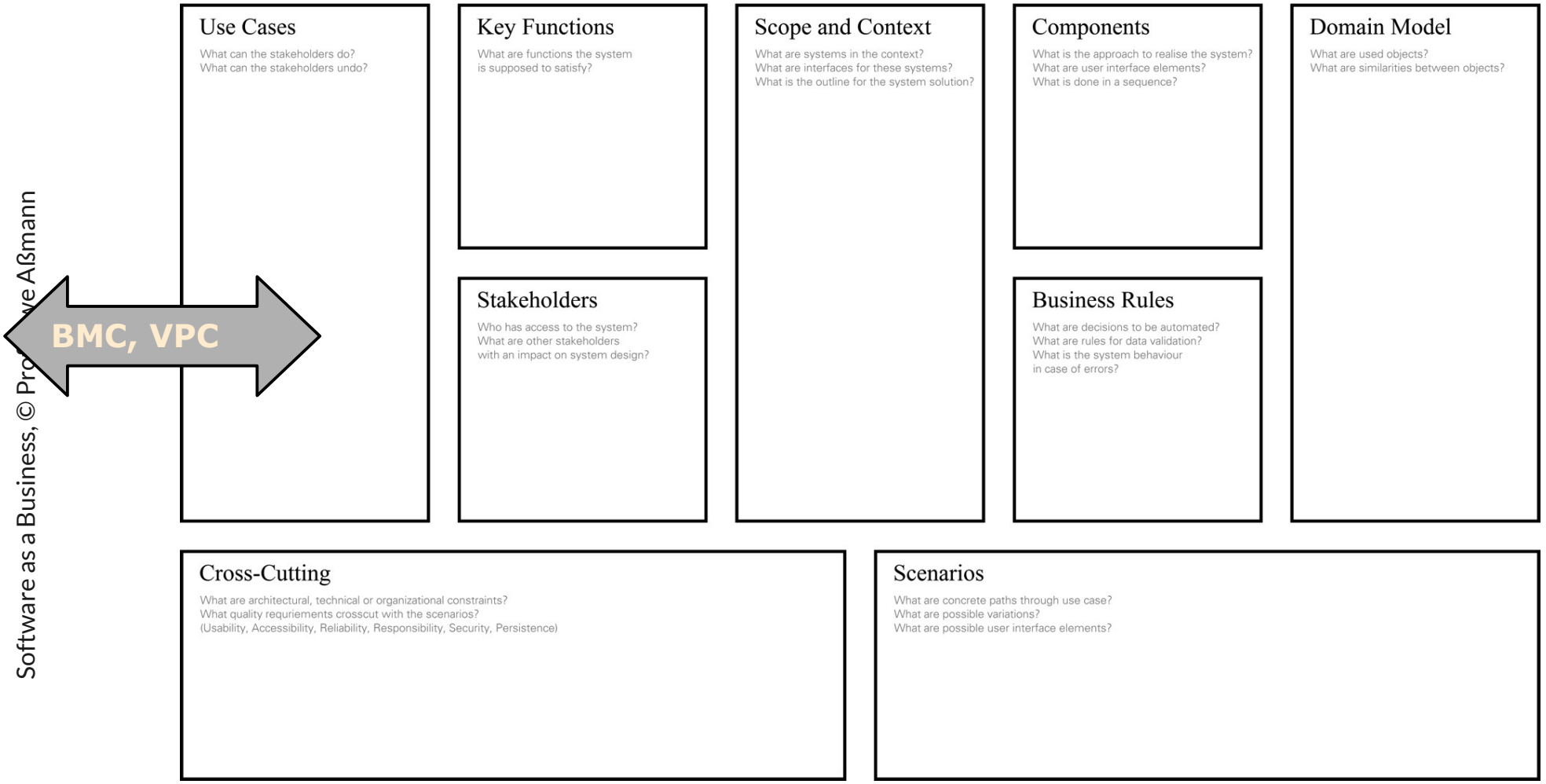
Requirements Engineering Canvas (ReqEC)

- [Oddoy], C. Wende, Belegarbeit at Chair of Software Engineering, Prof. Aßmann (2014)



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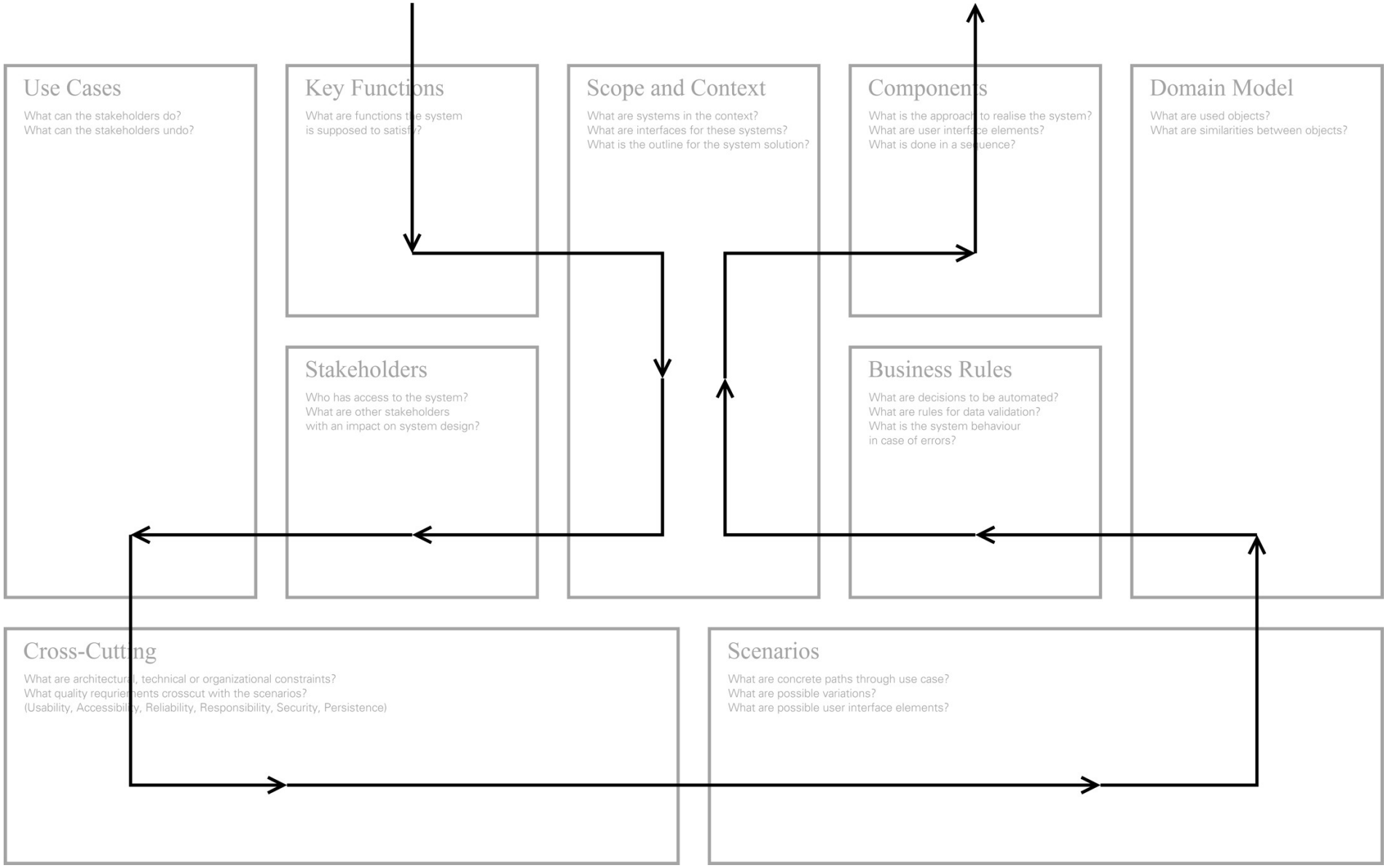
Fill Order of ReqEC



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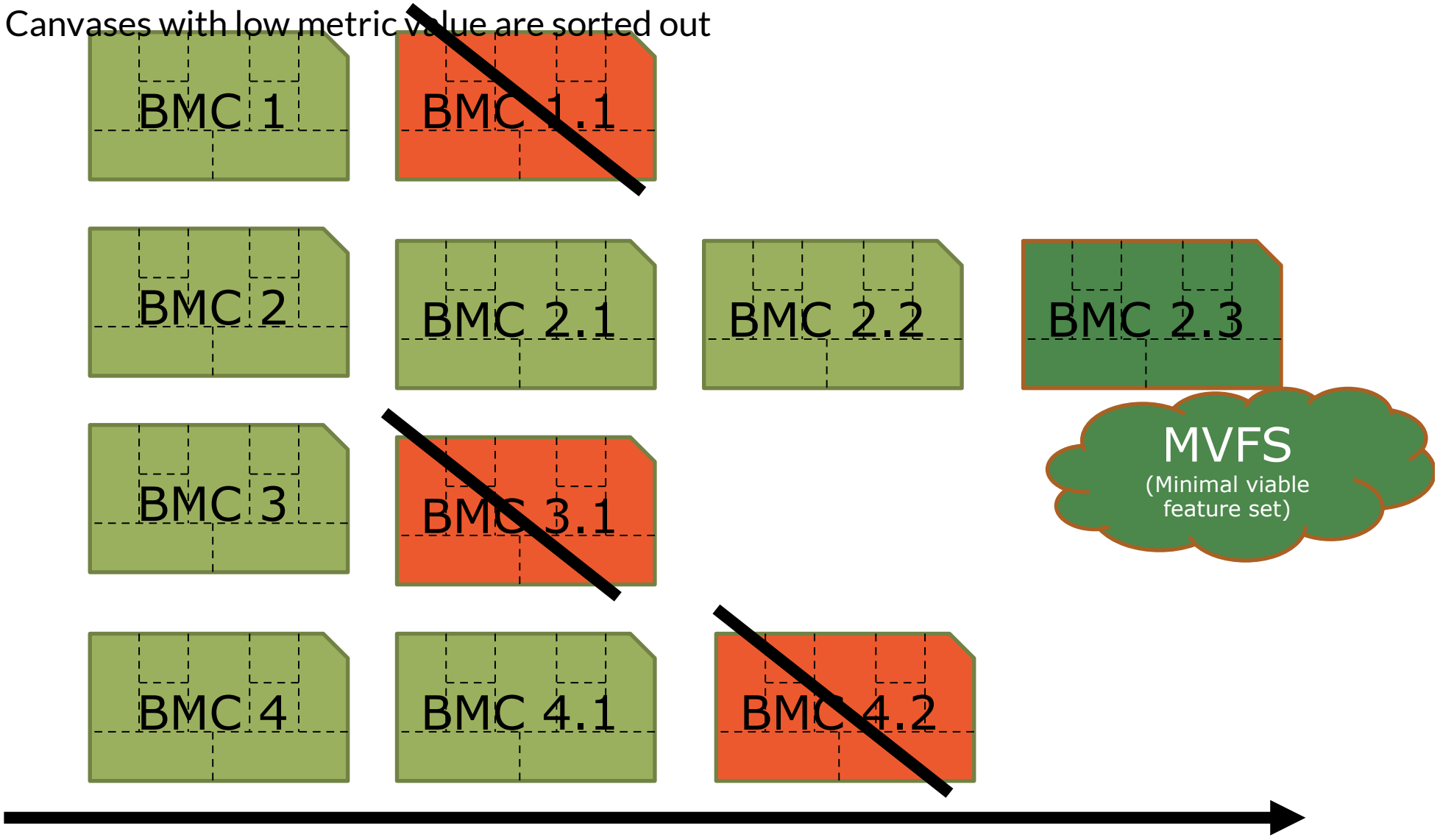
03.6 The Canvas Cactus and the Triple SCRUM

- From Lean Analytics, Chapter Stickyness, p 220
- The work items in the Lean-Measure Incubation Sprints are Problem items, arranged in an LLC
  - The objective is to learn about the customer

Sorting out Inappropriate Business Model Canvases in the BM SCRUM

Canvases with low metric value are sorted out



http://www.ashmaurya.com/wp-content/uploads/2011/06/test.png

[Maurya]

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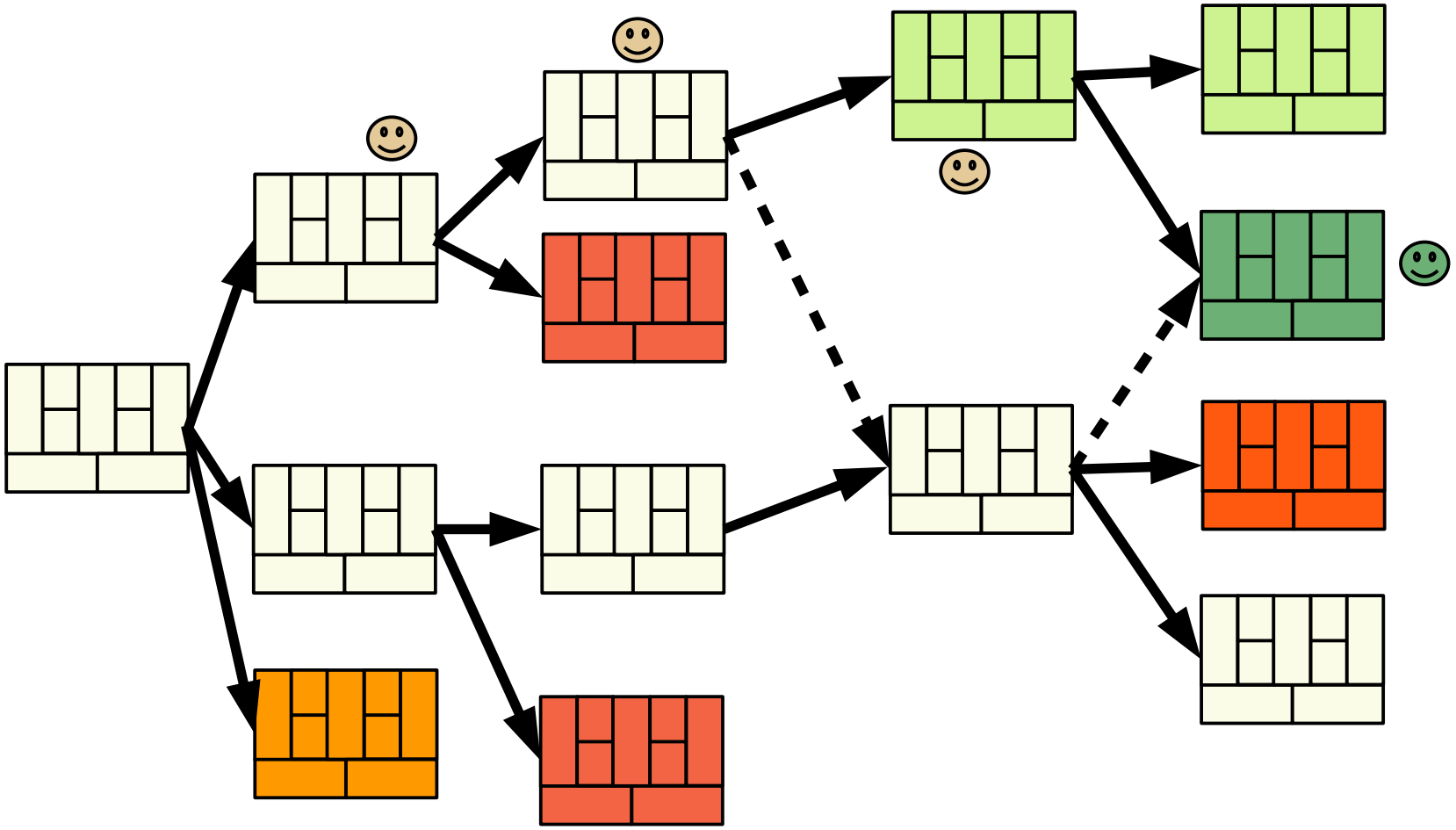
The Business Model Canvas Cactus

- Growing a link tree with side edges (dag cactus) out of a first version
- Assess with metrics (BMC SWOT assessment,
  - Then with red-yellow-green; choose a current “champion” in the feature tree
- Remember: **BMC is deep!**



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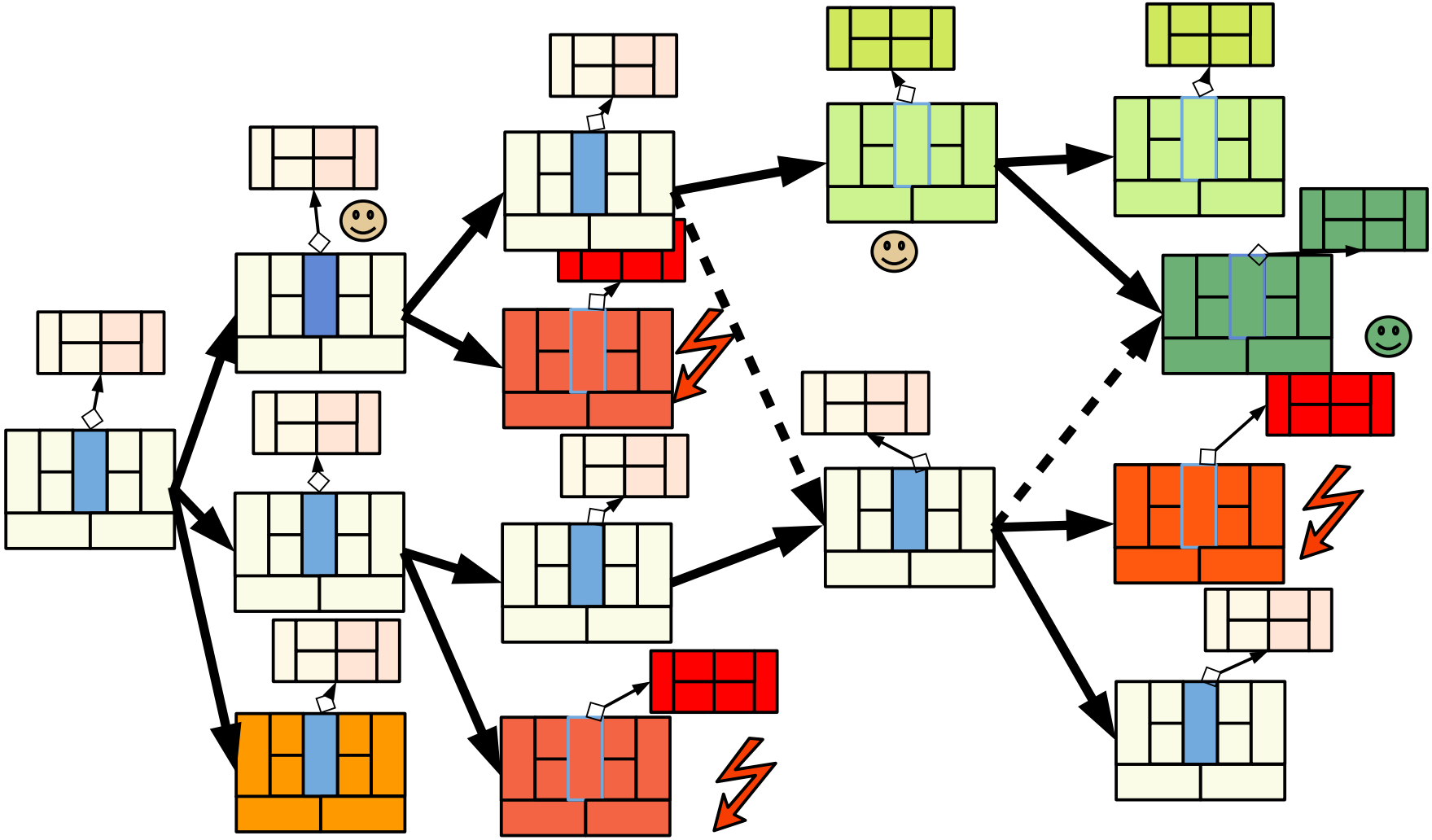
The Evolving deep-BMC-VPC Canvas Cactus (extended)

- Growing a tree with side edges (link tree - cactus) out of a first version
  - Assess with metrics and red-yellow-green; choose a current “greenest” “champion”
- Every step tests **hypotheses** about the customer and **changes metrics**
- Not too many canvases are kept active (small dashboard)



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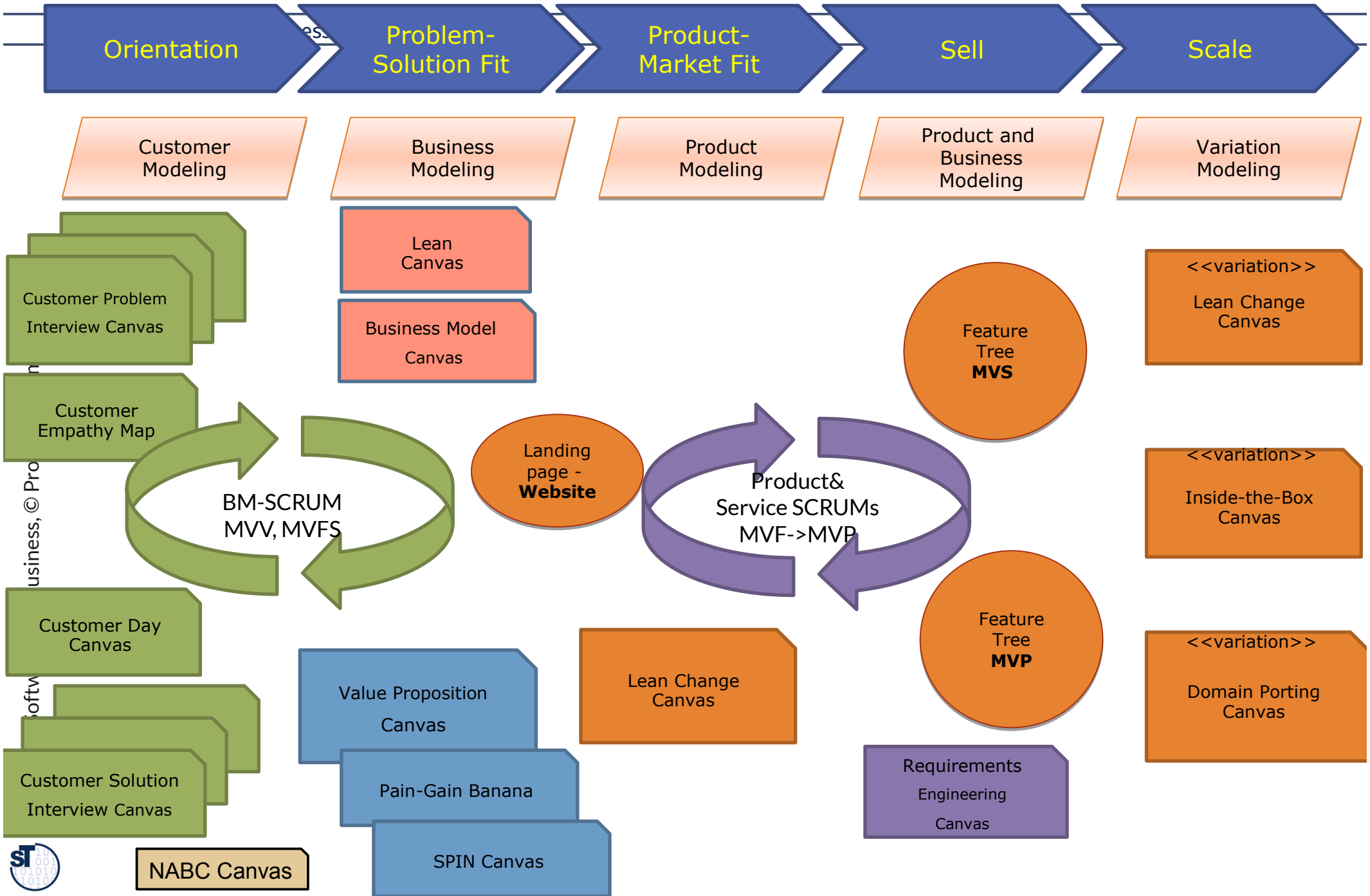
Overview of Canvases and Startup Maturity Phases



The Goal: Measure the Startup Readiness Level by Milestones of the BMC

[www.steveblank.com, Nov. 2013]

1. First-Pass Minimal Marketable Feature Set (MMVS)
2. First-Pass Value proposition
3. **First-Pass BMC (IRL 0.1)**

Or entat on

4. Market Size and Competitive Analysis
5. Problem-Solution Validation
6. **Low-Fidelity Prototype (alpha-MVP 0.5)**

Problem-Solut on

7. Product-Market Fit Validation
   1. Customer Development
8. Validation of Right Part of BMC (Customer)
9. **High-Fidelity Prototype (beta-MVP 0.9)**
10. Validation of Left Side of BMC (Resources)
11. Validation of other Relevant Metrics
12. **gamma-MVP 1.0**

Product-Market

MVP 1.0
(Minimal viable product)

Sell

Scale

Startup Readiness Level (SRL) Depends on Metrics

- The SRL of a startup results from the maturity level of several lean models:
  - Maturity Level of Value Proposition Canvas
  - Maturity Level of Empathy Maps (Customer Development)
  - The Blank Investment readiness level IRL
  - Maturity Level of Requirements Engineering Canvas
  - Maturity Level of Feature Trees with Pricing Model
- The SML is used to decide whether a startup has passed a stage gate

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Evaluating Startups for their Readiness Level

The Startup Readiness Level (Startup Metrics) can be computed
over all deep canvases of the canvas cactus

The Startup Readiness Level allows for automated (self-)monitoring of startups

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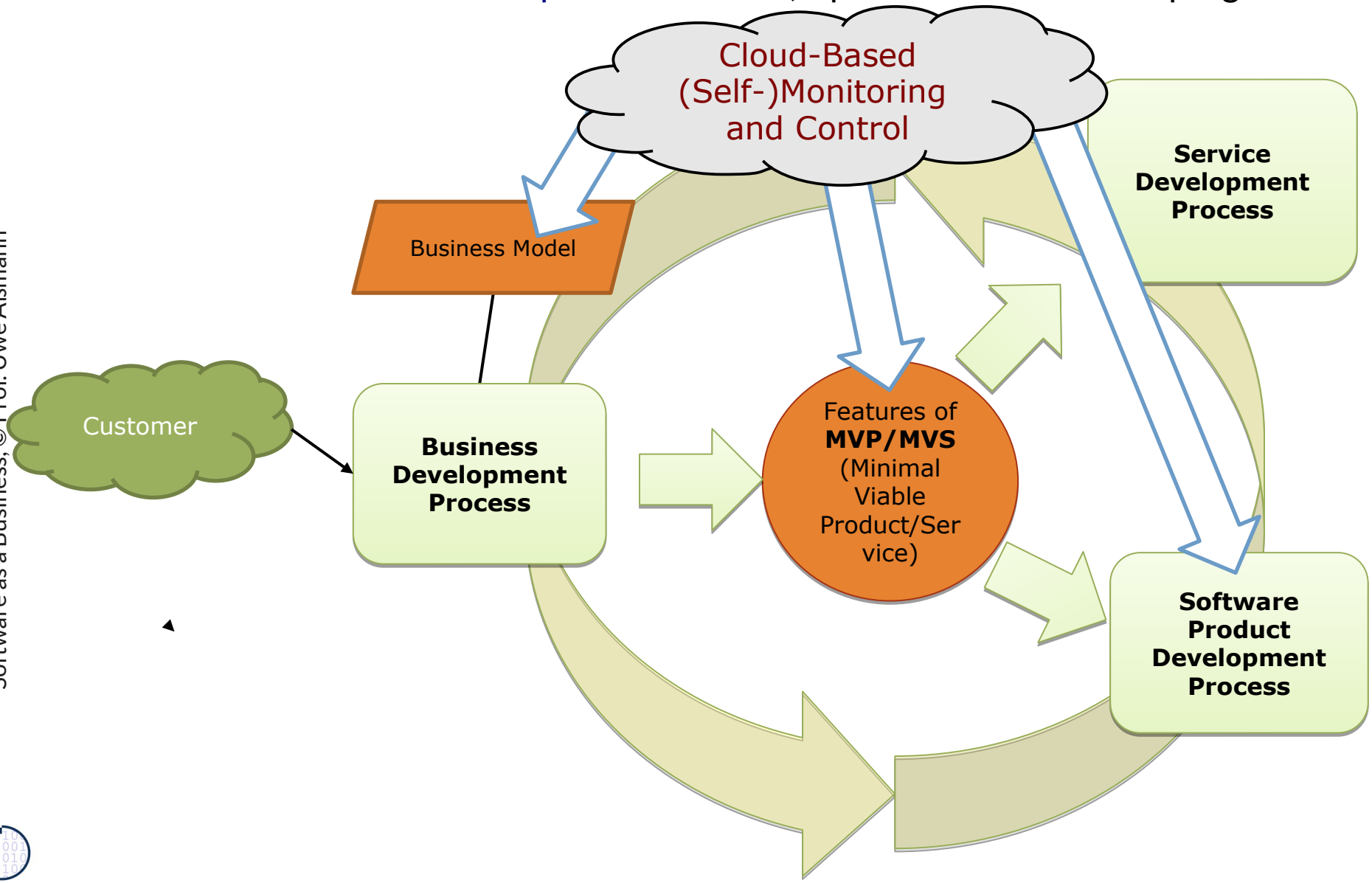
Speeding up Triple SCRUM with the Cloud

- Max Marmer founded http://blackbox.vc/, a portal to measure the progress of a startup



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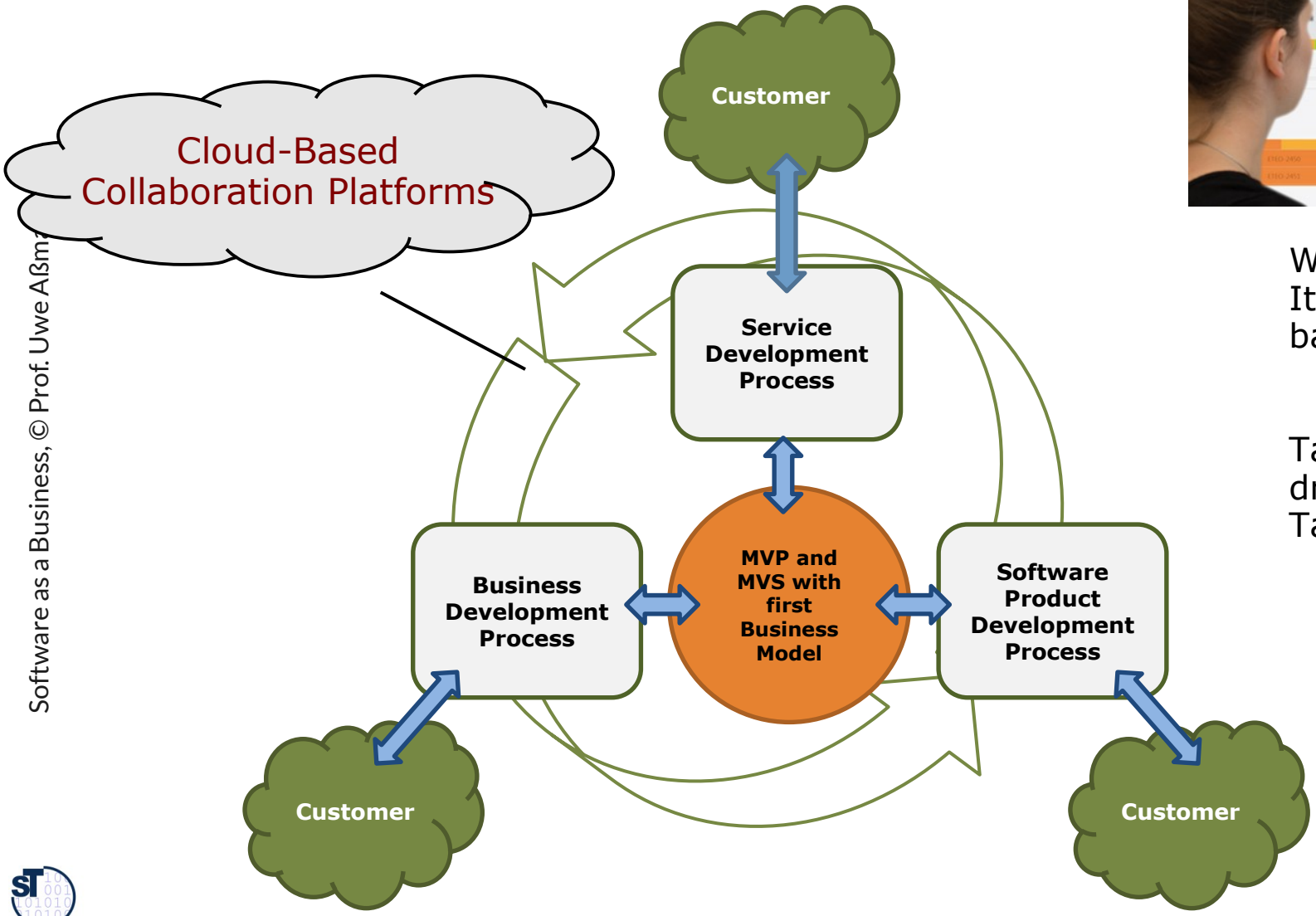
Cloud-Based Incubation: a Triple SCRUM on Modern SCRUM Platforms

Www.eteoboard.com
Iterations with SCRUM-based process control

Task.saab18.inf.tu-dresden.de:
Taiga platform



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Cloud-Based Incubation as SCRUM Incubation Process

Www.eteoboard.de

http://en.wikipedia.org/wiki/File:Scrum_task_board.jpg

- An **business development SCRUM** conducts sprints for finding the business model
  - Arranging customer interviews for requirements
  - Finding the minimal viable product (MVP)
- A **product development SCRUM** develops the MVP
  - From the MVFS
- A **service development SCRUM** develops the MVS, coupled with the MVP
- Advantages:
  - Controllability
  - Quality gates
  - Customer-driven

Software as a Business, © Prof. Uwe Aßmann

Incubation Backlogs will be Cloud-Based

- SCRUM boards can be cloud-based and virtual
- ETEO http://www.eteoboard.de/ (Saxonia Systems)

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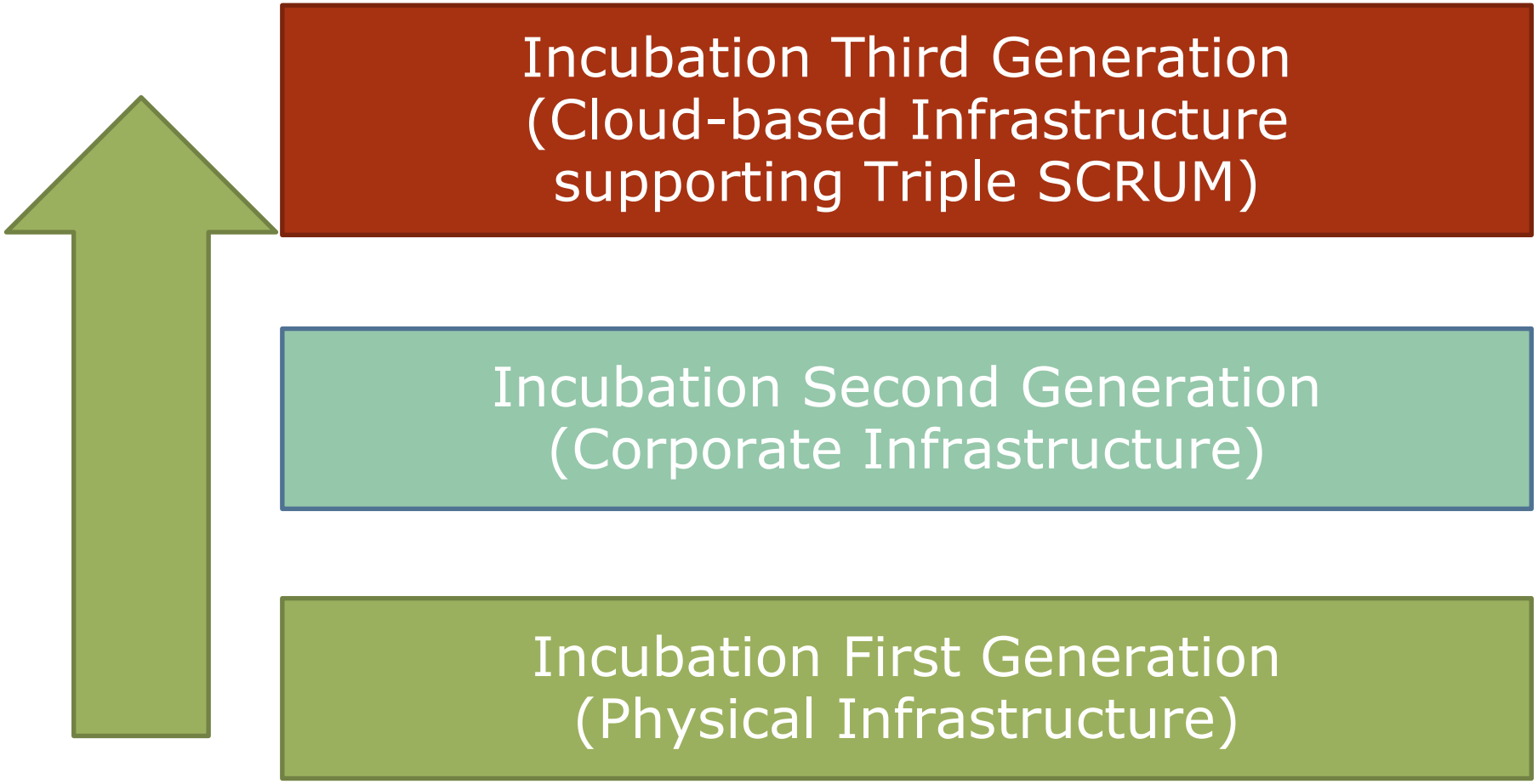
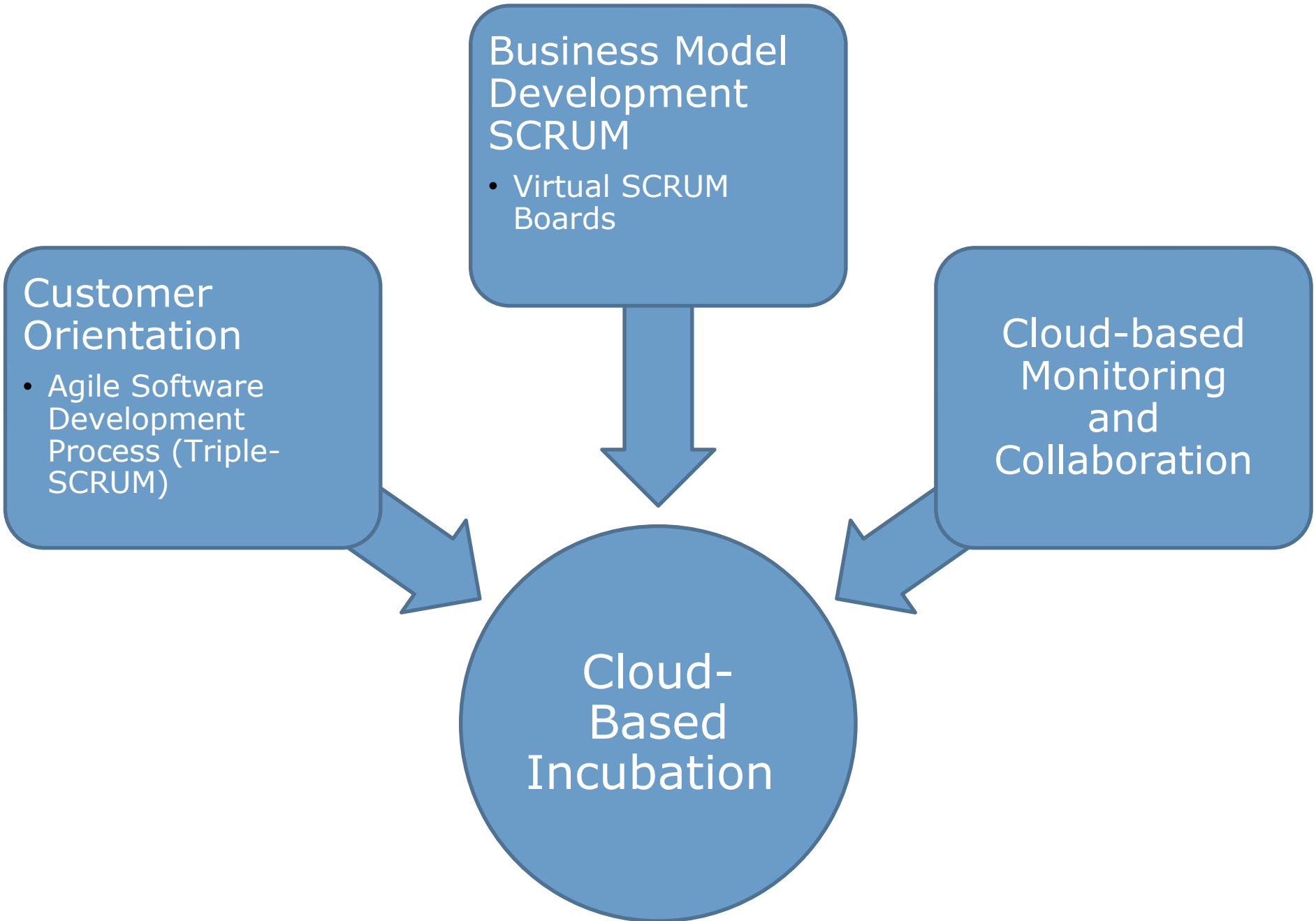
3rd Generation Incubation with Cloud-Based Collaboration Platforms



Cloud-Based Incubation



The End

- Which phase model for Lean Startup do you like most? Why is it superior to others?
- Explain the Triple SCRUM process a Lean Startup has to do – how can MVP development, business model development and service development go together?
- Which roles do testing of hypotheses play in Lean Startup?
- Explain the smoke portfolio of different ways to show the vision for a product.
- Which advantages does a cloud offer to startup development
- Explain some ways to generate assessment questions for canvases and their fields.
- Explain the full way from the paperware MVV to the software ecosystem.

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Value-Problem-Feature Mapping

Problem-Solution Mapping

- Work with customers on the minimal feature set (MVFS) before doing prototyping
  - Create a customer model
    - customer segmentation
    - pricing demands
  - Put up problem trees for all customers separately
  - Put up a problem variability tree for all customers, and map it to the feature tree (hopefully a surjective mapping)
    - The feature tree is the first solution model

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Example: Customer Interview Canvas (CIC)

- Korger designed a specific canvas for customer interviews (both for solutions and problems), to find out the expectations of a customer for a software product
  - Techniques for basic, performance and delighters factors of the Kano model for requirements
    - https://en.wikipedia.org/wiki/Kano_model
  - Interview techniques [Rupp und Schüpferling]

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Customer Interview Canvas (CIC)
Finding out the World of the Customer

[Korger]

Goal/Paradox Inverted Goal	System Users	Project Status Within Schedule	Domain Model	Success Indicators/Criteria
What is the goal of the project? *What has to be avoided?*	*Who has access to the system?* *For what type of user does the system offer a certain functionality?*	*What is the schedule for the project (important dates)?* *What is the current state of the project?*	*What are the objects identified within the project domain?* *How do the objects relate to each other?*	*What measures are suitable to verify the success of the project?* *What criteria does the project have to meet?*
	Resources *What are the resources for this project, e.g. developer team, experience & expertise, money, time*		**Risks** *What are the main risks to be addressed?*	

Questions	Answers
What aspects need further clarification?	*What are the answers as the interviewer has understood them?* *Have they been understood correctly from the point of the customer?*

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