

Delivering on Time and in Budget

# Cross Functional Hardware Development Teams

Karl Bredemeyer  
Boris Gloger Consulting

# Boris Gloger Consulting

**16** Consultants

**3** Freelancer

**6** Training & Consulting  
Backbone



## borisgloger consulting GmbH

Lichtentaler Straße 7 | D-76530 Baden-Baden | Deutschland  
T: +49 (0) 7221/39 87 37-0 | FAX: +49 (0) 7221/39 87 37-10  
[office@borisgloger.com](mailto:office@borisgloger.com)

VID: DE 815 220 730

HRB: 710201

Stadtparkasse Baden-Baden

BAN: DE37 6625 0030 0030 2436 12 | BIC: SOLADES1BAD

web: [www.borisgloger.com](http://www.borisgloger.com)

mail: [office@borisgloger.com](mailto:office@borisgloger.com)

## borisgloger training KG

Margaretenstraße 77/5 | 1050 Wien | Österreich  
FAX: +43 (0) 1/91 39 90 0

[wien.office@borisgloger.com](mailto:wien.office@borisgloger.com)

UID: ATU65817324

FN: 347717 z, Handelsgericht Wien

Erste Bank

IBAN: AT54 2011 1283 3189 1403 | BIC: GIBAATWWXXX

web: [www.borisgloger.com](http://www.borisgloger.com)

mail: [wien.office@borisgloger.com](mailto:wien.office@borisgloger.com)

**3** Mio Umsatz



# Karl Bredemeyer



Management Consultant at Boris Gloger Consulting

## Expertise

Coaching of Transition Teams, Scrum Master and Product Owner

Scrum in Industrial Engineering

Visual Facilitation and Scrum

Interim Product Owner

Interim ScrumMaster

Graphic Recording

## Contact:

[karl.bredemeyer@borisgloger.com](mailto:karl.bredemeyer@borisgloger.com)

Twitter: @karlbredemeyer



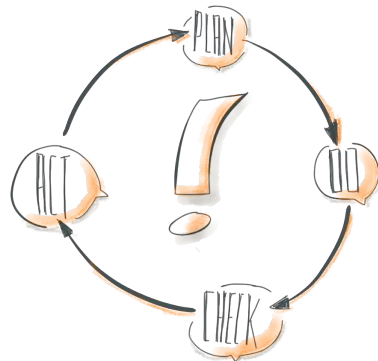
# Agenda



Case



Results



Takeaways

# Develop a Mass Spectrometer with Scrum

- Feasibility Phase for the development of a new high end analytical device
- Design and build working prototypes (incl. ordering single components), experimentation, validation
- Cross functional team (mechanics, electronics, science, software, purchasing, marketing)
- Phase from Discovery Exit to Feasibility Exit (4 Months)
- Comply with phase gate process



# Expectations

- › Deliver faster
- › Meet deadlines
- › Successful interdisciplinary cooperation  
manage dependency (in and outside)
- › Optimize Ressource allocation
- › Transparency - follow the progress
- › Learning about Scrum



# The Story





# Warmup Phase

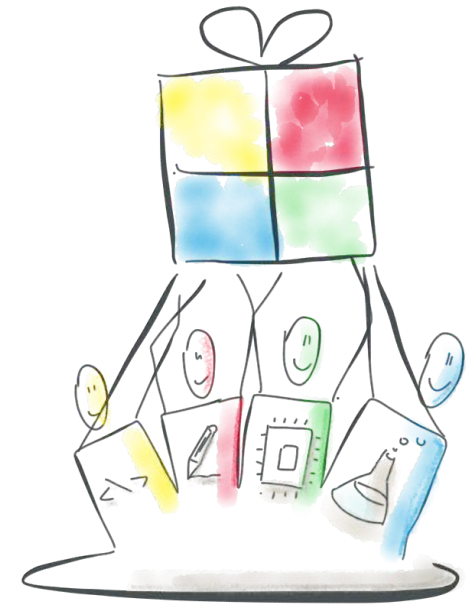




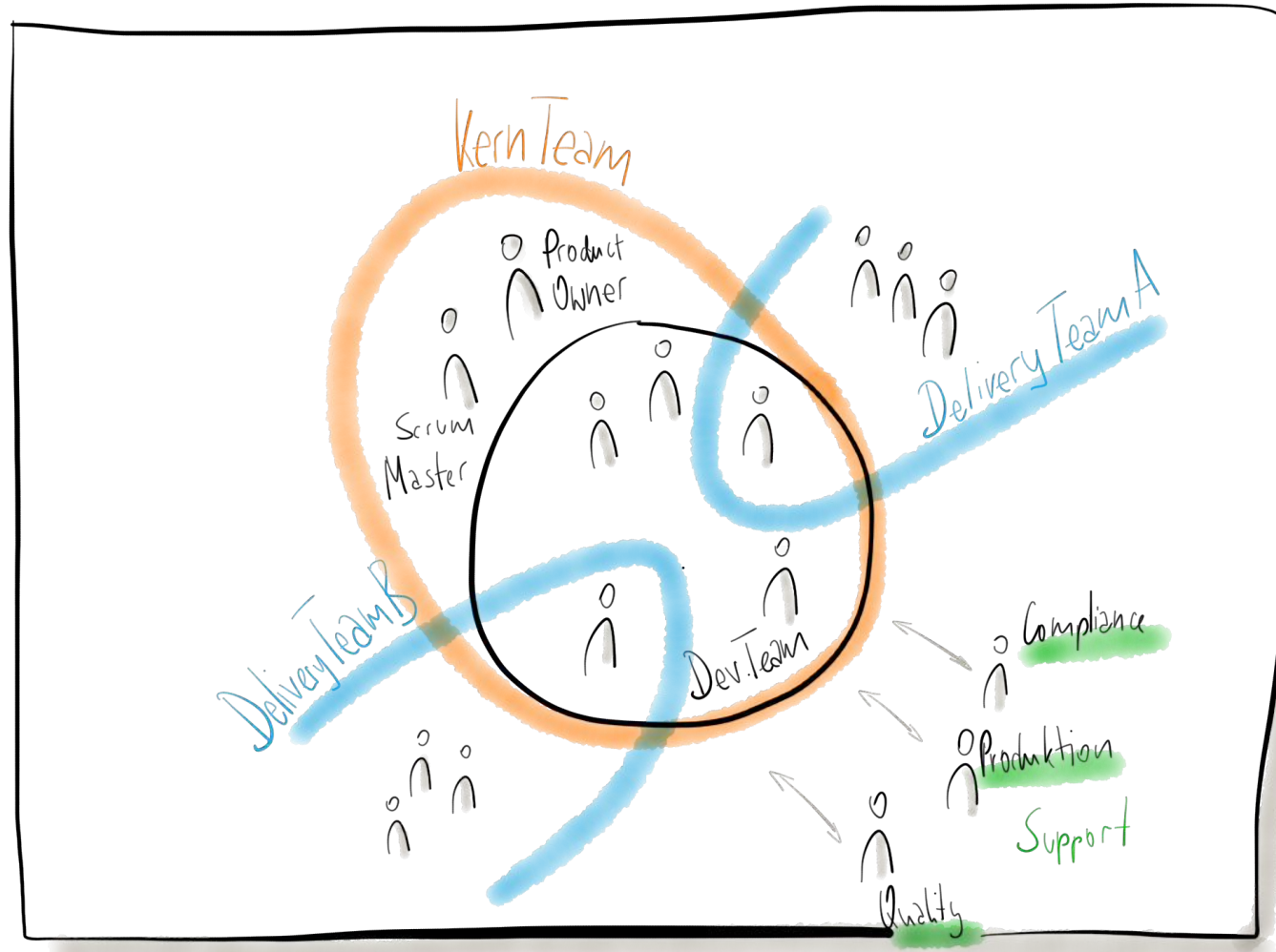
# A Team

A **Team** is “a small number of people with complementary skills who are committed to a common purpose, set of performance goals, and approach for which they hold themselves mutually accountable.”

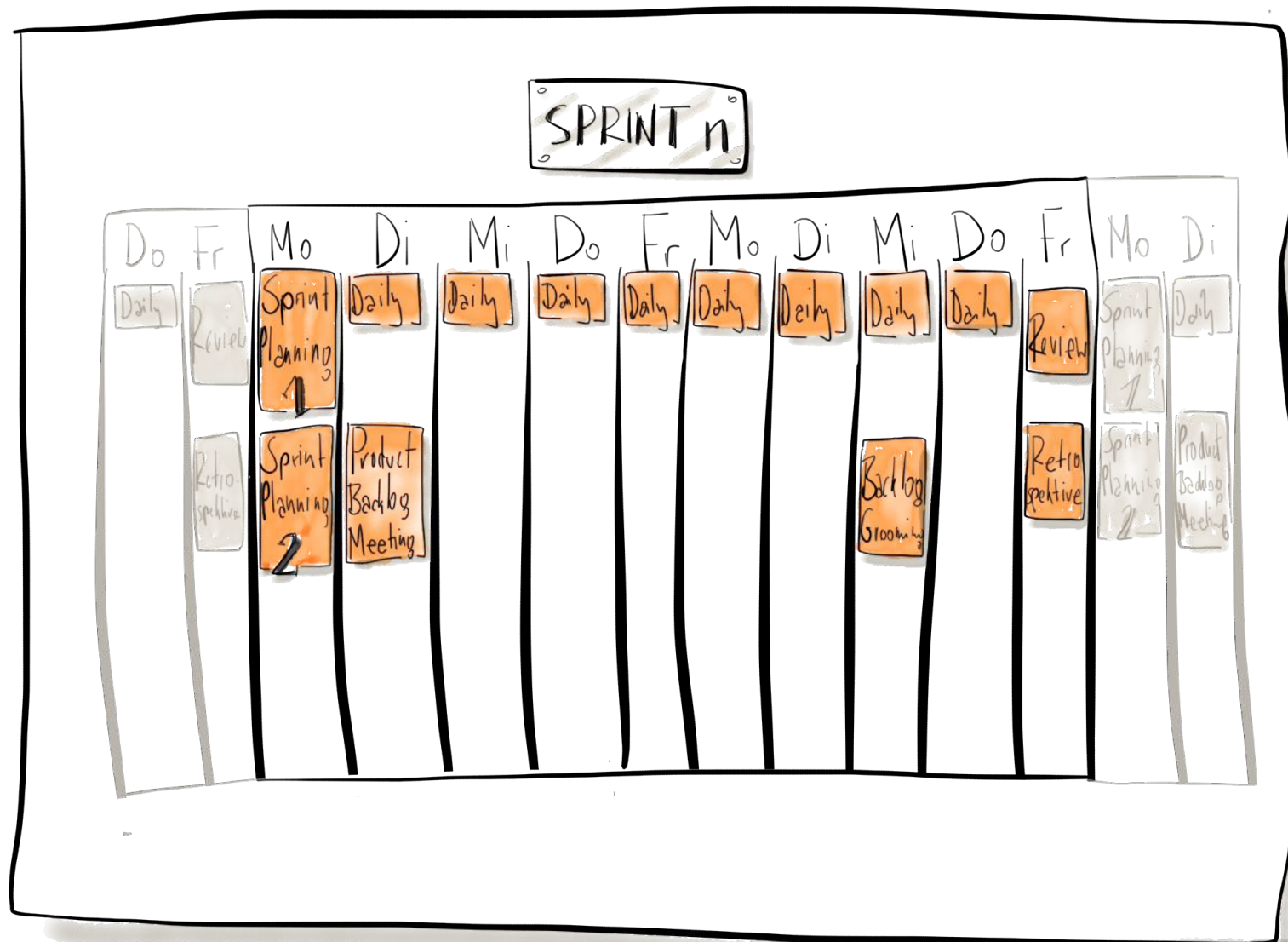
Katzenbach and Smith, HBR 2005



# Team Setup



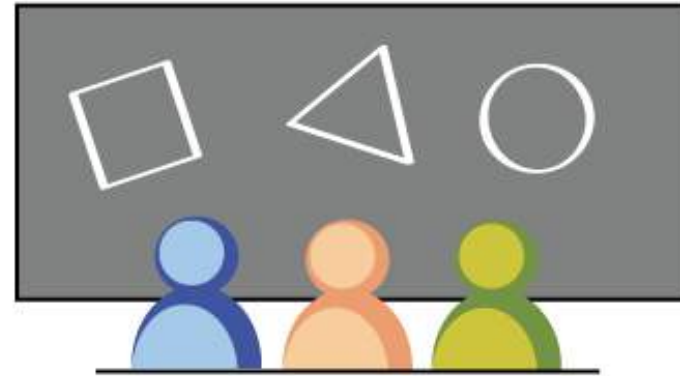
# Scrum Meetings



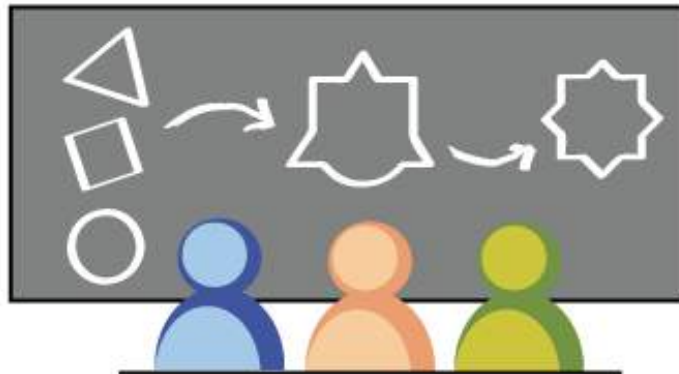
# Communication - Visualisation



We are all in agreement then.



Oh.

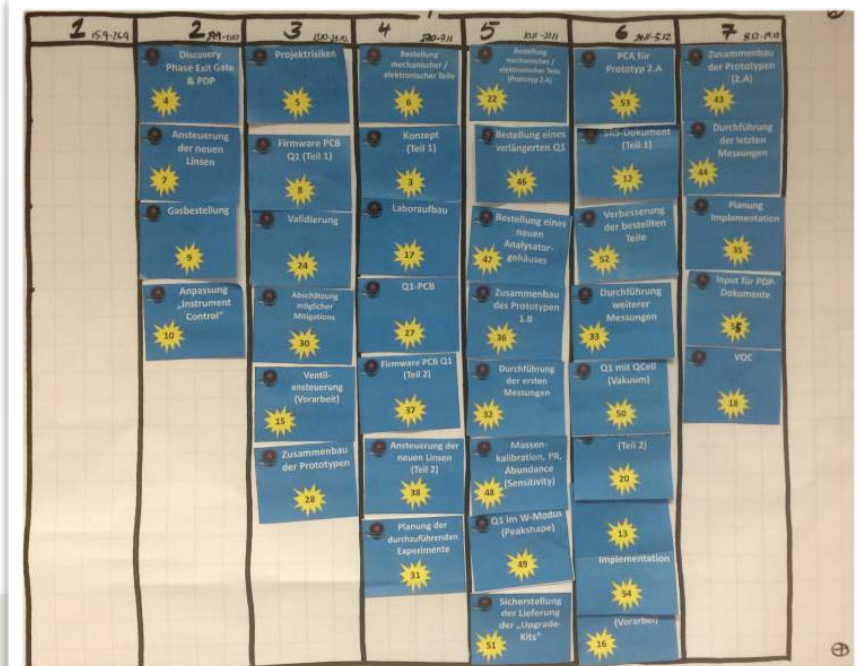
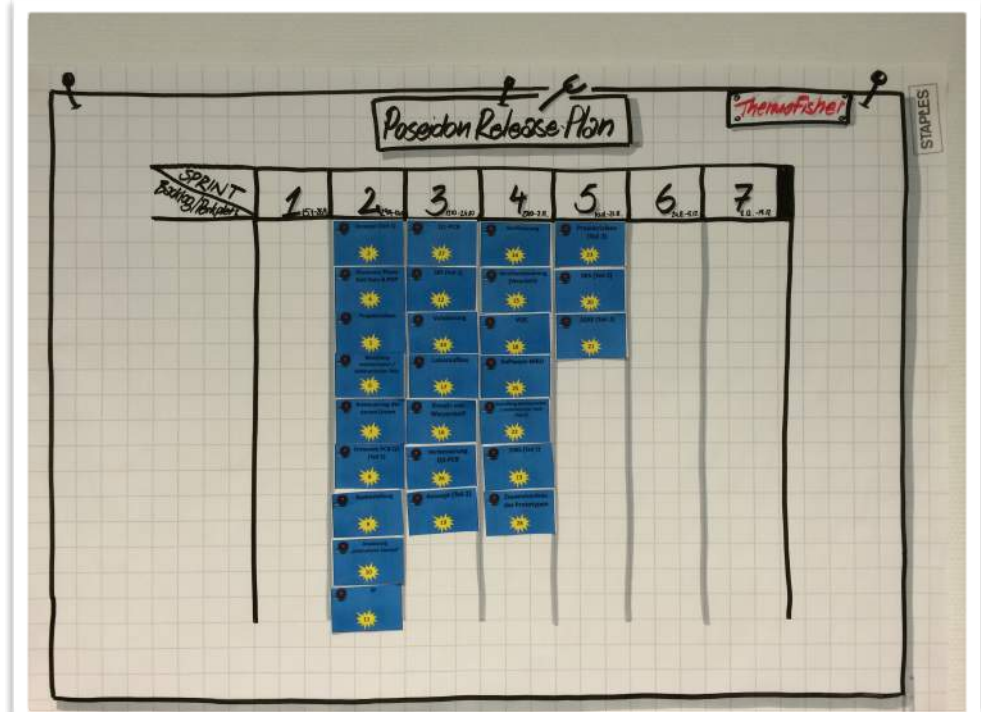
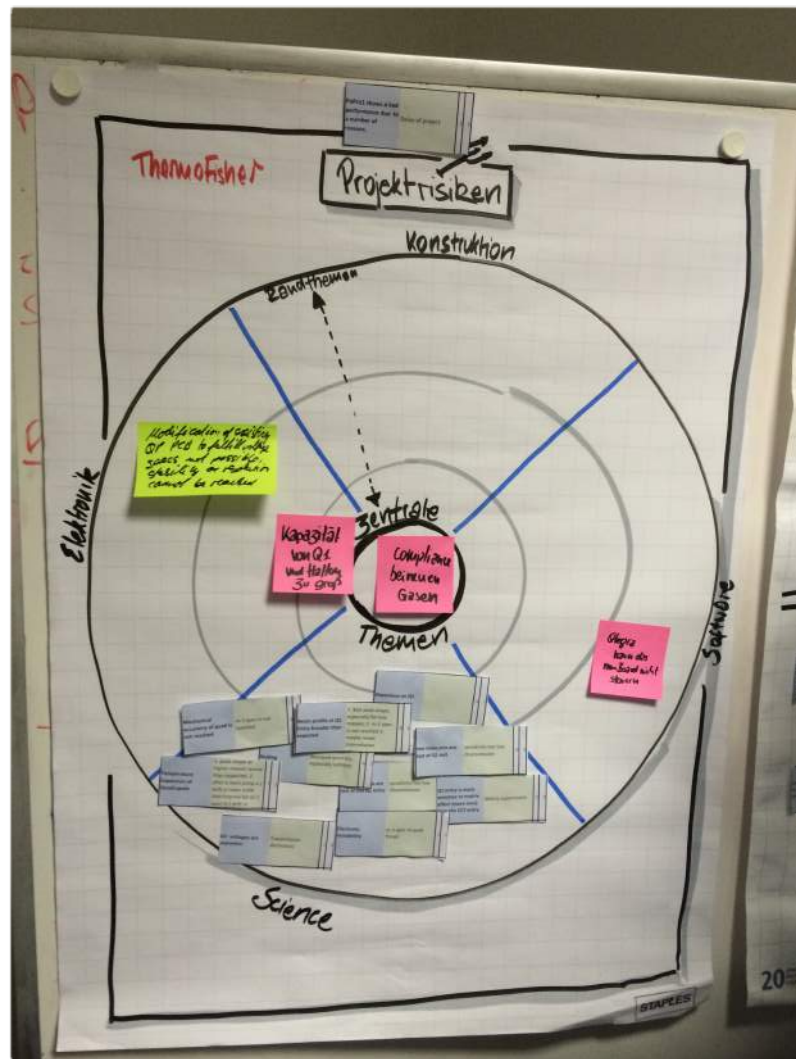


What if we did this ...



Ah!

# Visualisation

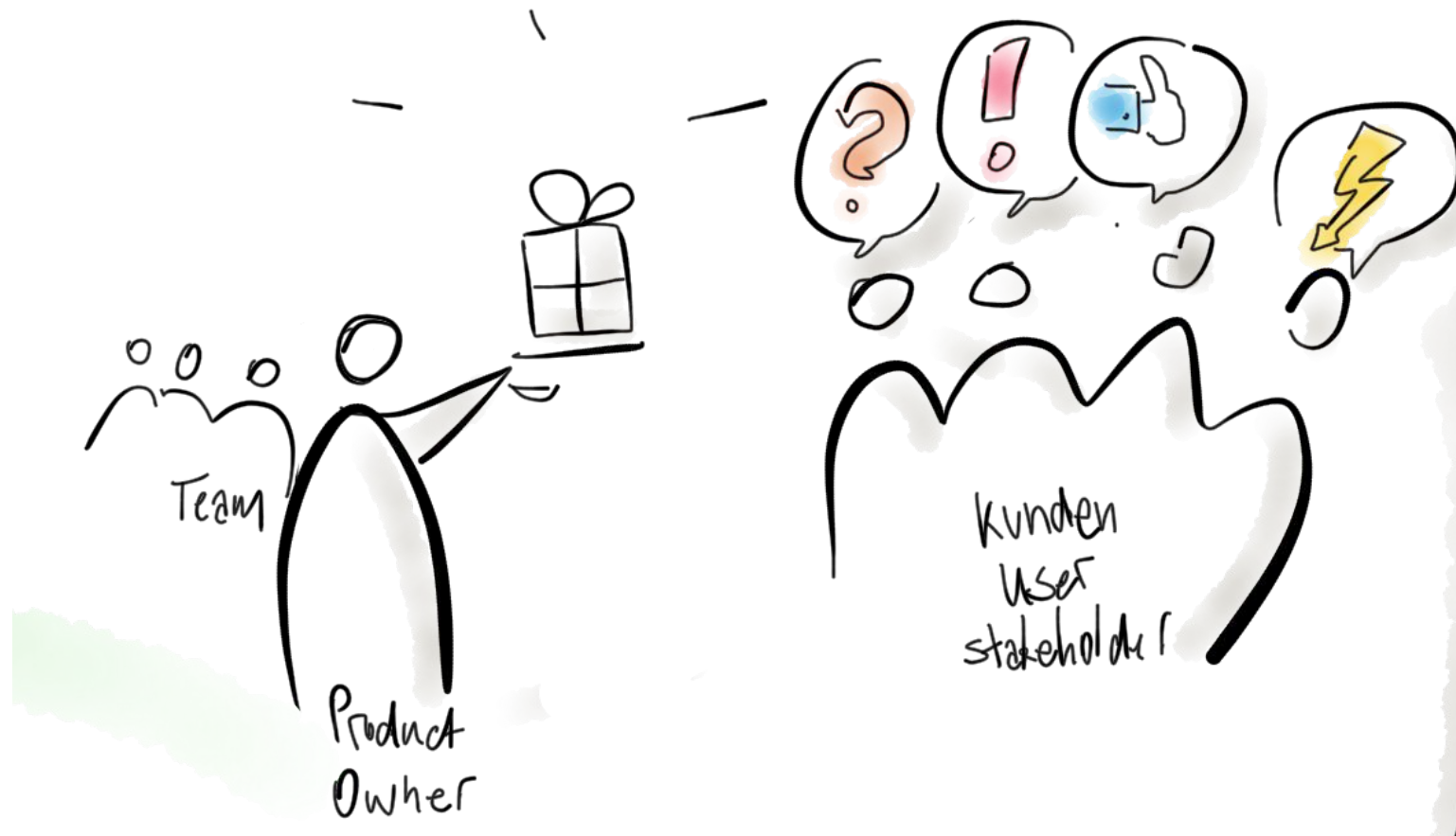




# Consolidation Phase



# Review

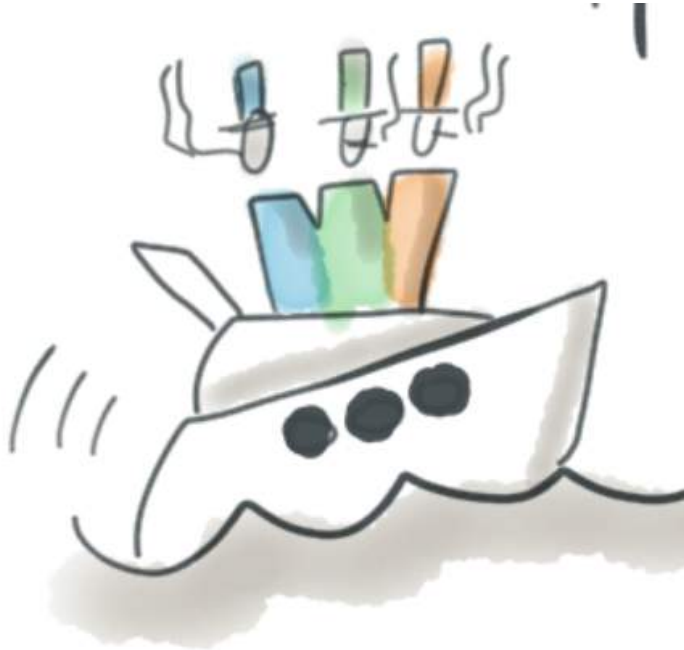




# Product Backlog Meeting

## Stakeholder Meeting

- Next sprints outlook
- Orientation, scope
- Impediments
- Priorisation

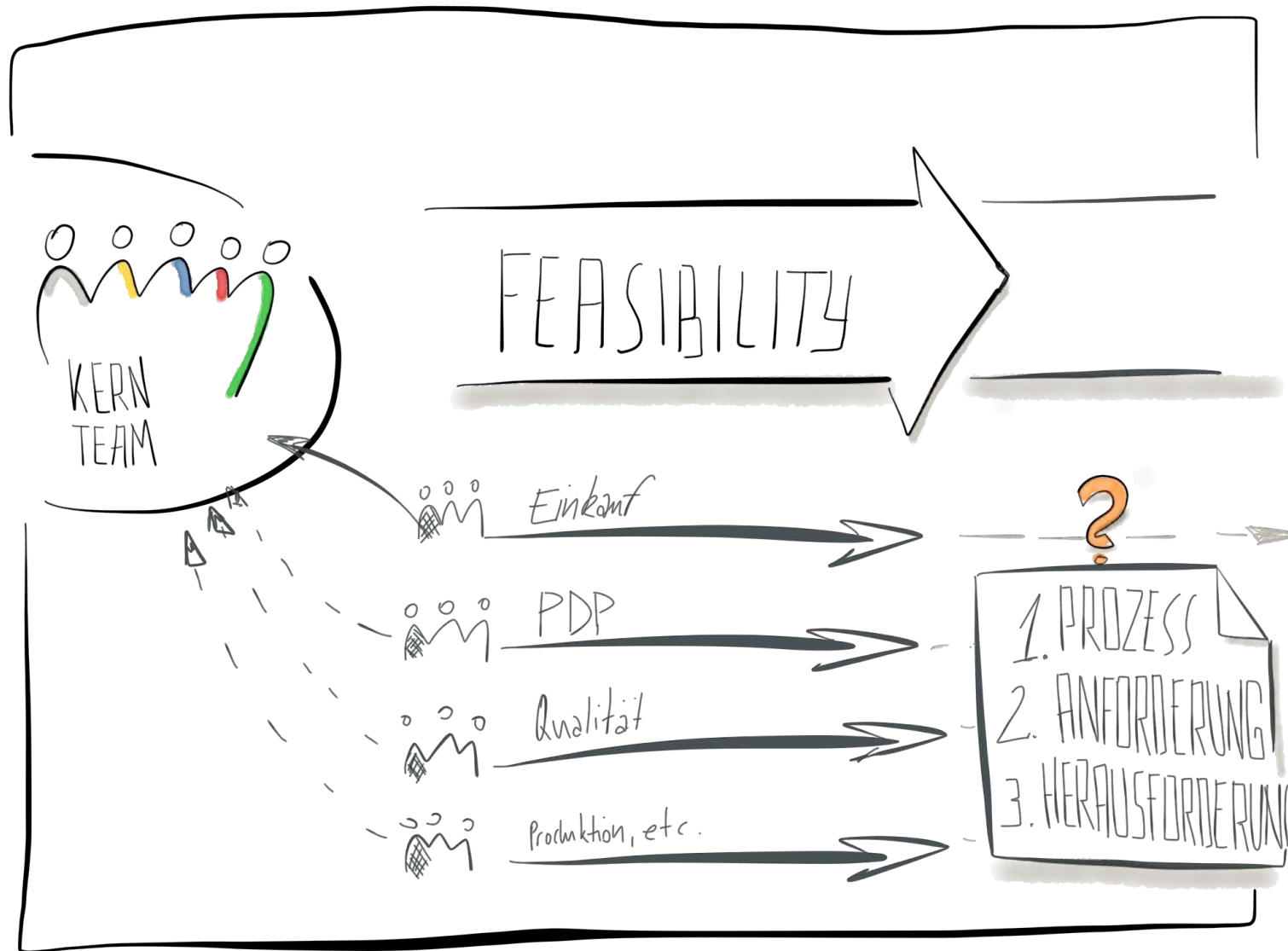


1	2	3	4	5	6	7
15.4.-24.4.	25.4.-01.5.	02.5.-10.5.	11.5.-18.5.	19.5.-26.5.	27.5.-03.6.	04.6.-11.6.
	Discovery Phase Exit Gate & POP 1	Projektrisiken 5	Bereitstellung mechanischer / elektronischer Teile 6	Bestellung mechanischer / elektronischer Teile (Prototype 2.0) 22	PCA für Prototyp 2.0 53	Zusammenbau der Prototypen (2.0) 43
	Ansteuerung der neuen Linsen 2	Firmware PCB Q1 (Teil 1) 8	Konzept (Teil 1) 3	Bestellung eines verlängerten Q1 46	Wiki-Dokument (Teil 1) 11	Durchführung der letzten Messungen 44
	Gasbestellung 9	Validierung 24	Labora Aufbau 17	Bestellung eines neuen Analysator-gehäuses 47	Verbesserung der bestellten Teile 52	Planung Implementation 35
	Anpassung „Instrument Control“ 10	Abrechnung möglicher Milestones 30	Q1-PCB 27	Zusammenbau des Prototypen 1.0 36	Durchführung weiterer Messungen 33	Input für PQN Dokumente 58
		Ventil-ansteuerung (Vorarbeit) 15	Firmware PCB Q1 (Teil 2) 37	Durchführung der ersten Messungen 32	Q1 mit QCell (Vakuum) 50	VOC 18
		Zusammenbau der Prototypen 28	Ansteuerung der neuen Linsen (Teil 2) 31	Massenkalibration, PR, Abundance (Sensitivity) 48	(Teil 2) 20	
			Planung der durchzuführenden Experimente 31	Q1 im W-Modus (Peakshape) 49	Implementation 13	
				Sicherstellung der Lieferung der „Upgrade Kits“ 51	(Vorarbeit) 16	

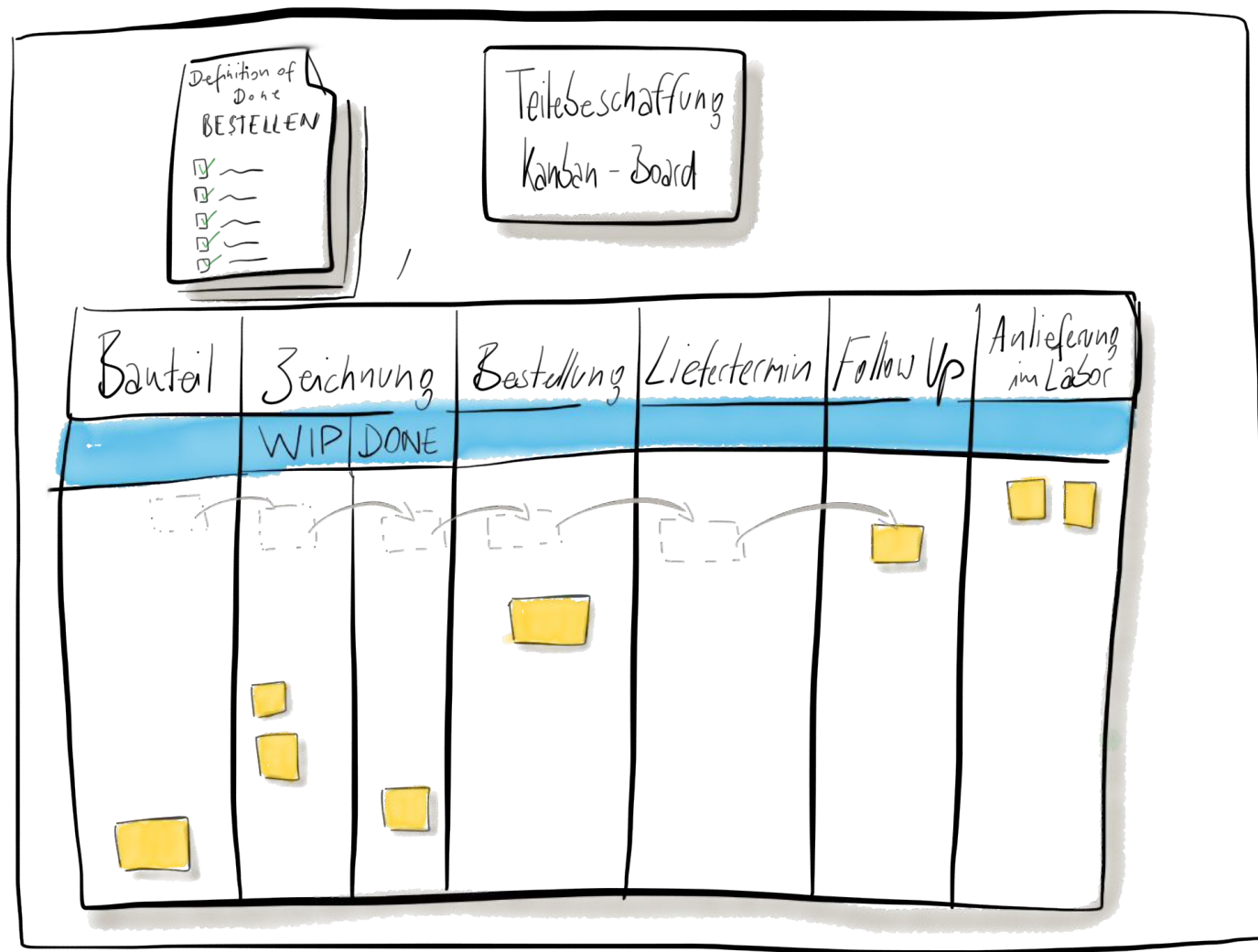
# Flow Phase



# Manage Dependencies-Resources

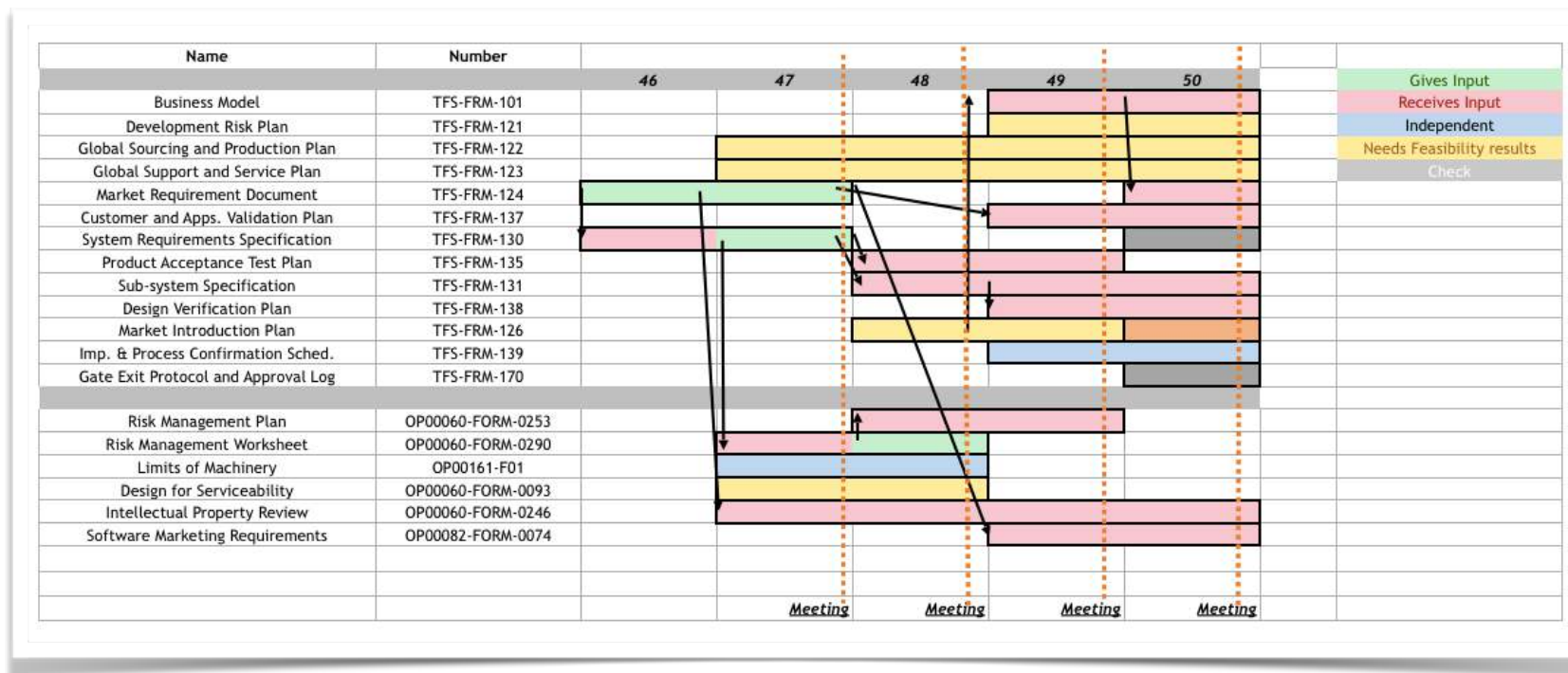


# Work With Suppliers



# Phase Gate process and Scrum

- Part of the delivery (DoD), continuously
- Synchronize and schedule the delivery - PDP meeting, PDP roadmap
- Identify impediments early



# Results

- ✓ All milestones were met
  - ✓ Functioning prototype in lab on Nov, 3<sup>rd</sup> (after 7 weeks)
  - ✓ Second prototype in lab on Dec, 7<sup>th</sup>
  - ✓ Feasibility exit gate planned for Dec 17<sup>th</sup> and passed
- ✓ On budget (Project Size: about 0.5 Mio EUR)
- ✓ Successful interdisciplinary cooperation
- ✓ Product ownership mindset
- ✓ Successful management of dependencies (purchasing, suppliers, other departments)



# Testimonials

“What we have achieved in **4 Months** usually takes us at least **1 year**”  
(CEO)

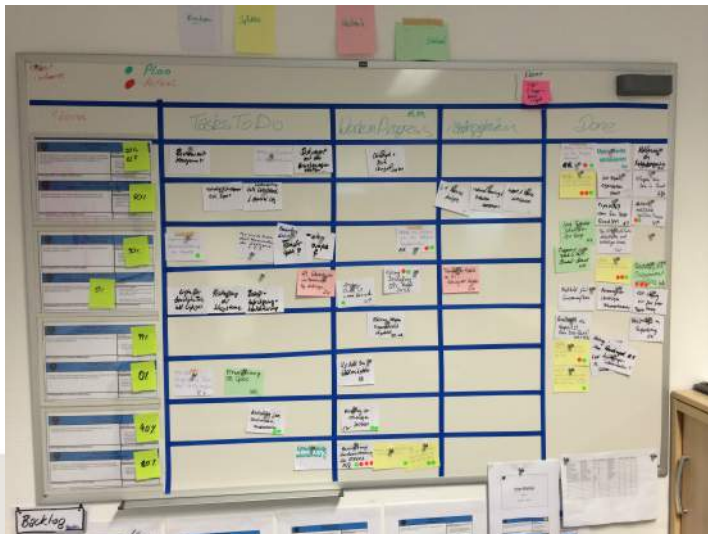
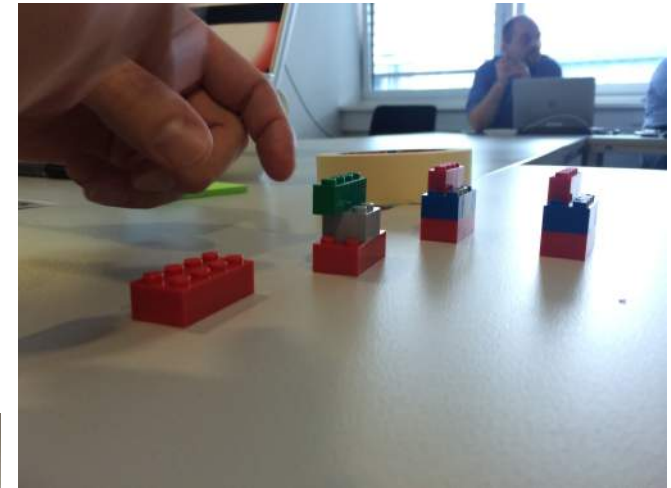
“It was the fastest functioning prototype ever:  
**about 8 weeks faster than prior projects**”  
(Director Engineering,

“Having to work together with all departments from one day to the next was a big challenge. But we succeeded, I feel an **overlapping team spirit**”  
(Team Member)





# Gallery

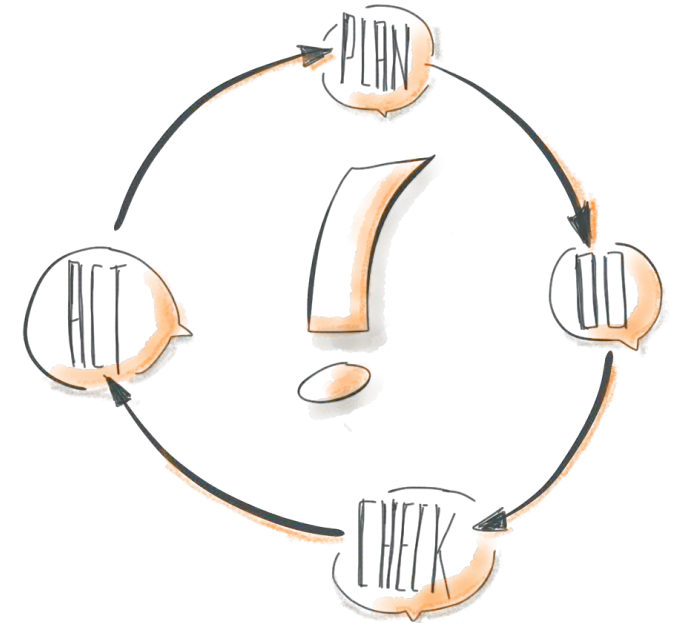
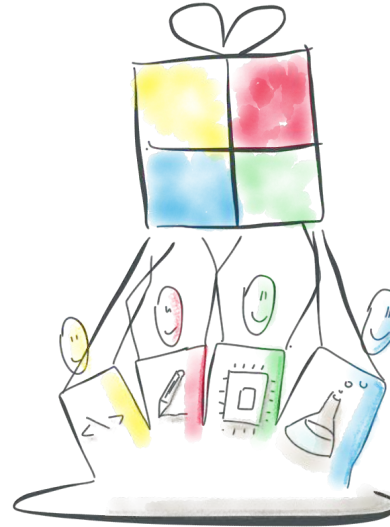
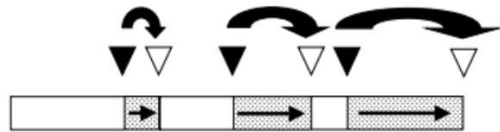


# Takeaways

## Schedule-Based



## Scope-Based



Ah!





1) FAST FEEDBACK (

Thank you!

@karlbredemeyer  
borisgloger.com