

# Agile in Automotive. State of Practice

*Agile Survey 2013 & projects results*

Automotive SPIN Italia  
Milano, 30. October 2014

Horst Degen-Hientz

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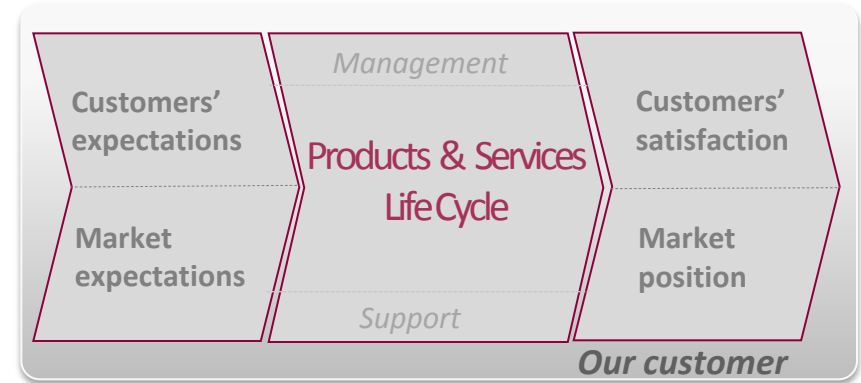
# Agenda

- Kugler Maag Cie
- Agile Study
- Agile Transformation



# Kugler Maag Cie

**We** are an independent consulting company supporting our customers world-wide particularly in the field of lasting performance improvements.



## Our Focus

Analyze, assess, and **improve** our customers' products and services **value creation processes**.

We take operative responsibility and provide systematic and sustainable **know-how transfer**.

## Our Mission

Support our customers in **mastering risks** associated with developing, acquiring or delivering software, systems, and services while **maintaining** the speed of **innovation**.

*"besser mit uns"*



Automotive extract



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## Disclaimer

Survey respondents (19 interviews) were chosen based on the fact that they claimed to have initial to extensive experience in applying Agile principles and methods in automotive.

However, we cannot make any statements about the extent of the implementation of Agile principles in the development of automotive embedded systems/software across the whole industry.

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# Study „Agile in Automotive“ – Motivation

The aim of the survey is to **investigate what is the status of implementation of Agile principles and methods within the automotive industry (embedded system/software development)**

- Which methods/practices/tools are used in which context?
- What are the lessons learned regarding their application?
- What are the barriers for a successful introduction of Agile?
- What are the concerns regarding Agile in the automotive context?
- How applicable are Agile principles in the automotive industry?
- Are Agile and development standards (Automotive SPICE<sup>®</sup>, ISO 26262) compatible or contradictory?



## About the study conducted

- Interviews were conducted in November and December 2013
- Survey respondents were primarily leading automotive companies (both OEMs and Tier 1 suppliers) from Germany and USA with distributed development teams in Romania, Bulgaria, Poland and India



- 19 interviews were analyzed. Among others, interviewed companies were BMW, Bosch, Continental, Daimler, Gentex, Hella, ...
- Survey respondents were engineering/software development managers/directors, project managers, team leaders, quality managers, as well as a few Scrum Masters and developers



# Agile is used in all application domains

## ECU /Application Types:

### Multimedia Applications:

- Location-based Services Applications
- Telematics
- Radio Navigation

### Body Electronics:

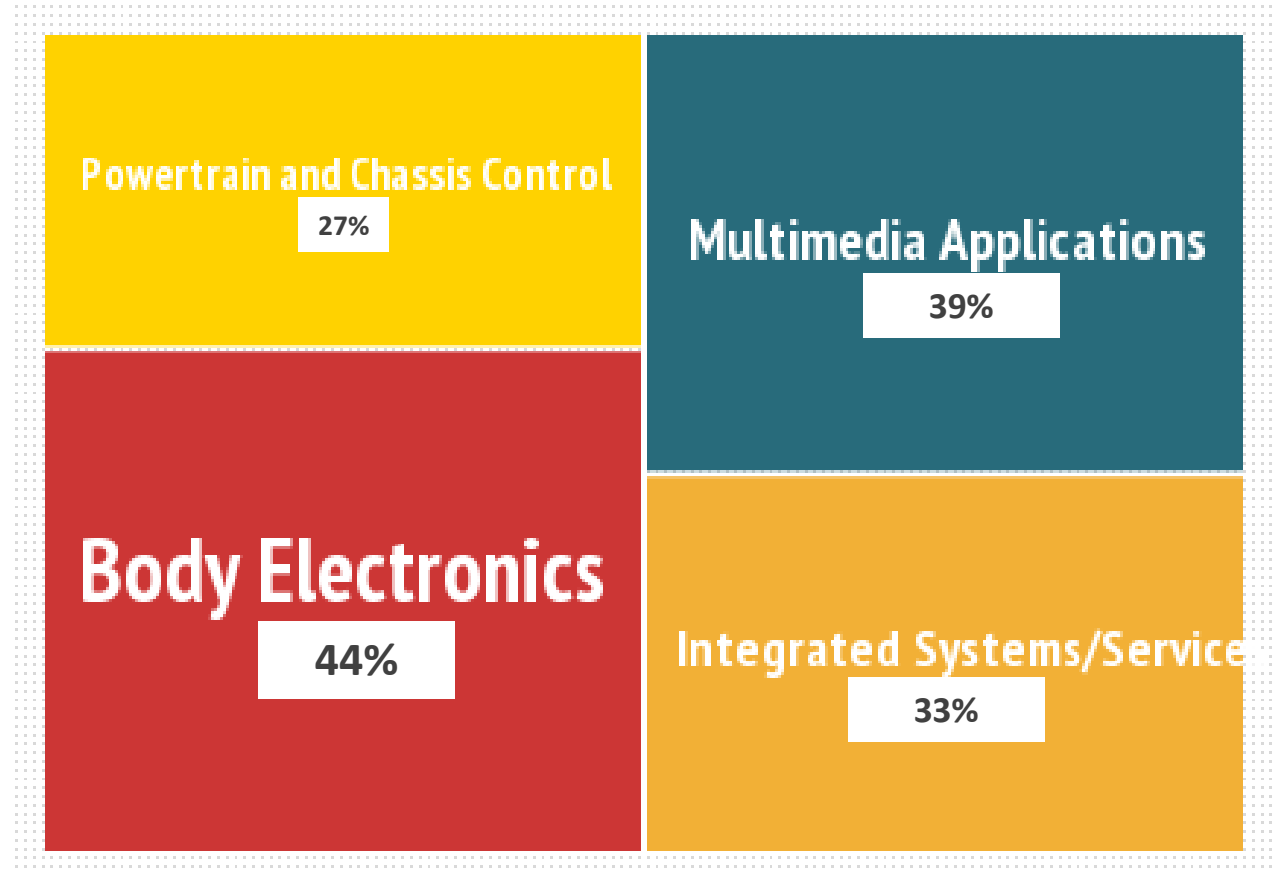
- Body Controller
- Sensors (Light, Battery, ...)
- Instrument Cluster

### Powertrain and Chassis Control:

- Braking Systems
- Engine Management

### Integrated Systems/Services:

- Intelligent Mirror System
- Active Safety
- Driving Assistance / Automatic Driving



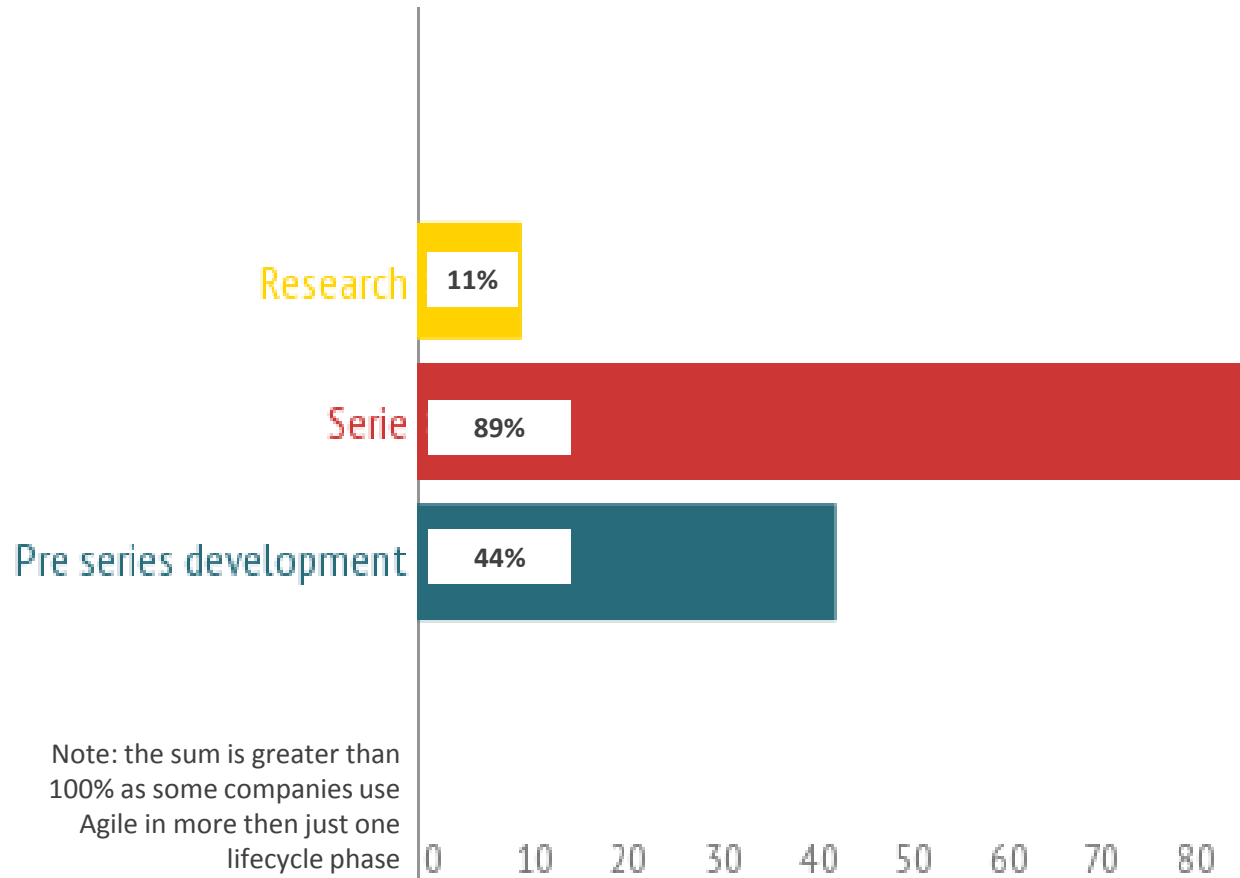
Which domain(s) does it cover?

Domain classification: According to the HIS working group assessment ECU classification





# Agile is mainly used in series development



Note: the sum is greater than 100% as some companies use Agile in more than just one lifecycle phase

Which Type(s) of projects are covered?

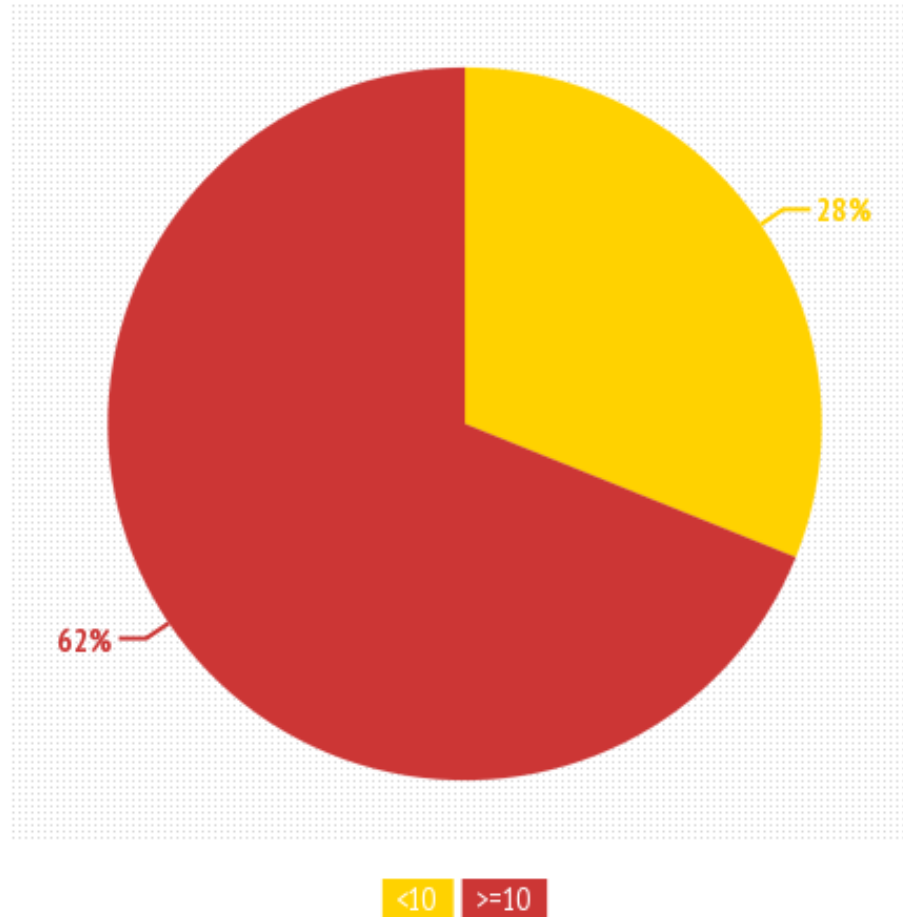


## About 2/3<sup>rd</sup> are working with agile teams larger than 10 people – multi-site location is normal

Team size ranges from **4 to 15 people**, with the exception of “Kanban teams” (**30-40**).

The biggest project in our survey had around **100 engineers in 8 teams**.

The largest application of Agile (completed transformation) was in a **department with 200 engineers**.



What is the typical size of the team doing Agile?



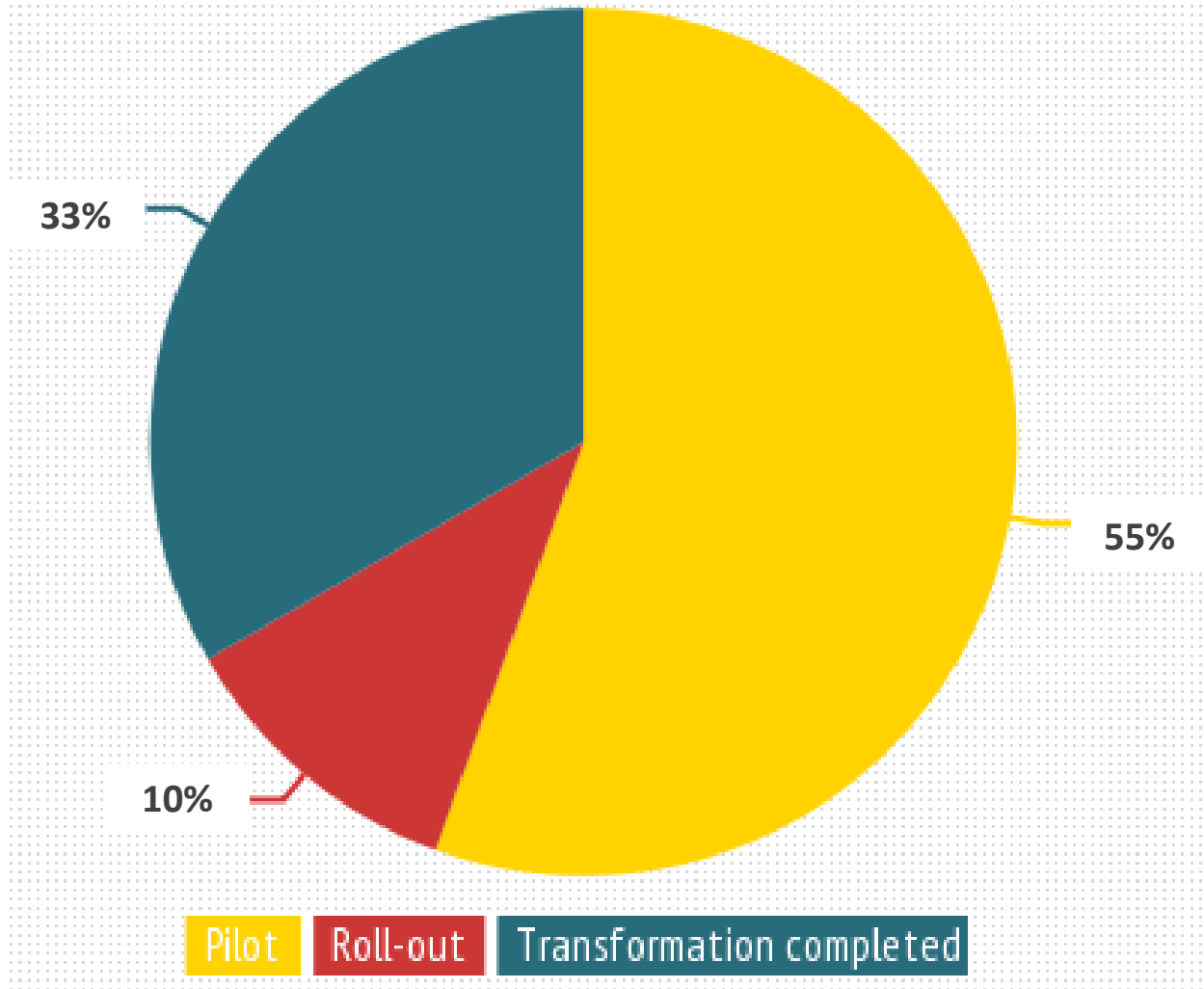
# About 1/3<sup>rd</sup> had already completed Agile transformation within their organization

At Tier 1 Suppliers, the status of implementation varied from first piloting to completion of agile transformation

A majority of Tier 2 “pure” software suppliers had already been applying agile methods for several years

Pilot projects typically covered the first sample development phases (A, B)

Which phase of the Agile transformation program are you currently in?



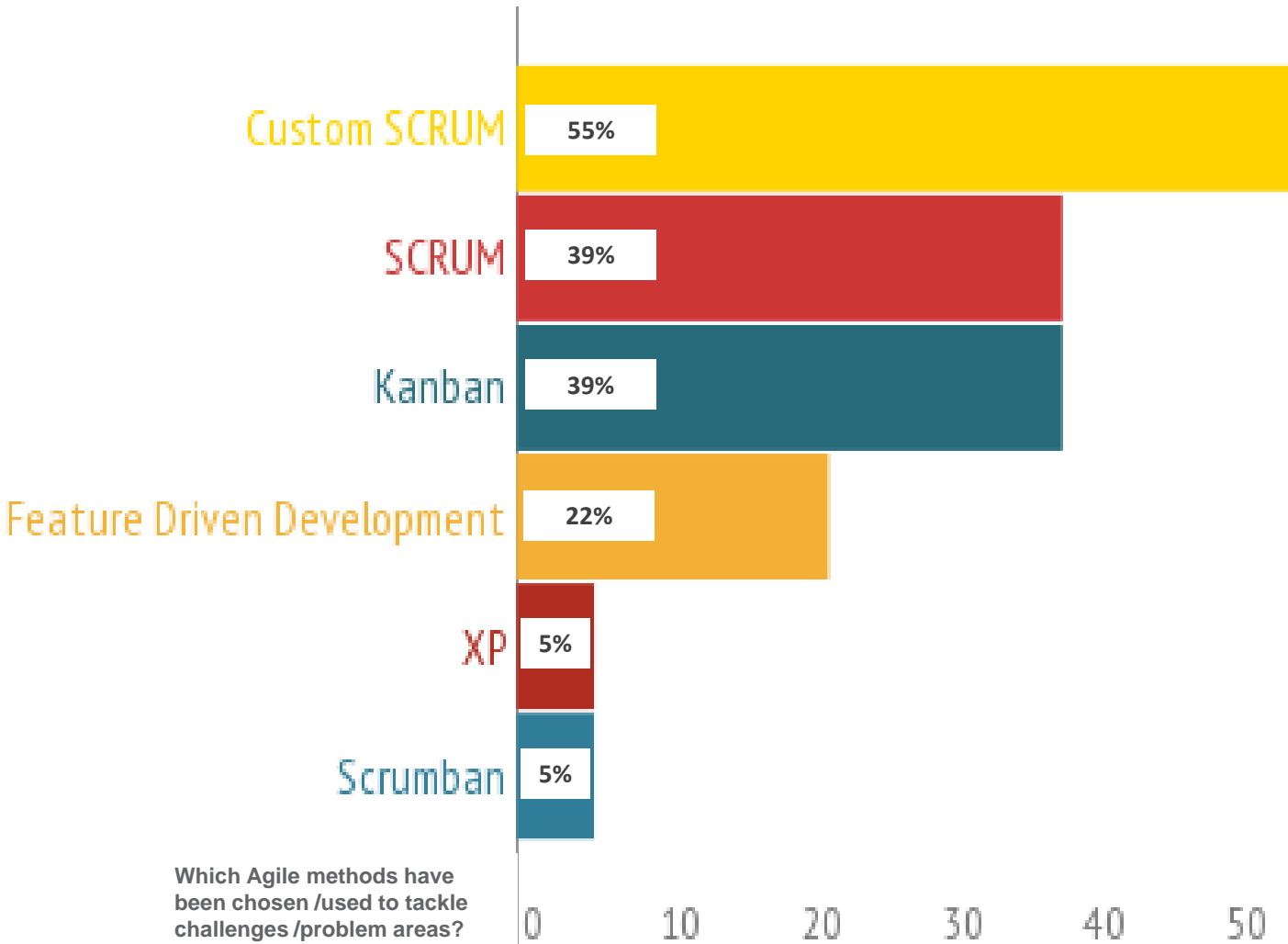
## 1<sup>st</sup> Question – Agile in practice

Is your Software development agile?

- a) Yes, we apply agile in practice
- b) Planned, but not started
- c) No / not planned



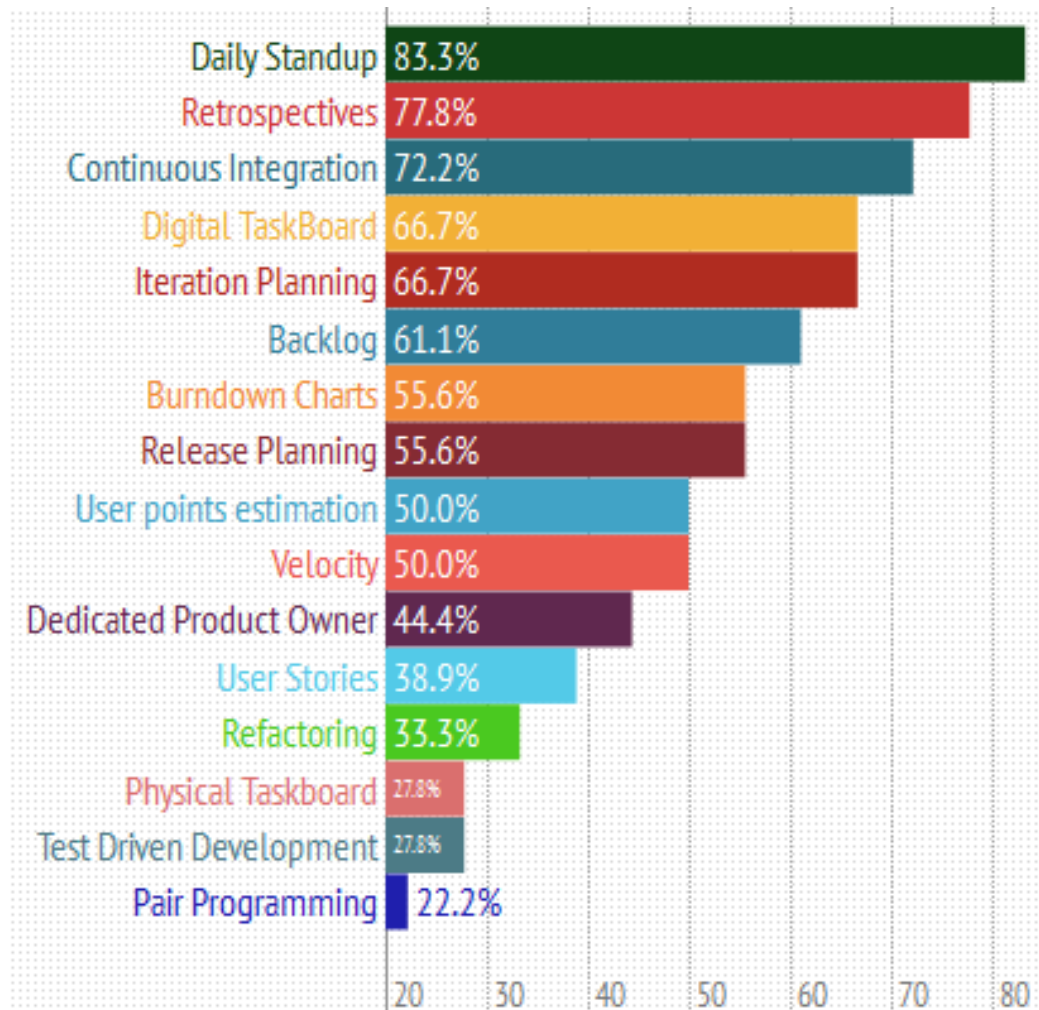
# Custom Scrum/Scrum is the most popular Agile method used in projects, followed by Kanban



Which Agile methods have been chosen /used to tackle challenges /problem areas?



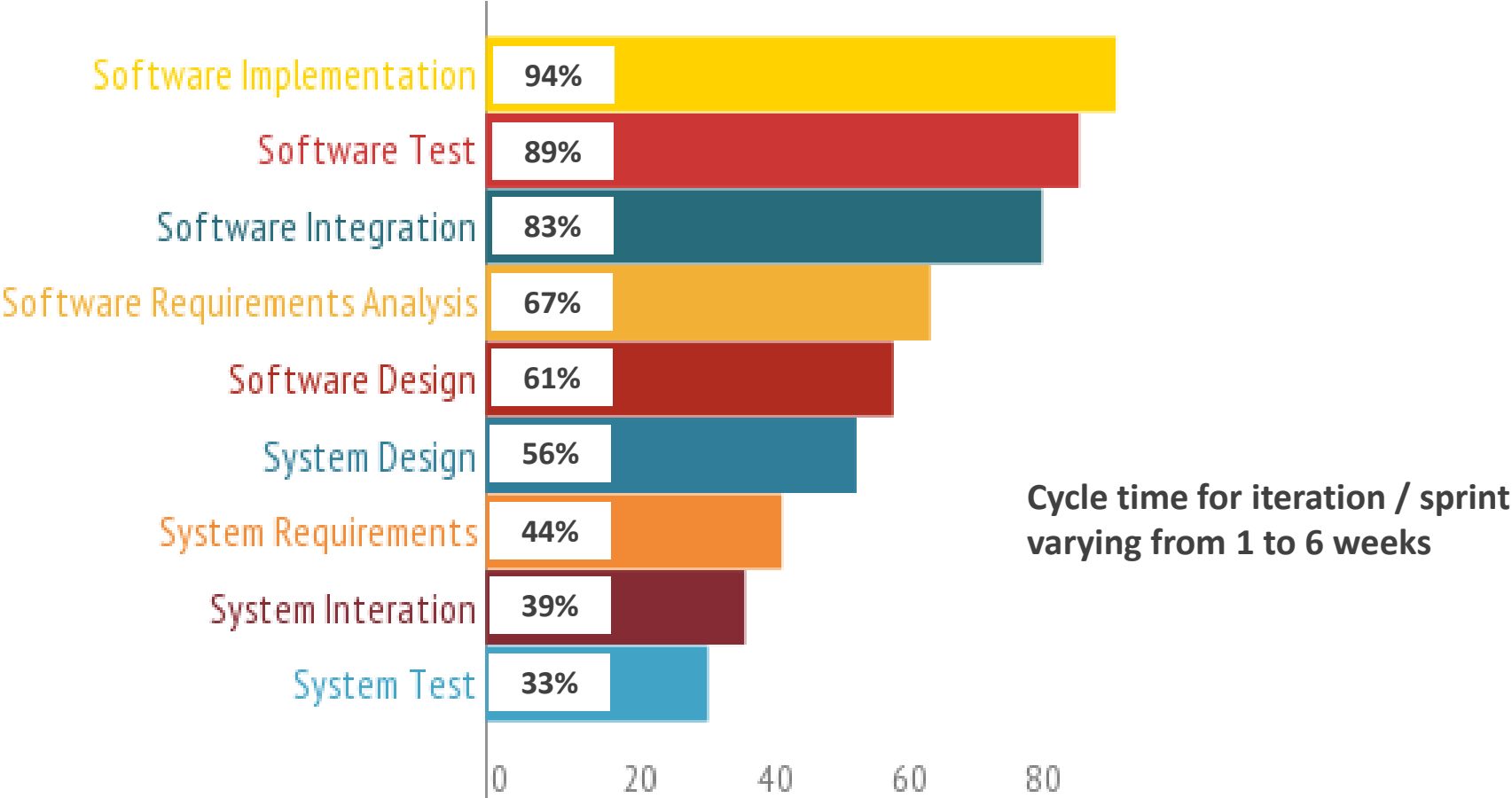
# Daily stand-up and retrospectives are the most popular Agile practices



Which Agile Practices have been used?



# 2 - 4 weeks cycle is perceived as optimal; and mostly software processes are covered



Cycle time for iteration / sprint varying from 1 to 6 weeks

Which processes are covered within a sprint?



## Mainly Product Owner and Scrum Master roles are implemented

Usually Product Owner / Scrum Master roles are full-time jobs;

however, sometimes the Product Owner / Scrum Master is responsible for more than one project.



Scrum Master



Product Owner

Which roles are used in Agile projects?





# Agile is compatible with Automotive SPICE®

The majority of respondents said there was no contradiction between Agile and Automotive SPICE® .

Kanban actually improved the compliance with some Automotive SPICE® practices (PRM/SUP.9, CRM/SUP.10)

SCRUM mainly supports PM/MAN.3, partly SRA/ENG.4 and SC/ENG.6 (Definition of Done).

Mapping exists; should be ASPICE compliant

ASPICE = Common sense. No influence. Agile Process is NOT in contradiction with ASPICE

ASPICE requirements are also considered, Capability level 2 needs to be fulfilled (either as additional tasks or covered by definition of done)

Tasks from the ASPICE process are included in the backlog and planned accordingly.

Small adaptation = Review process overhead. Since we do a lot of iteration, we cannot allow to do reviews thoroughly each time

It's always a challenge depending on individual customers and assessors to be assessed as ASPICE compliant while using an Agile approach

Internal assessments show no contradictions between the two "worlds". This is because no "pure" agile development is carried out, but agile aspects were included in the standard processes.



# It is complex to integrate Agile and Functional Safety (ISO 26262) requirements

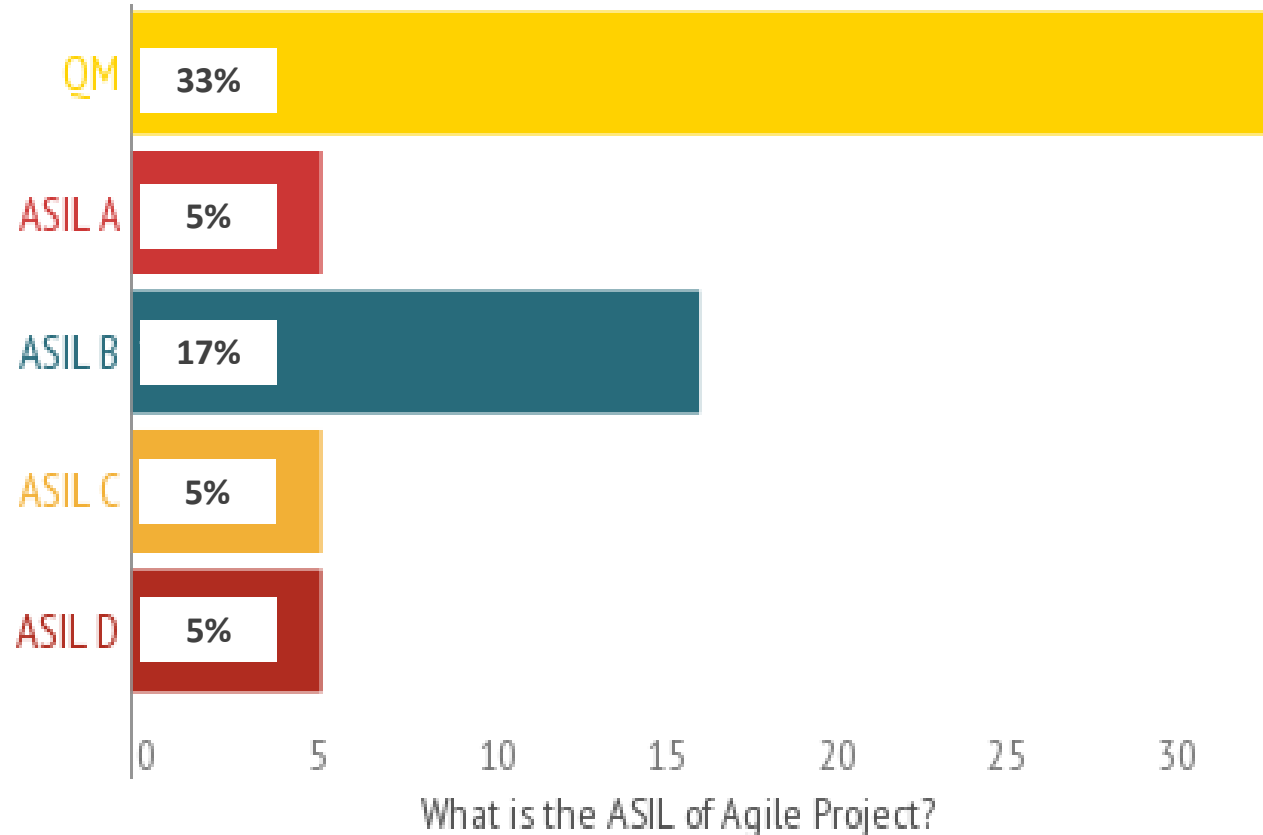
Functional Safety requirements are perceived as more independent from Agile than ASPICE requirements.

Some projects see it as nothing more than additional tasks in the backlog.

Part of the Agile Manifesto is not “compatible” with Functional Safety requirements

FS process is not really iterative. Key challenge is to bring together iterative development and some non iterative activities

FS is planned in the project as a separate timeline



## 2<sup>nd</sup> Question – Benefits introducing agile

Which improvements would you expect primarily?

- a) improvements regarding costs, quality or cycle time
- b) team spirit and communication
- c) non of above



# Most of the Agile projects succeeded, ... but mind the social skills

In all cases it took a couple of pilot iterations to get it right (adaptation of processes, changing mindsets, ...)

Agile projects clearly have succeeded by achieving better quality, predictability and team satisfaction

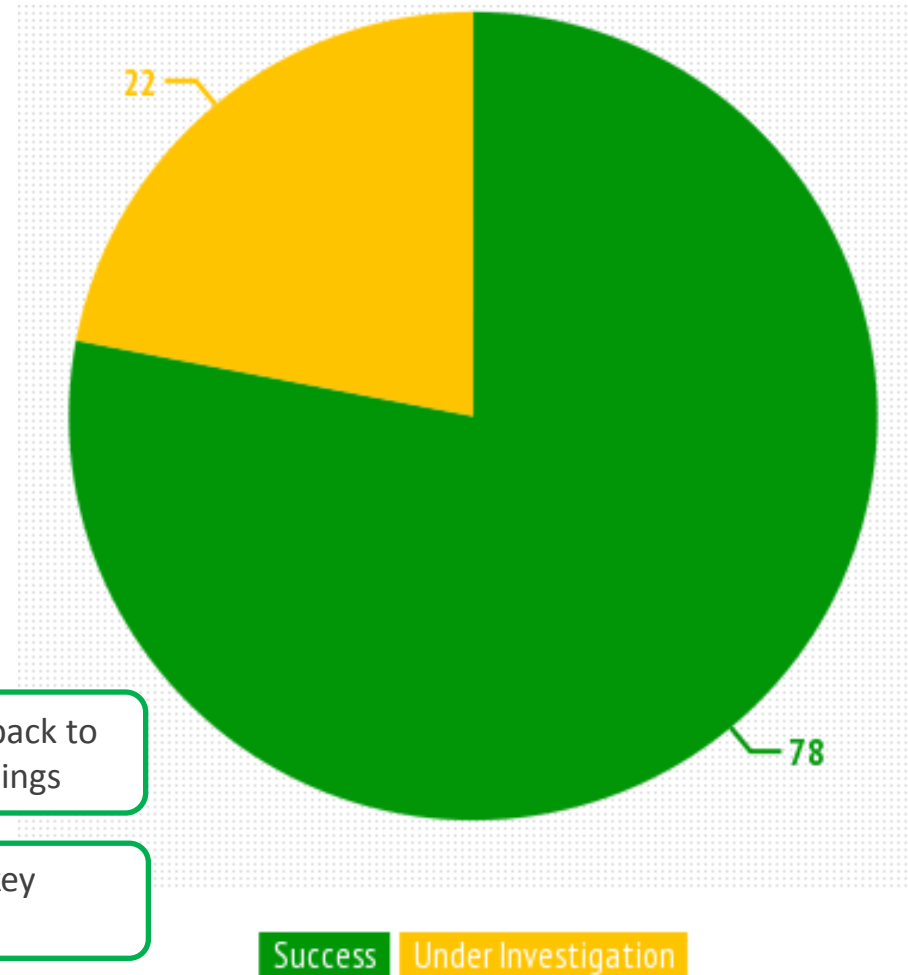
We can back up the success with significant quality and time to market improvements

We have not achieved the optimum due to inadequate social skills from key individual

Agile does work under certain conditions and for certain type of projects

It is unthinkable to go back to our old way of doing things

Process discipline is a key success factor



Would you consider Agile projects to have succeeded or failed?



### 3<sup>rd</sup> Question – Challenges

Which challenge do you perceive primarily applying agile?

- a) Customer
- b) Organization
- c) Know-how



# To become Agile takes what is required for any other complex change too, e.g.,...

High maturity in the development process must be already established (at least Level 2)

Excellent, open minded development team, empowered to define their methods

Right communication about Agile, what it is, to raise realistic expectations

Ability to show agile project progress in a traditional form (e.g., milestone assessment) to achieve understanding at all levels of management

Manager with vision and assertiveness

The necessary move away from the weak matrix (dominated by line organization) and thus of the temporarily created teams consisting of part-time workers.

Flat hierarchy

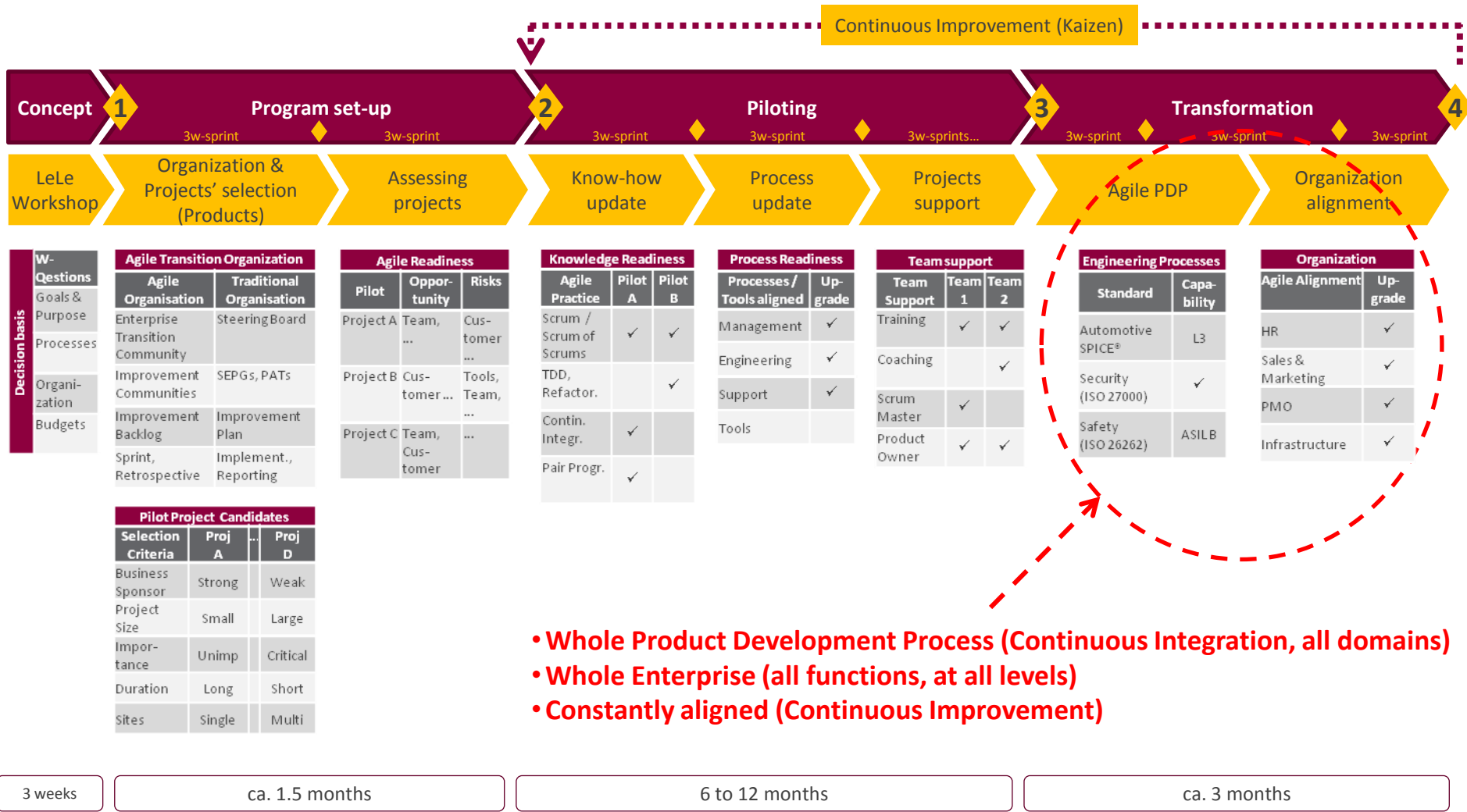


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# An Agile Transformation – begins with the “end” in mind



- Whole Product Development Process (Continuous Integration, all domains)
- Whole Enterprise (all functions, at all levels)
- Constantly aligned (Continuous Improvement)





Survey 2013  
downloadable  
@ Kugler Maag Cie

Interested in updated  
Survey 2014 ?  
(→ agile@kuglermaag.com)

**The Survey is initiated and conducted by Kugler Maag Cie.**

The study is performed in the context of the major European research project SCALARE. This ITEA2 project supports the automotive industry in developing and expanding their ability to scale. SCALARE assumes that software will continue to be the key to bring about innovations and be able to provide holistic services.



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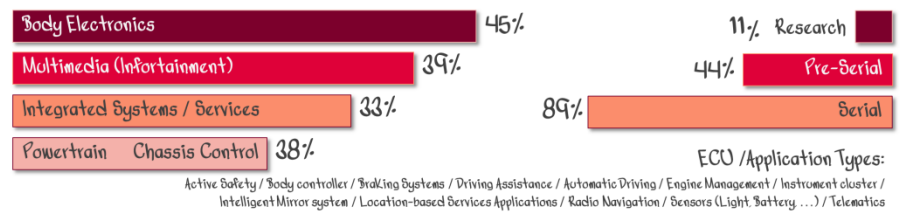
<http://scalare.org/about-scalare/>

# Agile in Automotive

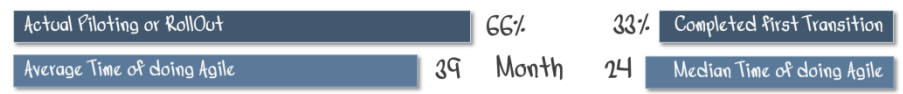
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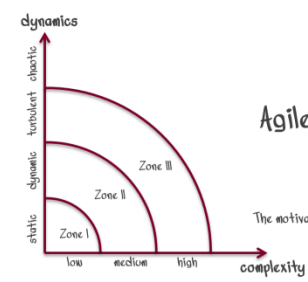
Agile was used in **ALL** domains of software development, mainly serial projects



The agile history in Automotive Development is **SHORT**



At Tier 1 Suppliers status of implementation varies from first piloting to completion of agile transformation. A majority of Tier 2 'pure' software suppliers is applying some agile methods for some years already. Pilot projects typically cover the first sample development phases (1, 2).

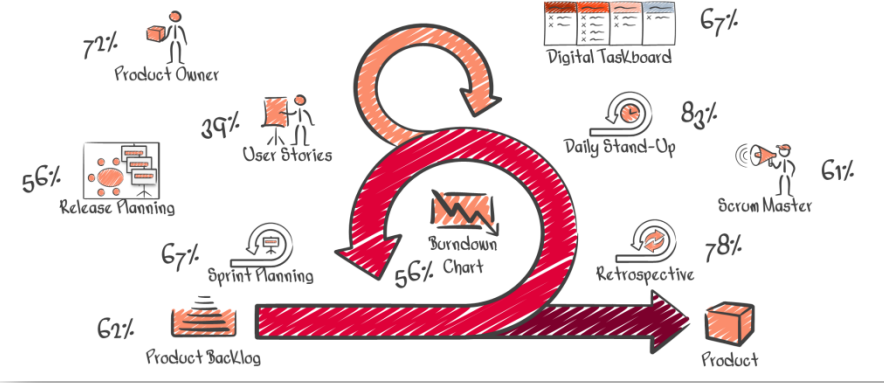


## Agile in Automotive Development to overcome **Dynaxity**

The current development approach was not suitable any more to address current trends adequately: High complexity increase / Pace of changes / Shorter time to market

The motivation was to optimize the development of complex and distributed projects. We failed to act the complexity and dependencies under control with traditional MS-project planning tracking in software development.

## Agile in Automotive Development with **Custom SCRUM**



Thank you for your  
attention – Q&A?

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