



From research questions and study design  
to common data format

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VTT

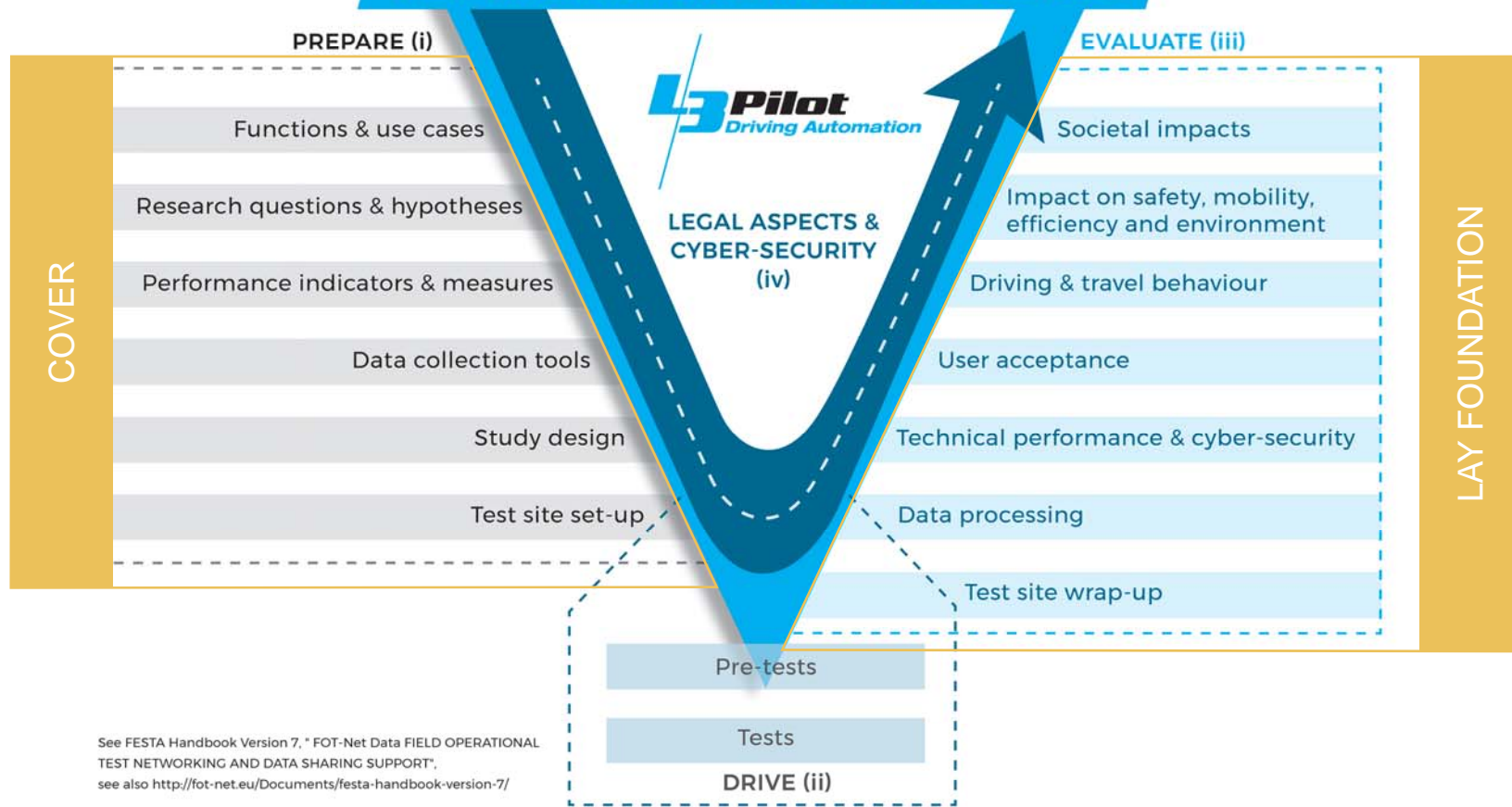


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# FESTA Implementation Plan adapted to L3PILOT



## From theories and AD function descriptions to research questions



Theories of impact areas



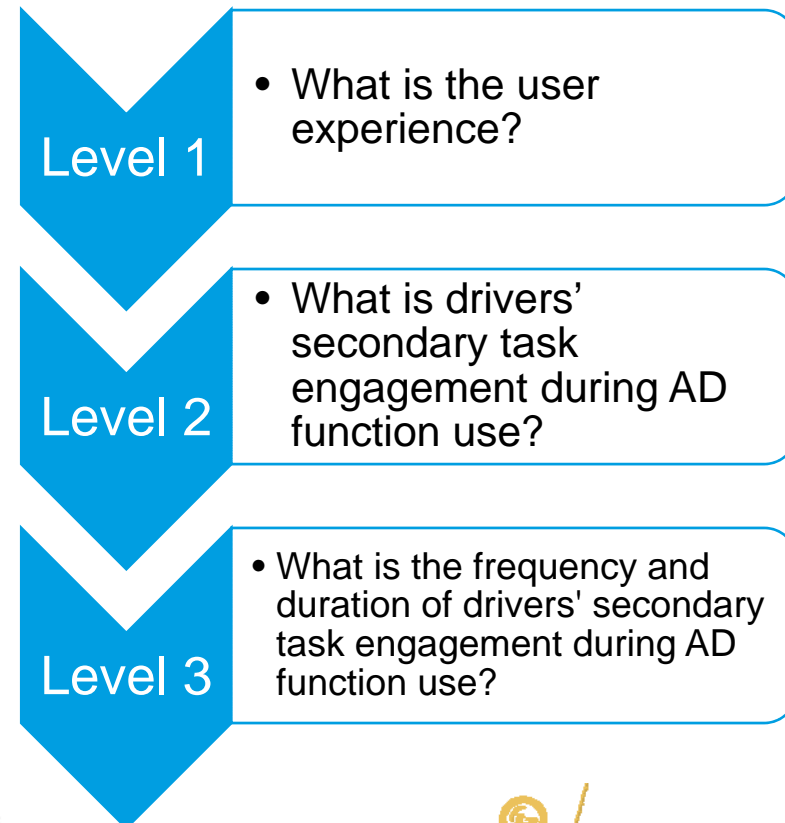
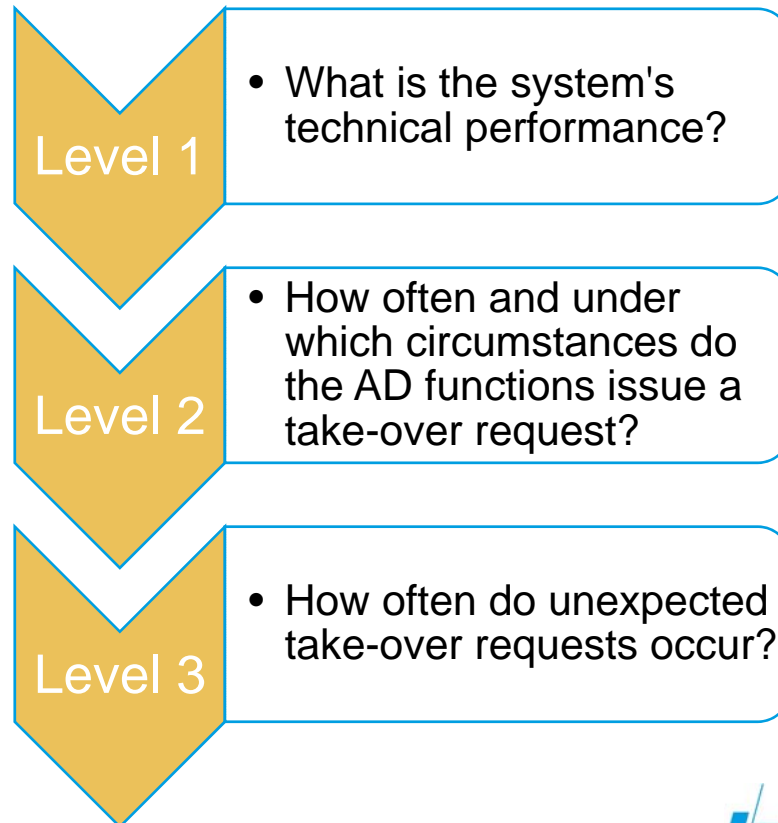
Early descriptions of AD functions



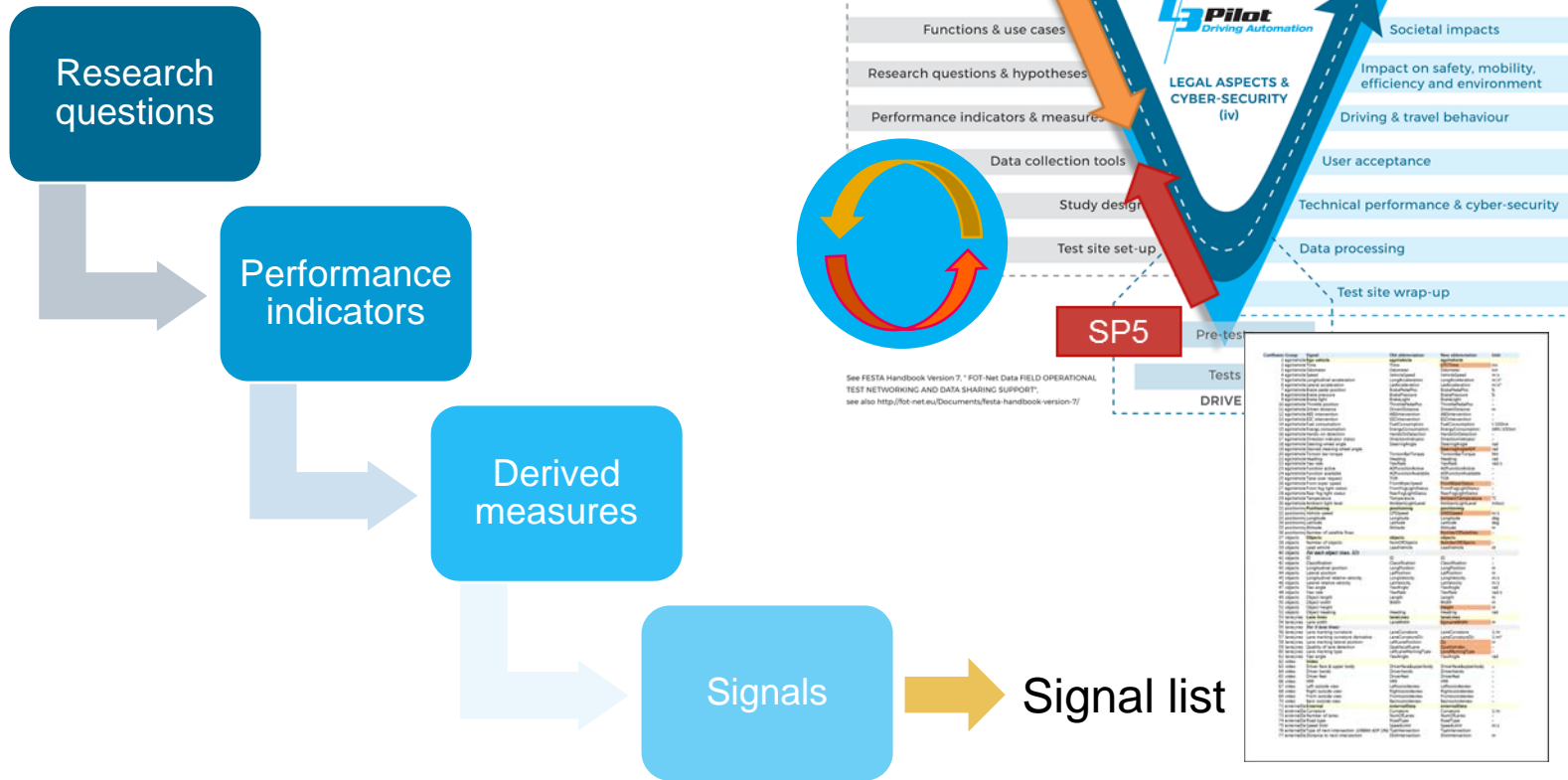
Research questions (3 levels) for all evaluation and impact areas:

- **Technical & traffic evaluation:** System performance, Driving behaviour (28 level-3 RQs)
- **User & acceptance evaluation:** User experience (21 level-3 RQs)
- **Impact evaluation:** Mobility, Safety, Efficiency, Environment (21 level-3 RQs)
- **Socio-economic evaluation:** Socio-economics (5 level-3 RQs)

## Examples of research questions

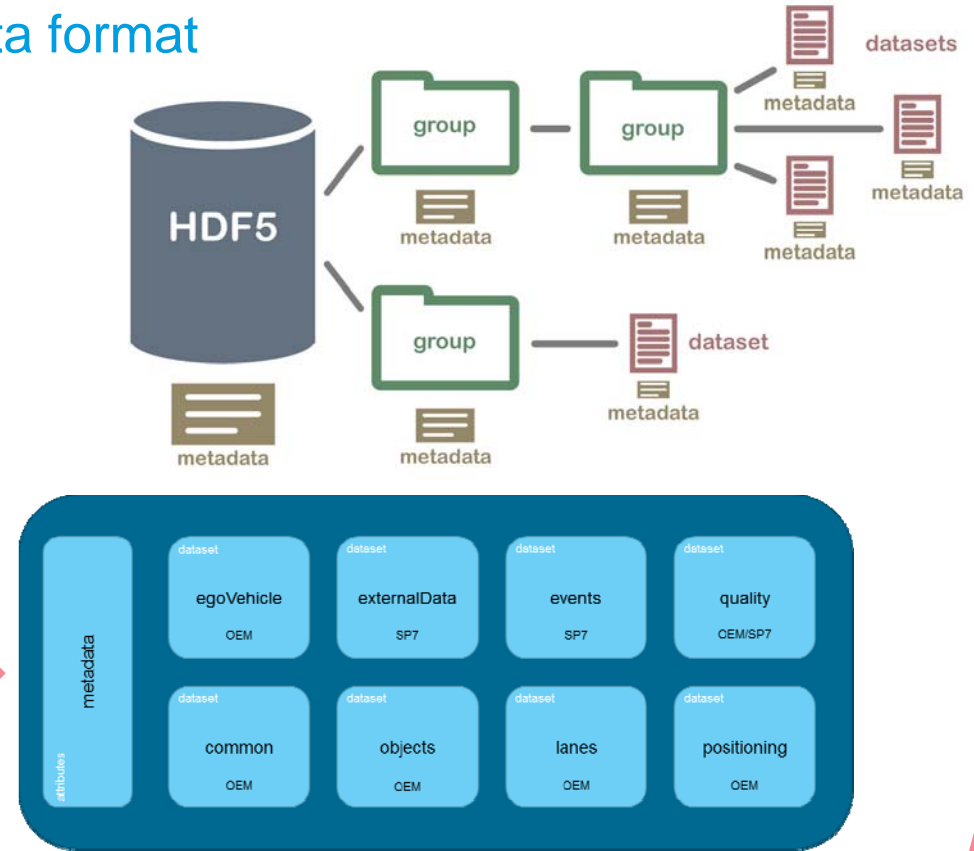


# From research questions to signal list



# From signal list to common data format

Conflicto Group	Signal	Old abbreviation	New abbreviation	Unit
1	egoVehicle	egoVehicle	egoVehicle	ms
2	egoVehicleTime	egoTime	egoTime	ms
3	egoVehicleOdometer	Odometer	Odometer	km
4	egoVehicleSpeed	VehicleSpeed	VehicleSpeed	m/s
5	egoVehicleLongitudinalAcceleration	LongitudinalAcceleration	LongitudinalAcceleration	m/s <sup>2</sup>
6	egoVehicleLateralAcceleration	LateralAcceleration	LateralAcceleration	m/s <sup>2</sup>
7	egoVehicleSteeringWheelAngle	SteeringWheelAngle	SteeringWheelAngle	°
8	egoVehicleBrakePressure	BrakePressure	BrakePressure	°
9	egoVehicleBrakeLight	BrakeLight	BrakeLight	°
10	egoVehicleThrottlePosition	ThrottlePosition	ThrottlePosition	°
11	egoVehicleDriverDistance	DriverDistance	DriverDistance	m
12	egoVehicleAEBIntervention	AEBIntervention	AEBIntervention	-
13	egoVehicleESCIntervention	ESCIntervention	ESCIntervention	-
14	egoVehicleFuelConsumption	FuelConsumption	FuelConsumption	l/100km
15	egoVehicleEnergyConsumption	EnergyConsumption	EnergyConsumption	kWh/100km
16	egoVehicleSteeringWheelDirection	SteeringWheelDirection	SteeringWheelDirection	°
17	egoVehicleDirectionIndicatorStatus	DirectionIndicatorStatus	DirectionIndicatorStatus	-
18	egoVehicleSteeringWheelAngle	SteeringWheelAngle	SteeringWheelAngle	°
19	egoVehicleDesiredSteeringWheelAngle	DesiredSteeringWheelAngle	DesiredSteeringWheelAngle	°
20	egoVehicleTorsionBarTorque	TorsionBarTorque	TorsionBarTorque	Nm
21	egoVehicleHeading	Heading	Heading	rad
22	egoVehicleType	Type	Type	rad
23	egoVehicleFunctionActive	ADFunctionActive	ADFunctionActive	-
24	egoVehicleFunctionAvailable	ADFunctionAvailable	ADFunctionAvailable	-
25	egoVehicleTakeOverRequest	TakeOverRequest	TakeOverRequest	-
26	egoVehicleFrontRightWheelSpeed	FrontRightWheelSpeed	FrontRightWheelSpeed	m/s
27	egoVehicleFrontLeftWheelSpeed	FrontLeftWheelSpeed	FrontLeftWheelSpeed	m/s
28	egoVehicleRearRightWheelSpeed	RearRightWheelSpeed	RearRightWheelSpeed	m/s
29	egoVehicleRearLeftWheelSpeed	RearLeftWheelSpeed	RearLeftWheelSpeed	m/s
30	egoVehicleAmbientLightLevel	AmbientLightLevel	AmbientLightLevel	lux
31	egoVehiclePositioning	Positioning	Positioning	-
32	egoVehicleVehicleSpeed	VehicleSpeed	VehicleSpeed	m/s
33	egoVehicleLongitude	Longitude	Longitude	deg
34	egoVehicleLatitude	Latitude	Latitude	deg
35	egoVehicleAltitude	Altitude	Altitude	m
36	egoVehicleNumberOfSatelliteFixes	NumberOfSatelliteFixes	NumberOfSatelliteFixes	-
37	egoVehicleObjects	Objects	Objects	-
38	egoVehicleNumberOfObjects	NumberOfObjects	NumberOfObjects	-
39	egoVehicleLeadVehicle	LeadVehicle	LeadVehicle	id
40	egoVehicleForEachObjectOwner_AZH	ForEachObjectOwner_AZH	ForEachObjectOwner_AZH	-
41	egoVehicleID	ID	ID	-
42	egoVehicleClassification	Classification	Classification	-
43	egoVehicleLongitudinalPosition	LongitudinalPosition	LongitudinalPosition	m
44	egoVehicleLateralPosition	LateralPosition	LateralPosition	m
45	egoVehicleLongitudinalRelativeVelocity	LongitudinalRelativeVelocity	LongitudinalRelativeVelocity	m/s
46	egoVehicleLateralRelativeVelocity	LateralRelativeVelocity	LateralRelativeVelocity	m/s
47	egoVehicleYawAngle	YawAngle	YawAngle	rad
48	egoVehicleYawRate	YawRate	YawRate	rad/s
49	egoVehicleObjectLength	Length	Length	m
50	egoVehicleObjectWidth	Width	Width	m
51	egoVehicleObjectHeight	Height	Height	m
52	egoVehicleHeading	Heading	Heading	rad
53	egoVehicleLaneID	LaneID	LaneID	m
54	egoVehicleLaneWidth	LaneWidth	LaneWidth	m
55	egoVehicleLaneOffset	LaneOffset	LaneOffset	m
56	egoVehicleLaneHeading	LaneHeading	LaneHeading	°
57	egoVehicleLaneHeadingDerivative	LaneHeadingDerivative	LaneHeadingDerivative	1/s
58	egoVehicleLaneHeadingSecondDerivative	LaneHeadingSecondDerivative	LaneHeadingSecondDerivative	1/s <sup>2</sup>
59	egoVehicleQualityOfLaneDetection	QualityOfLane	QualityOfLane	-
60	egoVehicleLaneHeadingType	LaneHeadingType	LaneHeadingType	-
61	egoVehicleYawAngle	YawAngle	YawAngle	rad
62	egoVideo	Video	Video	-
63	egoVideoDriverFaceAndUpperBody	DriverFaceAndUpperBody	DriverFaceAndUpperBody	-
64	egoVideoDriverHands	DriverHands	DriverHands	-
65	egoVideoDriverFeet	DriverFeet	DriverFeet	-
66	egoVideo	Video	Video	-
67	egoVideoLeftOutsideView	LeftOutsideView	LeftOutsideView	-
68	egoVideoRightOutsideView	RightOutsideView	RightOutsideView	-
69	egoVideoFrontOutsideView	FrontOutsideView	FrontOutsideView	-
70	egoVideoBackOutsideView	BackOutsideView	BackOutsideView	-
71	egoExternal	ExternalData	ExternalData	-
72	egoExternalCurve	Curve	Curve	line
73	egoExternalNumberOfLanes	NumberOfLanes	NumberOfLanes	-
74	egoExternalRoadType	RoadType	RoadType	-
75	egoExternalSpeedLimit	SpeedLimit	SpeedLimit	m/s
76	egoExternalTypeOfEachIntersection	IntersectionType	IntersectionType	-
77	egoExternalDirectionToNextIntersection	DirectionToNextIntersection	DirectionToNextIntersection	-



## Experimental procedure set-up



Traffic Jam



Motorway



Parking



Urban

Experimental procedures: Approaches, participants, study design (incl. baseline)

- Aim: Sufficient commonalities to be able to make harmonised evaluation

### Step 1: Description of alternatives

- Alternatives
- Pros & cons
- **Minimum requirements**

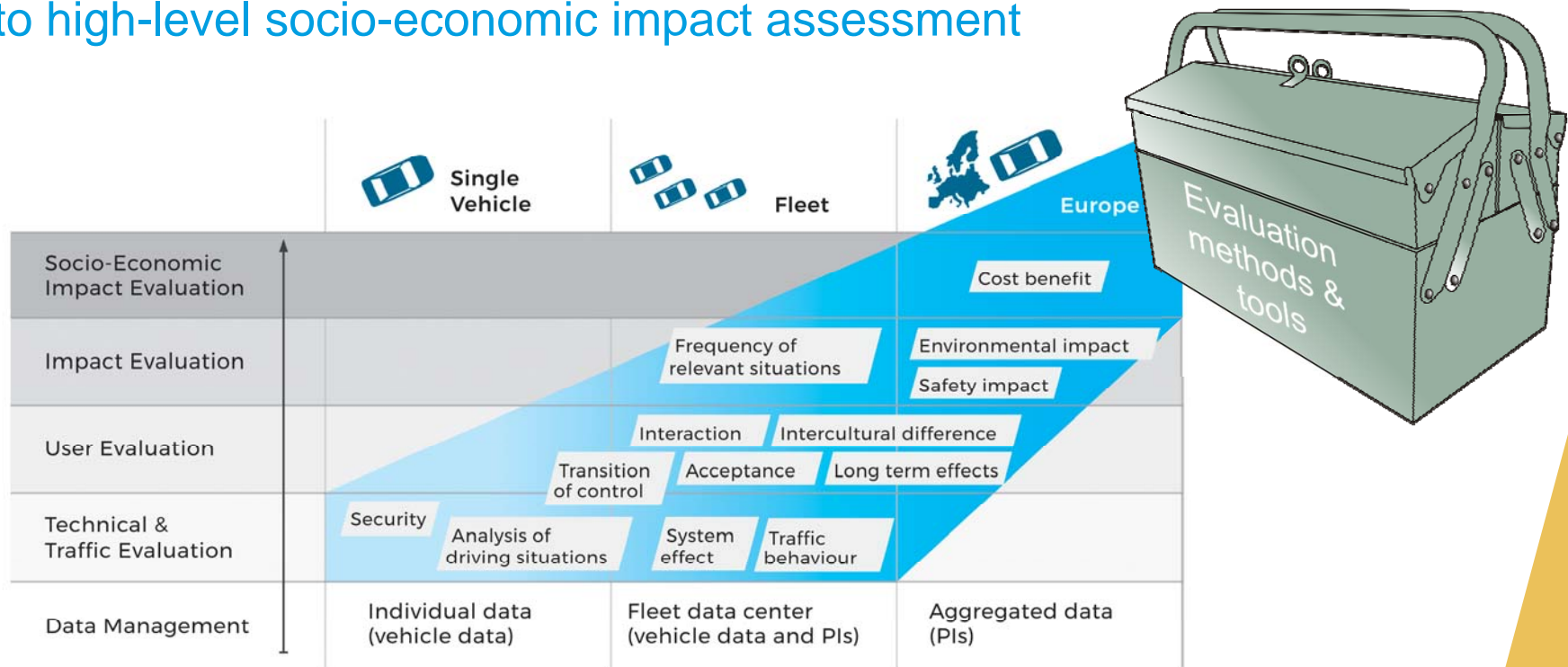


### Step 2: Pilot site consultation

- **Support** on how to implement the methodology into practice
- Awareness of optimal solution vs. **Best practical solution** for a pilot study



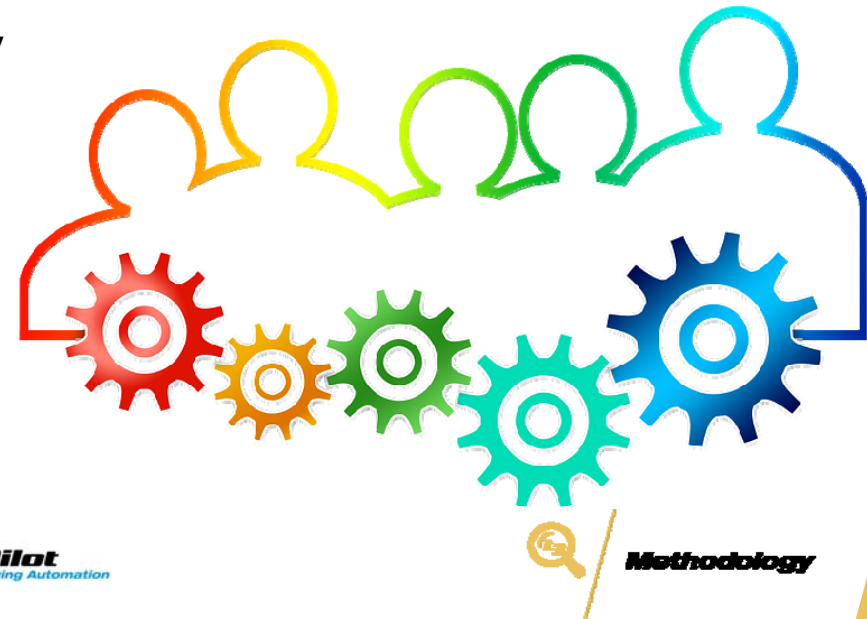
# Development of toolbox of evaluation methods: From analysis of direct field measurements to high-level socio-economic impact assessment





## Foundation for successful evaluation

- Harmonised approaches across pilot sites, established partnerships between evaluation and pilots
- Smooth data flow from pilots via tools to all evaluation methods
- Multidisciplinary evaluation methodology
- Well-defined and tested evaluation plan for all research questions





Thank you for your kind attention.

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