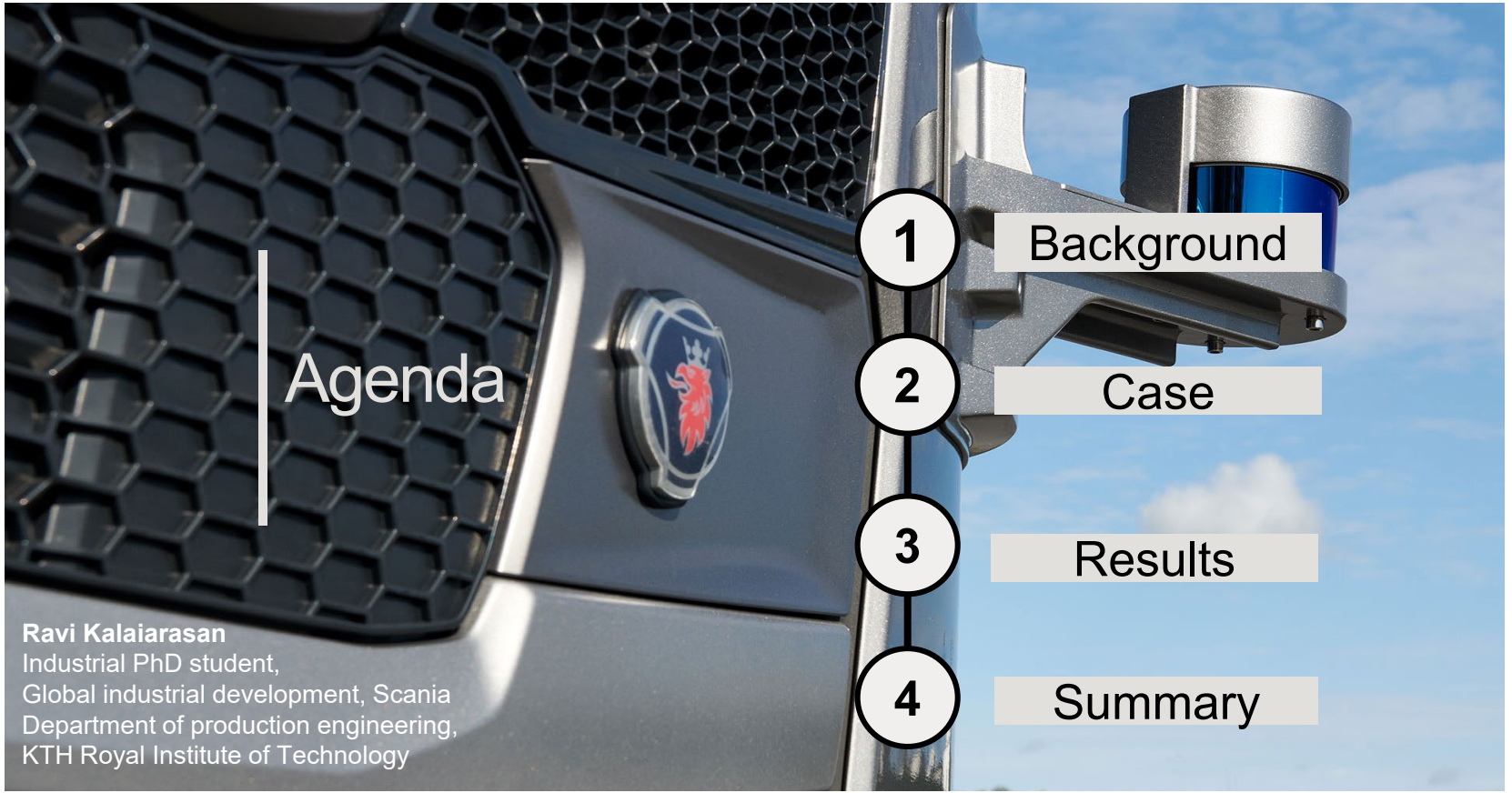
Visibility in extended supply chains



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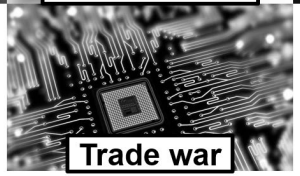
Background

Future

AUTOMATION CONNECTIVITY ELECTRIFICATION

Current situation

Global and regional flows



Case - scope

Understand visibility in extended supply chains, moving beyond the dyadic perspective

Few studies explored visibility in extended supply chains, and they mostly focused on **producing nodes** (Oyedijo et al., 2023)

Supplier → Focal company → Customer

Transportation links are important to consider while consider improving SCV in extended supply chains (Wysislak, 2023)

Supplier → Transport → Component plant → Transport → Assembly plant → Transport → Customer

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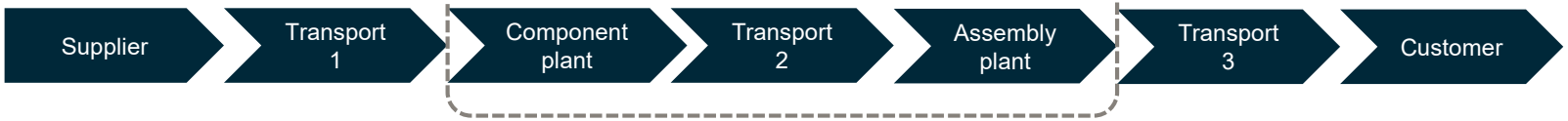
Case – insights from seven actors

- **Perspectives on SCV along extended supply chains**
- **Data made visible to support the physical flow of a product and the items belonging to that product**
- **Seven actors, both internal and external perspectives**
- **Include transports of part, component, and finished product**



What?	Data elements	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx
Why?	Drivers	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx
	Capabilties	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx
	Performance	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx
How?	Enablers	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx
	Barriers/ challenges	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx	Xxx

Results – actors defining supply chain visibility (SCV)

Information related	Internal and external visibility	Material across the supply chain	Having holistics view
• Accuracy • Accessibility • Available • Timeliness	*Internal visibility* In-house operations, stock and related material flow *External visibility* • Lead time (upstream) • Part demand (downstream)	• Ability to follow parts, components, and finished products • Ability to follow vehicles and trailers transporting parts, components and/or products	• Holistic understanding of extended supply chain • Interconnectedness in the supply chain

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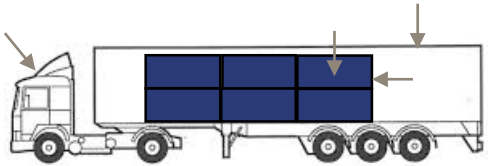
Results – SCV data elements

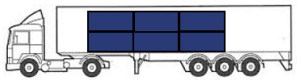
Supplier	Transport 1	Component plant	Transport 2	Assembly plant	Transport 3	Customer
Track and trace (parts and pallets)	Track & trace (trailer)	Track and trace (parts and pallets)	Track & trace (vehicle)	Track and trace (parts and pallets)	Track & trace (delivery to customers)	Track and trace (product)
Notifications of delivery disturbances	Transport capacity demand	Notifications of delivery disturbances	Transport capacity demand	Notifications of material disturbances	Forecast (trucks to final customers)	Customer specific requirment
Delivery time from tier-2 supplier	Transport disturbances	Stock levels	Component information	Stock levels	Estimated time of arrival (ETA)	
Forecast (part demand)	Part information		Transport data		Product information	
	Transport data				Transport data	

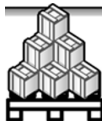


Transport related data | **Demand and supply data** | **Product-related data**

Results – SCV drivers

Supplier	Transport 1	Component plant	Transport 2	Assembly plant	Transport 3	Customer
Finding local suppliers	Reduce transport cost	Reduce cost	Reduce transport cost	Reduce cost	Secure transport capacity	Fulfill regulations
Establish holistic view	Customer demand	Customer demand	Fulfill regulations	Customer demand	Customer demand	Reduce operational cost
Sustainability	Sustainability	Fulfill legal requirements	Sustainability	Late information of shortages	Sustainability	
Material supply uncertainty		Material supply uncertainty		Material supply uncertainty		





Sustainability | **Cost reduction** | **Customer demand**

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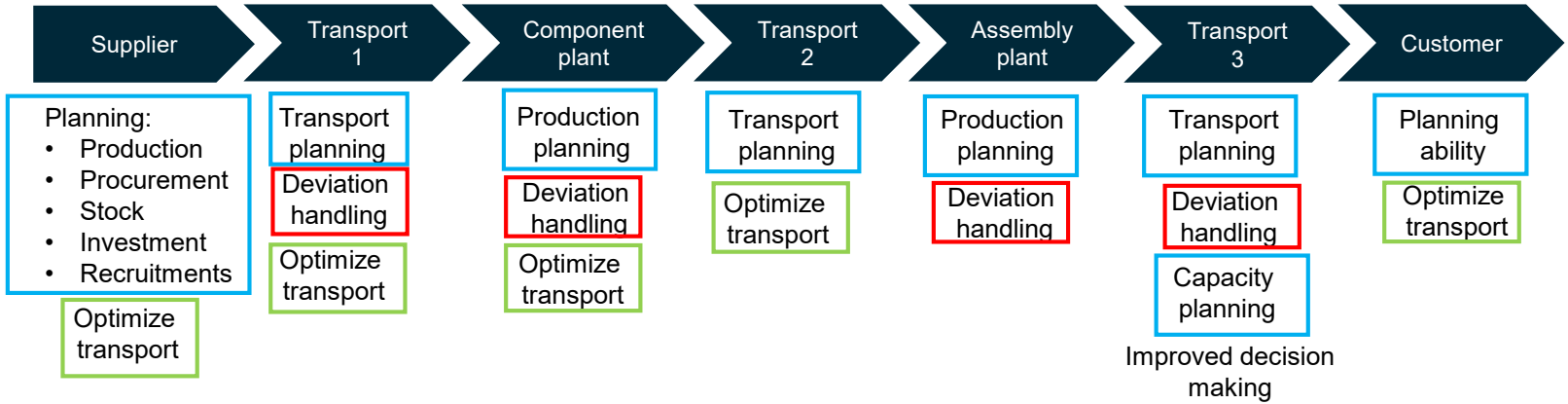
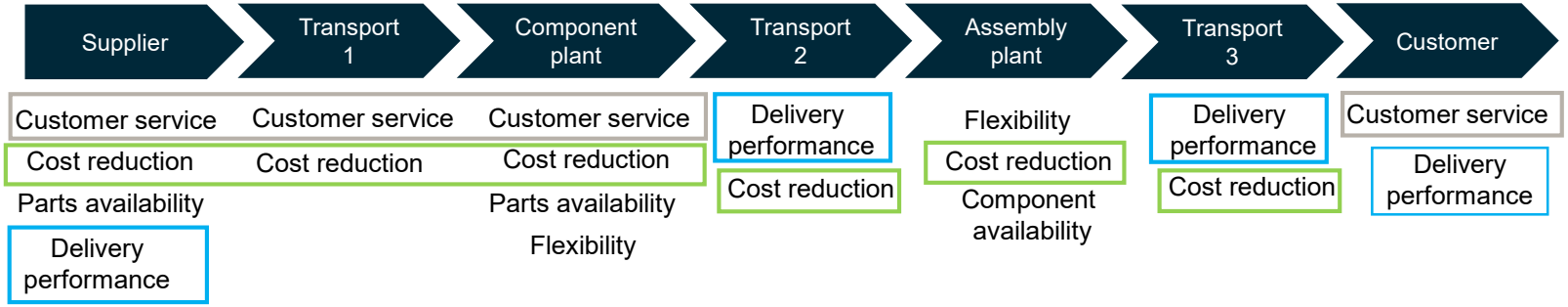
Results – outcome (capabilties)



Planning | Deviation handling | Optimize

Results – outcome (effects)



Results – enablers

Supplier	Transport 1	Component plant	Transport 2	Assembly plant	Transport 3	Customer
Collaboration – with tier-2 suppliers	Label scanning	Production planning experience	Customer relationships	Collaboration with suppliers	Common system for communication	Sensor technologies
Reliable forecast	Technology GPS equipment	Collaboration with suppliers	Truck driver skills	Continuous reviews and updates processes	Reliable forecast	System access
	Common systems	System capable of generating scenarios	System access	Tracking system	Collaboration – inbound and outbound	

Supply chain collaboration

People

Technology

Results – barriers & challenges

Supplier	Transport 1	Component plant	Transport 2	Assembly plant	Transport 3	Customer
Finding local suppliers	Not reporting deliveries	Way of working	Location and geography	Delivery of information in time	Time for updates to be visible	Cost of solutions
Not feasible	Solutions differ depending on situation	High number of parts with deviations	New routes	Communication of information between management levels	Location and geography	Lack of infrastructure for data communication
Part type	Ownership	Implement solution broadly	Lack of communication	Number of parts with deviations	Lack of trust	Data security
Lack of trust – on forecast	Conflict of interest			Ownership	Number of transport modes	

Supply chain complexity

Lack of trust

Conflict of interest

Ownership

Technology implementation

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Similarities and differences along the extended supply chain

Similarities along the extended supply chain

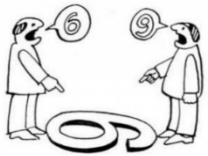
- Consensus regarding **track & trace data**
- **Improved planning** was mentioned by all actors
- Common perception among several of the actors that **forecast data** is important

Differences along the extended supply chain

- Perspectives are strongly related to the local context rather than to an extended supply chain perspective
- Clear difference between the **production nodes** and **transportations link**
- Production nodes were primarily focused on the part, component, and/or the finished product
- Transportation links focused on transport related aspects such as trailers and vehicles

Summary – take aways

- Insights on SCV data elements and related factors in an extended supply chain case



- Despite certain similarities, there are very different perceptions

- Increased level of awareness among the actors of the interconnectedness in the supply chain

- Barriers & challenges outweigh the enablers

- The importance of considering transportation links

Reflections and Discussions

1. Do you believe that other industries than automotive have similar and/or different perspectives on SCV data? Examples?

2. Is SCV always feasible and plausible?

3. What is the role of *standards* and *product passports* while considering broader implementation of SCV?