The case study provides researchers’ insights on how Industry 4.0 transforms innovation in the automotive industry supply chain in Germany and China.

**Topics covered**
- Industry 4.0, multinational enterprises, automotive supply chains

**Methods**
- Semi-structured interviews with 27 industry experts, including leading carmakers and automotive suppliers

### Key digital technologies in the automotive industry
- Automated guided vehicles
- Blockchain
- IoT
- Cloud computing
- Mobile services
- Robotics
- Big data analytics

### Germany
- Automotive is the largest industry sector, accounting for 20% of Germany’s industrial revenues; home of 10 most valuable automotive OEMs and 19 of 100 biggest automotive suppliers

### China
- Largest manufacturing country and consumer market for automotive worldwide

### Effects of these digital technologies on innovation practices
- Multinational enterprises (MNEs) already use digital technologies to "digitise" their supply chains, resulting in:
  - Improved reliability
  - Agility
  - Effectiveness

**Examples:**
- Bosch started an idea crowdsourcing among all its manufacturing sites to develop innovative ideas how to digitalize the supply chain
- A Tier 2 supplier without sufficient data analytics capabilities shared data with its customer to jointly identify improvement potentials
- Volkswagen closely integrated its IT department with all business functions & business processes

### Companies collaborate with start-ups and supply chain partners:
- BMW’s “Startup Garage” to purchase start-ups’ products
- Volkswagen’s “Future Automotive Supply Tracks” (FAST) initiative to work closer with suppliers
- Daimler’s engagement in the Blockchain in Transport Alliance (BitA) to “lead in the blockchain for transportation space”

### Main challenges to digitalisation

#### Standardization
- Various competing standards are common
- Standards often lag latest industry developments
- OEMs create their own standard and force them on their suppliers

#### Data security
- Data security must be considered across the whole supply chain
- Need of supportive regulatory framework for data servers

#### Employees’ skills
- Need for data analytics and data management skills

### Policy recommendations to support digitalisation
- Establish / support standardization bodies
- Support international cooperation of standardization bodies
- Develop data security recommendations
- Pass international anti-cybercrime laws
- Enhance digital skills in early education and support continuous education

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