Organizational embedding of Big Data and predictive analytics

Dr. Florian Neukart | Leiden, 17.11.2015
Some challenges
Management summary Volkswagen Data Lab

Objective
- Innovative IT-solutions for the digital future of the Volkswagen Group
- Safeguarding the future: new fields, potentials in current fields

Innovation Network
- Network including the most innovative IT & technology partners worldwide, extraordinary universities, international startups and the German Accelerator

Team & Competences
- Big Data, Advanced Analytics
- Connectivity: Connected Customer / Connected Car, Internet of Things
- IT-Security
- Data Scientists: Machine Learning, Algorithms, Statistics, Maths…

Scalability
- International Approach: Shared Services, Technology & Team
- Scalability of Use Cases to other brands & markets
- Knowledge Management
- Qualification

Use Cases & Cooperation
- Use Cases in cooperation with partners from various business departments, brands, markets & innovation network

Speed
- Fast performance and realisation of innovative Use Cases in prototyping environment
- Hand over to the line function
- Analytics as a service
Objective

Quick realisation of innovative Use Cases in the areas of Big Data, advanced analytics, connectivity and internet of things.

Customer and business focus

Innovation

Partnering, collaboration & speed

Collaboration with many specialists in the field of Big Data, Advanced Analytics, Connectivity and Internet of Things

Scouting: Start-ups and technologies
Competencies at one glance

Our focus is on developing solutions in the fields of advanced analytics, connectivity and internet of things, whereby expertise and data remain in the company.

Data Lab Services

- Use cases
- IT-Prototypes
- Data protection
- Tech-scouting
- Start-Up scouting
- Design thinking
- Big Data Consulting
- IT-Security

- Machine learning
- Deep learning
- Tech library
- Prototype env.
- Flexible partnering
- Data visualisation
- Text & Data Mining
- Anomaly detection

Technologies & partners

- Big Data und advanced analytics prototyping environment: separately hosted

Internal & external data sources

- Vehicles
- Mobile devices
- Audio & video
- IoT
- Images
- Text
- Web & social
- Machine data
- CRM
- ...
IT prototyping-platform: latest technology stack, secure, fast, and flexible*

*extensible at any time
Core competency: digitalization and connected car

- Digitalization
- Mobility & parking
- Connected Car
- Data Lake
- CRM, dealer experience

- Team lead Digital & Connected Car
- Websites
- Configurator
- Mobility & Parking

- PhD. in Data Mining
- Connected Car
- Mobility
- Big Data
- Project lead Mobility at BMW- contractor
- Machine Learning

- Big Data
- Internet of Things, Smart Home
- Big Data Technology-evaluation
- Legal expert
- Sttistic risk models

- Digitalization
- Web Analytics
- Configurator
- Websites, Customer Journeys
- CRM

- Text Mining
- Web Analytics
- Enterprise Search
- Machine Learning
- Visitor stream
- Analysis int. Fairs
Core competency: Data Science and technology

- Statistic
- Cern Background
- Python, R, C++, Matlab
- Machine Learning
- Data Science & Process Mining

- Data analysis
- Machine Learning
- Smart Home
- Robotic
- Python, R, Matlab

- Machine Learning
- Deep Learning

- Industry 4.0, Computer Scientist
- Handling Factory Data
- Supply Chain Analysis
- Algorithm design (Heuristics, …)
- Java, C++, SQL

- Chief Technology Officer
- Machine Learning / Artificial Intelligence
- Advanced and predictive analytics
- IoT, risk prediction, …
- Python, R, Java, SPSS, …

Dr. F. Neukart
CTO

- Physicist
- PhD. candidate in pred. Analytics
- Participant Hackathon „Codefest N“
- Data Scientist

- PhD. candidate “Visual Analytics”
- Recommender Systems
- Human Machine communication

- Statistiker für Risikomodelle
- R, SAS, IBM SPSS
- Clustering Verfahren
- Machine Learning
Data lab competences: examples for potential data-driven innovation across the value chain

Examples for Big Data Analytics in selected stages of a simplified Automotive OEM value chain (no demand for completeness)

- Technical Development
  - Prognosis & stock planning
  - Logistic optimisation
- Procurement Finance
  - Predictive maintenance
  - Repurchase probability
- Logistics
  - Warranty analytics & optimisation
- Production, Quality
  - Logistic optimisation
- Marketing
  - Call center: complaints early detection
- Sales, After Sales, Retail
  - Customer Loyalty
  - Enterprise Search
  - Early warning systems, risk reduction
  - Production, Industry 4.0
  - Media spend optimisation
  - Interactive Fairs
  - Customer Loyalty
- Connected Customer
  - Sales planning
  - Connected Car & Connected Customer, e.g. Algorithms & Apps

Further Use Cases: Smart Home, Smart City, Big Data for the IT, Cyber Security, etc.
Data lab use cases (overview, examples)

Connectivity: Connected & Customer Car, IoT

Customer needs prediction, prediction markets (CHN)

Technical Service: Risk predictions

Optimisation of loyalty: Marketing, Sales, After Sales

Optimisation of parts prediction, quality

Industry 4.0: Paintshop / Production

Optimisation of After Sales, warranty
Data lab use case overview – facts and figures

<table>
<thead>
<tr>
<th>Completed in total</th>
<th>Currently in progress 2015</th>
<th>Currently in clarification / prioritized</th>
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<td><strong>45</strong> 2014: 20 2015: 25</td>
<td><strong>18</strong> 18 will be completed in 2015</td>
<td><strong>16</strong> In clarification: 8 Prioritized: 8</td>
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- **9 markets**
  - Natural Language Processing: 7
  - Text Mining: 6
  - Predictive Analytics: 7
  - Advanced Analytics: 8
  - Internet of Things: 24
  - Analytics: 37
  - Infrastructure: 10

- **7 brands**
  - Sales, After Sales: 45%
  - Marketing: 5%
  - Production, Quality: 5%
  - Logistic's: 3%
  - Financial procurement: 7%
  - Technical Development: 15%
  - Connected car & connected customer: 15%

> 40 Use Cases requested and in the Pipeline
Data lab innovation network

Business departments, brands and markets

Specialists in Big Data, Analytics & Internet of Things as well as international start-ups

Universities and research institutes

Own data, own technology and IT infrastructure
Scalability: use cases and know-how can be transferred to other brands and markets

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**Fast Scaling: Successful Use Cases to other brands and markets**

**Know-how, data, lessons learned and results provide benefits for the group!**
How do we support business?

**Development of prototypes & scaling**
- Consulting and advice on
  - Algorithms, statistical methods, Big Data technologies and tools, etc.
  - Predictions, forecast models, prototypes
  - Scaling of successful use cases

**Technology-Scouting and fast, flexible partnering**
- Markets & IT departments
- Leading technology partners
- Renowned universities
- Dynamic start-ups and German Accelerator

**Internal expertise & prototyping environment**
- Big Data & Analytics, digital know-how & experts
- Internal state-of-the-art prototyping environment
- Expertise & lessons learned („Use Case Library“, „Tech Library“)
- Hand over to line function according to 4-phase-model

**„Bring your Data“: Integration, Analysis & Visualization**
- Evaluation of data privacy, IT-Security
- Consolidation and analysis of internal and external data
- Big Data & Advanced Analytics
  - Realtime-Analysis & interpretation, Pattern Recognition
  - Visualization by the use of newest tools
  - Recommendations

**Big Data Concepts & Use Cases**
- Intense alignment with departments, brands & markets
- Development of innovative Use Cases
  - Concept and design thinking workshops
  - Benefit potential: quantitative & qualitative

Contact Volkswagen Data Lab: datalab@volkswagen.de