

# Internet of (Wind)Turbines » Erfolgreiche Daten und Analytics Projekte @EnBW

Dr. Frank Säuberlich  
Chief Data Officer, EnBW



# Our Journey: Analytics/AI @EnBW



Successful analytics initiatives for several years

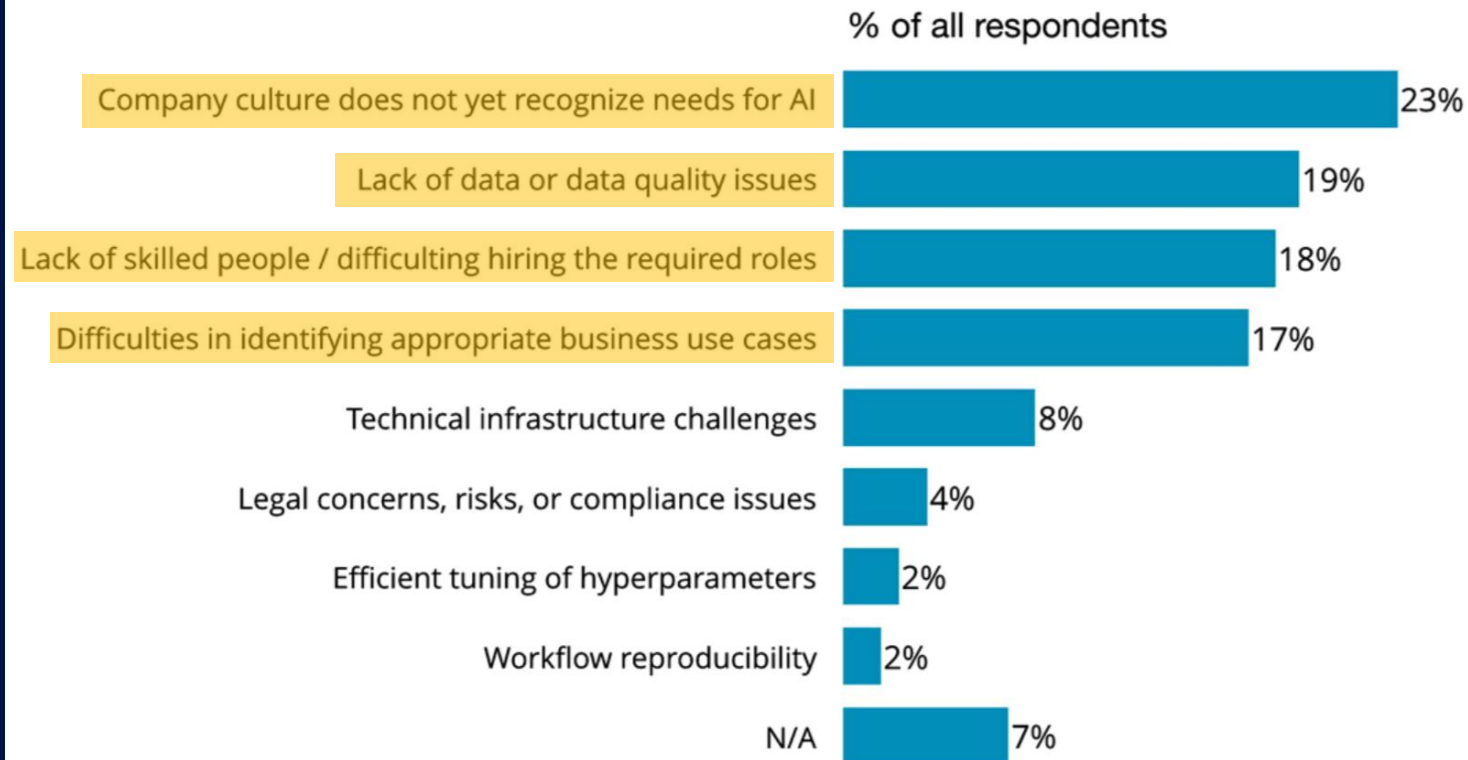
Pull vs push: motivated departments vs. strategic topics/opportunities

Lab vs. Factory: how to bring analytics into production

□ How can we scale all of this?

# What was holding us back from scaling analytics? — EnBW

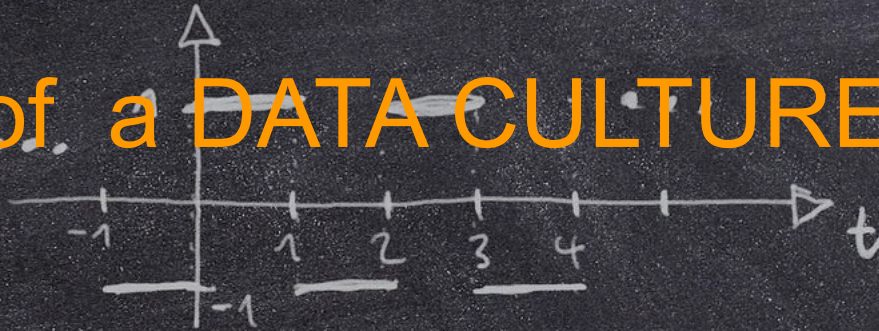
What is the main bottleneck holding back further AI adoption? (Select one.)



Quelle: O'Reilly – AI Adoption in the Enterprise (2019)



# Lack of a DATA CULTURE



$$f(t) = a_0 + \sum_{n=1}^{\infty} \left[ a_n \cdot \cos\left(\frac{n\pi t}{L}\right) + b_n \cdot \sin\left(\frac{n\pi t}{L}\right) \right]$$

$$= a_0 + a_1 \cdot \cos\left(\frac{\pi t}{L}\right) + b_1 \cdot \sin\left(\frac{\pi t}{L}\right) + a_2 \cdot \cos\left(\frac{2\pi t}{L}\right) + b_2 \cdot \sin\left(\frac{2\pi t}{L}\right) + \dots$$

$$a_0 = \frac{1}{2L} \int_{-L}^L f(t) dt = \frac{1}{2} \int_{-1}^1 f(t) dt$$



“By 2020, 50% of organizations will lack sufficient AI and data literacy skills to achieve business value”

$$2L=2 \Rightarrow L=1$$

$$a_n \approx \frac{1}{n^2}$$

$$= \frac{1}{2} \int_{-1}^1 1 dt + \frac{1}{2} \int_0^1 1 dt$$

Gartner



## Our Experience

Internal Marketing raises awareness and curiosity

Training of “AI/Analytics Ambassadors” raises enthusiasm

Training of decision makers raises awareness

Intense support and training on the job leads to „Data Literacy“

$$a_n \rightarrow a(\omega)$$

$$b_n \rightarrow b(\omega)$$



# missing DATA and low DATA QUALITY

## Our Experience

Critical success factor for Analytics is DATA

Mindset „Data = Asset“ need to be developed

Data integration skills/technology should be provided centrally

Data Governance has to fit to the organisation

“It's not who has the best algorithm who wins, it's who has the most data.”



# lack of TALENTs and SKILLS

## Our Experience

External vs. Internal skills

Invest in internal development and training

Many Analytics Cases can be solved with simple solutions

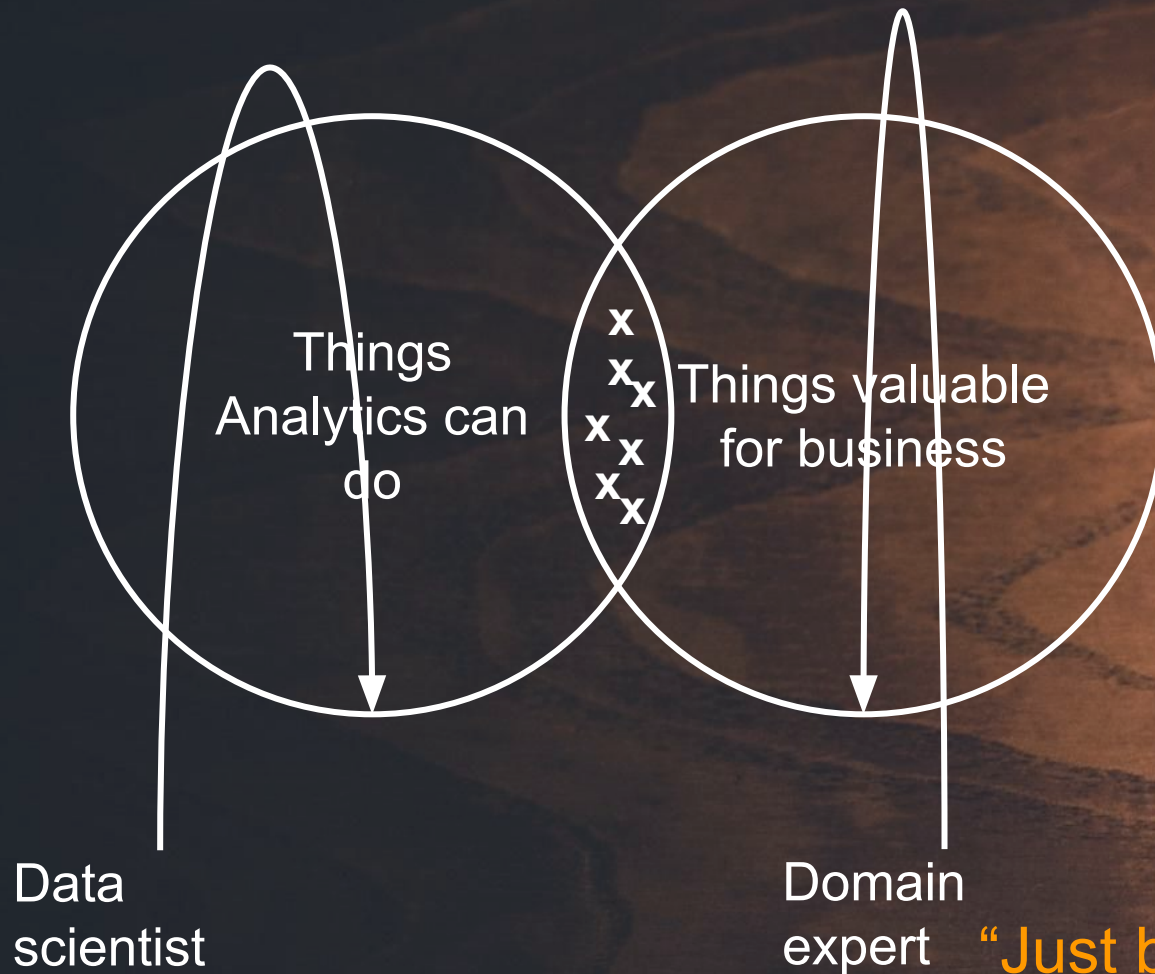
You need different skills for PoCs and operationalization of analytics (Lab vs. Factory)

“Don’t fall for the lie that says you need a PhD to do amazing things with machine learning”

Cassie Kozyrkov



# Difficulties to IDENTIFY valuable USE CASES



## Our Experience

To find any Analytics Cases is easy

To find valuable Analytics Cases is much more difficult

“Decision Making is a Science“

Development of an Analytics Strategy helps to focus

“Just because you can do something, doesn't mean it's a good use of anyone's time”

Cassie Kozyrkov



# Internet of Wind Turbines

- Focus on **Maintenance** and **Availability** of Windparks
- Step by step making **Data usable** without starting a mammoth Data Integration project
- Started with Maintenance Reports (PDF), then wind forecasts, power curves of individual turbines, etc.
- In each step generate **usable results** that **generate value**
- Stepwise approach to a „**Digital Twin**“ of Turbines and Parks

Maintenance PDFs



- Life span per part
- Repair time
- Which parts are repaired together?

Turbine  
Wind Forecasts Power Curves



Predicted output per turbine

Best possible  
Maintenance/Repair  
interval







Damage Identification



Safety in public places



Forecast of Grid Condition



Market Forecasts



# Vielen Dank für Ihre Aufmerksamkeit!

Dr. Frank Säuberlich  
Chief Data Officer, EnBW  
[f.saeuberlich@enbw.com](mailto:f.saeuberlich@enbw.com)