

How do you teach AI the value of trust?

OSE Data Science, University of Bonn
2 June 2021



The better the question. The better the answer.
The better the world works.

EY

Building a better
working world

Agenda

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in Data Science

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in Data Science

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Questions

Here with you today

A professional headshot of a man with short brown hair, blue eyes, and a slight smile. He is wearing a dark grey blazer over a black t-shirt. The background is a solid dark grey.

“

The better the information the
better the world works

Professional background

- ▶ Master Diploma in Statistics from TU Dortmund University
- ▶ Certificate of Proficiency from the University of Auckland
- ▶ Research Assistant at Centre for Statistical Consulting and Analysis
- ▶ Researcher at Forschungsverbund Deutsches Jugendinstitut/Technische Universität Dortmund
- ▶ Joined EY in 2017, working in Technology Consulting

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A professional woman with dark hair tied back, wearing a gold sequined top, is smiling and looking towards the right. She is sitting at a desk with a laptop. In the background, there are other people, including a man and a woman, also appearing to be in a workspace or office environment.

Building a better working world

for our employees, our clients
and the society we live in.

We support employees and develop their abilities - A lifetime of benefits for you

- ▶ Fostering and development of people with different strengths and abilities
- ▶ Support for professional examinations (tax advisors, auditors, CFA, CISA, CPA), financially and with appropriate time models
- ▶ Intensive on-the-job training
- ▶ Individual training and further development
- ▶ Coaching and counseling by experienced managers
- ▶ Regular feedback



Employees

Clients

Company

EY

We strengthen trust in the economy and the financial markets

- ▶ Bundle our competencies for the individual sectors
- ▶ Detailed knowledge of the challenges that our customers face
- ▶ Relationships of trust through sustainable cooperation
- ▶ Deliver innovative solutions for digital change



Employees

Clients

Company

We take responsibility: Ethically, socially and ecologically

- ▶ Future-oriented, secure jobs
- ▶ Volunteering days
- ▶ Promoting young and dynamic companies
- ▶ Sustainable economic activity
- ▶ Fostering equal opportunities

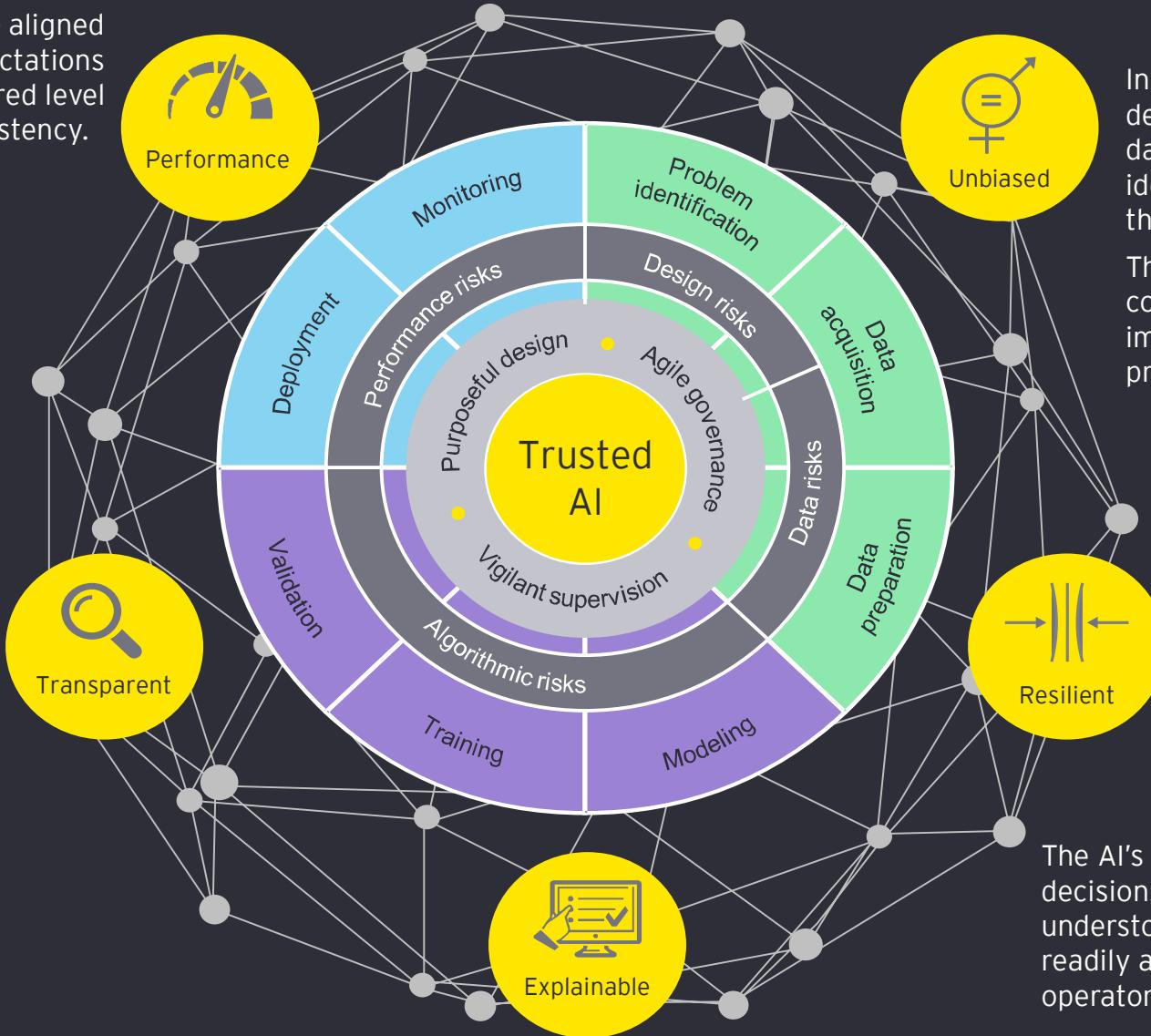
Employees

Clients

Company

We build trust in AI

The AI's outcomes are aligned with stakeholder expectations and perform at a desired level of precision and consistency.



When interacting with an AI, an end-user is given appropriate notification and an opportunity to select their level of interaction.

User consent is obtained, as required for data captured and used.

Inherent biases arising from the development team composition, data and training methods are identified and addressed through the AI design.

The AI system is designed with consideration for the need of all impacted stakeholders and to promote a positive societal impact.

The data used by the AI system components and the algorithm itself is secured from unauthorized access, corruption and/or adversarial attack.

The AI's training methods and decisions criteria can be understood, is documented and is readily available for human operator challenge and validation.

Our services at a glance: Consulting



In Consulting, we advise companies and groups looking to improve and expand their operating business and optimally prepare them for the future.

Business Consulting

- Business Transformation
- Enterprise Risk
- Finance
- Supply Chain & Operations
- Technology Risk

Technology Consulting

- Technology Transformation
- Technology Solutions Delivery
- **Data & Analytics**
- Digital and Emerging Tech
- Cybersecurity

Our services

Technology Consulting

- ▶ Reorganization of the technologies used and IT processes to generate growth and competitive edge, optimize costs and minimize risks
- ▶ Transformation of data architecture to gain information for corporate management
- ▶ Advise on the selection and introduction of new technologies
- ▶ Development and implementation of measures for cybersecurity



Our services

Technology Consulting

Technology Transformation

Advise on the direction of the IT strategy, on the design of IT operating models and the selection & design of suitable IT architectures

Technology Solutions

Design and implementation of technology solutions such as SAP solutions in all areas of the organization

Data & Analytics

Integration of intelligent automation and AI for data collection and analysis

Digital & Emerging Tech

Advise on the selection and implementation of innovative technologies such as MS Dynamics, blockchain, IoT

Cybersecurity

Setting up security measures to protect against attacks or identifying weaknesses, security by design



We are driving digital transformations with Data & Analytics

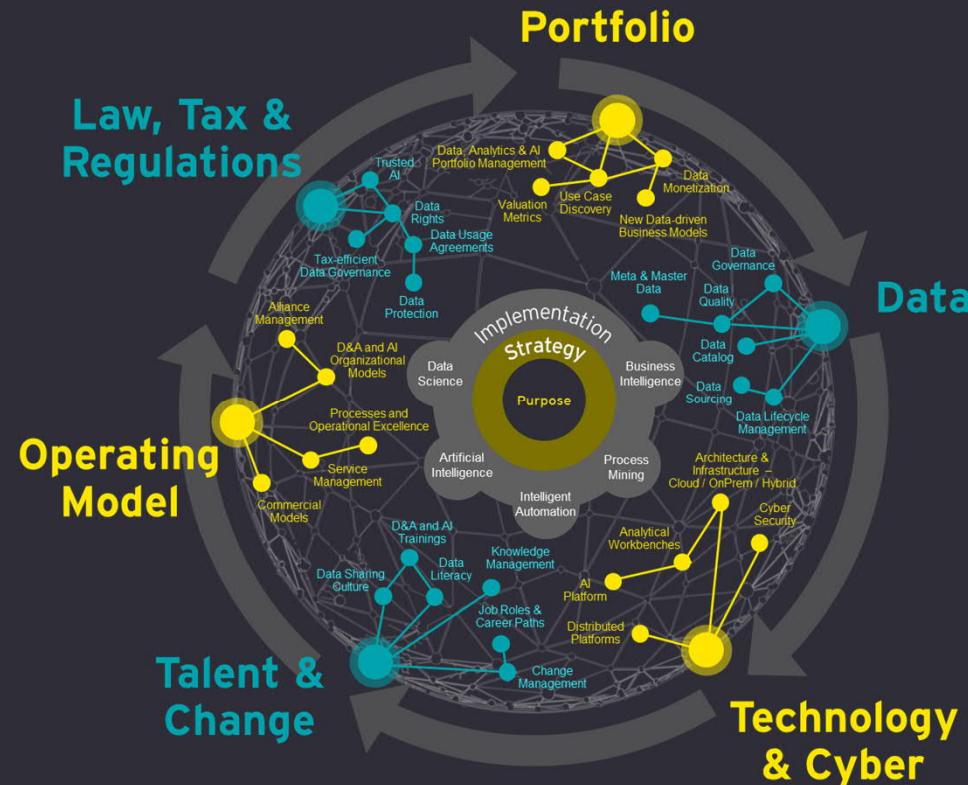
6400

professionals around the world with a focus on Data, Analytics and Automation

Our core topics

- ▶ Digital Strategy & Digital Transformation
- ▶ Data Management & Modern Architectures (mostly Cloud)
- ▶ Trusted Insights (from BI to Advanced Analytics)
- ▶ Intelligent Automation (from Process Mining to RPA to AI)

Our data driven enterprise framework



We think globally and are internationally connected

150+

countries*

298965

employees

37.2 bn

USD in revenue

Global Entities
46 748 employees

Europe, Middle East, India and Africa
117 306 employees
14.2 bn USD in revenue



*The figures on this and the following page refer to the 2020 fiscal year.

We are strongly positioned in Germany as well

20

offices

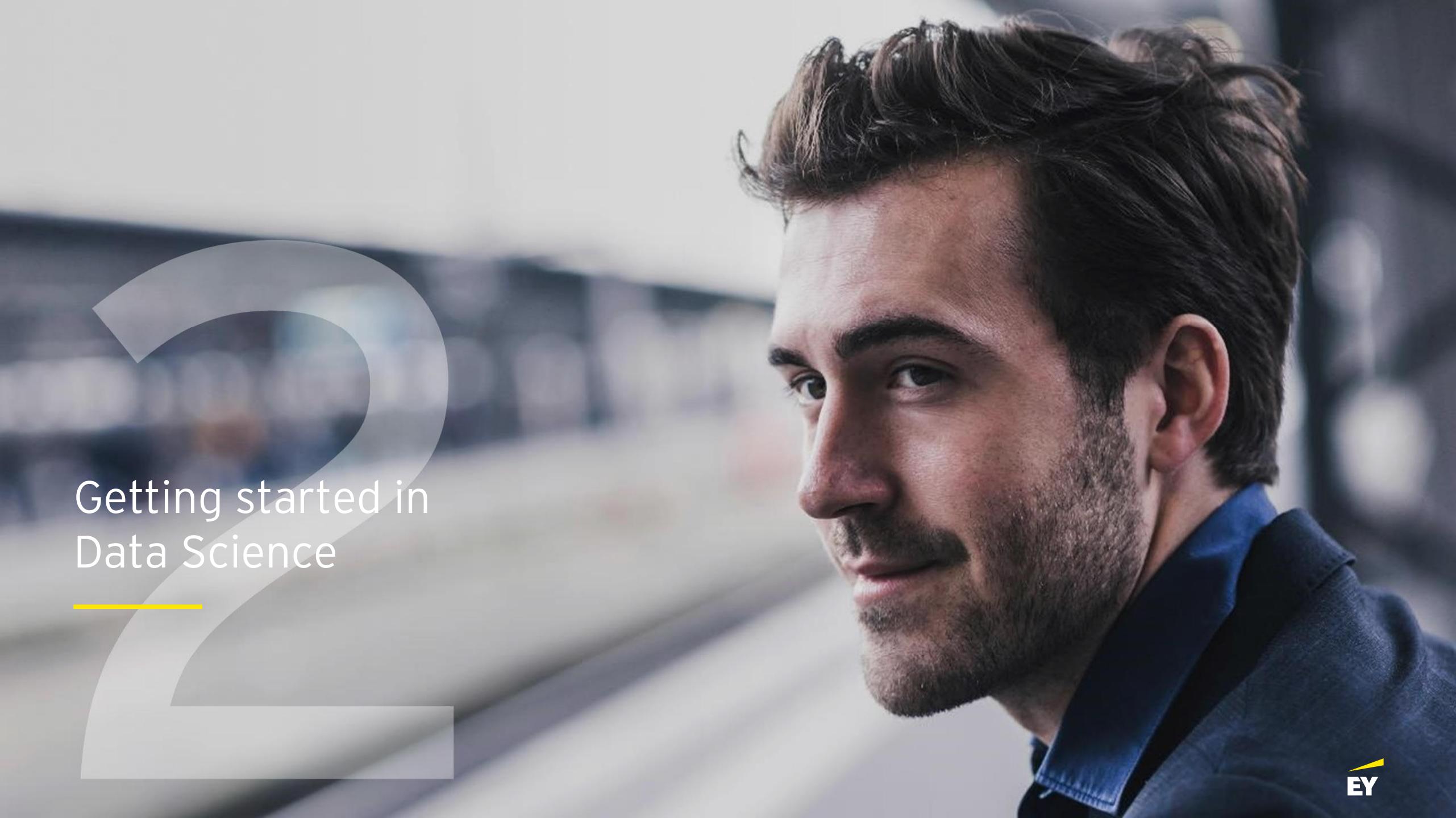
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employees

2.1 bn

EUR in revenue





2

Getting started in Data Science

Project setup

Quality Management/Quality Assurance
at a major manufacturer in the automotive sector

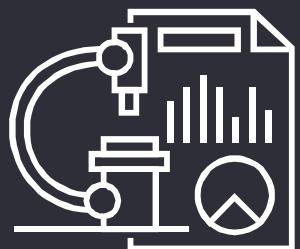


3 months

Fixed price



Proof of Concept



Project Scope:

- ▶ Requirements Engineering
- ▶ Data Ingest & Understanding
- ▶ Data Modeling & Analytics
- ▶ Operationalization & Handover

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In the advent of unacquainted technologies [client] proofs concepts for data driven analytics to assure and enhance its high quality standards.



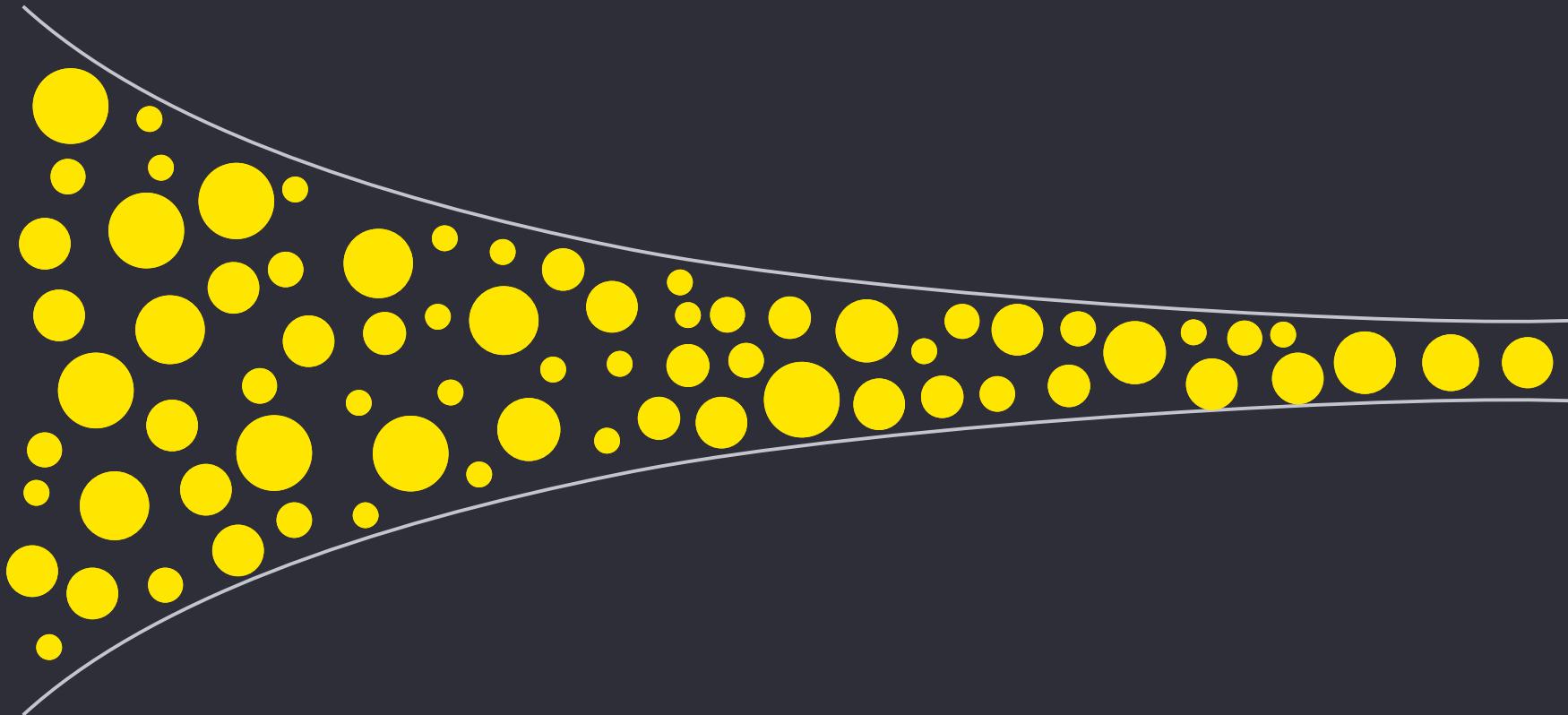
We compiled 20 use cases and ran proofs of concept for 7 use cases

Ideation

Data Analytics

Professionalization

Operations



We worked on multidimensional array data

Data was only provided after two months into the project:

- ▶ Data Source: maintenance sensors from existing electric cars
- ▶ Sample from 3 markets
- ▶ Data Format: raw data is stored as “load spectra”, i.e. crosstabs or frequency tables

Frequency	≤ 0 km/h	0-8 km/h	8-50 km/h	50-90 km/h	90-120 km/h	>120 km/h
< 0 kW	17%	2%	16%	8%	1%	0%
Frequency	≤ 0 km/h	0-8 km/h	8-50 km/h	50-90 km/h	90-120 km/h	>120 km/h
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Frequency	≤ 0 km/h	0-8 km/h	8-50 km/h	50-90 km/h	90-120 km/h	>120 km/h
≤ 0 kW	17%	2%	16%	8%	1%	0%
>0-35 kW	1%	7%	22%	16%	5%	0%
35-90 kW	0%	0%	1%	2%	1%	0%
>90 kW	0%	0%	0%	0%	0%	0%



Across use cases, we applied a vast set of methods

- ▶ Descriptive analysis for a small-scale spatial differentiation of driving styles
- ▶ Outlier detection
- ▶ Cluster analysis for customer segmentation by operational profiles (driving and charging)
- ▶ Simulation of unrecorded measures to enhance the data provided

We proved that Patefield's algorithm results in sufficient outcomes

- ▶ Simulations with Patefield's algorithm showed sufficient results for the joint distribution of some (supposedly independent) features
- ▶ Actually, `r2dtable()` from base R did the trick
- ▶ This sparked the idea to replace some comparatively costly multidimensional sensors by unidimensional sensors

In a follow-up project, we extended our proof of concept and also took the Iterative Proportional Fitting Procedure into consideration.

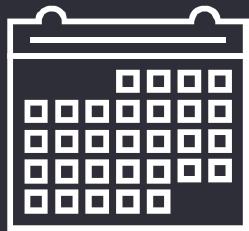


**Growing professional in
Data Science**



Project setup

Recommendation engine for an online tool
at an organization in the public sector

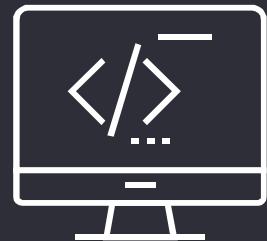


3 years



100m+ EUR

Minimum viable
product



Project Scope:

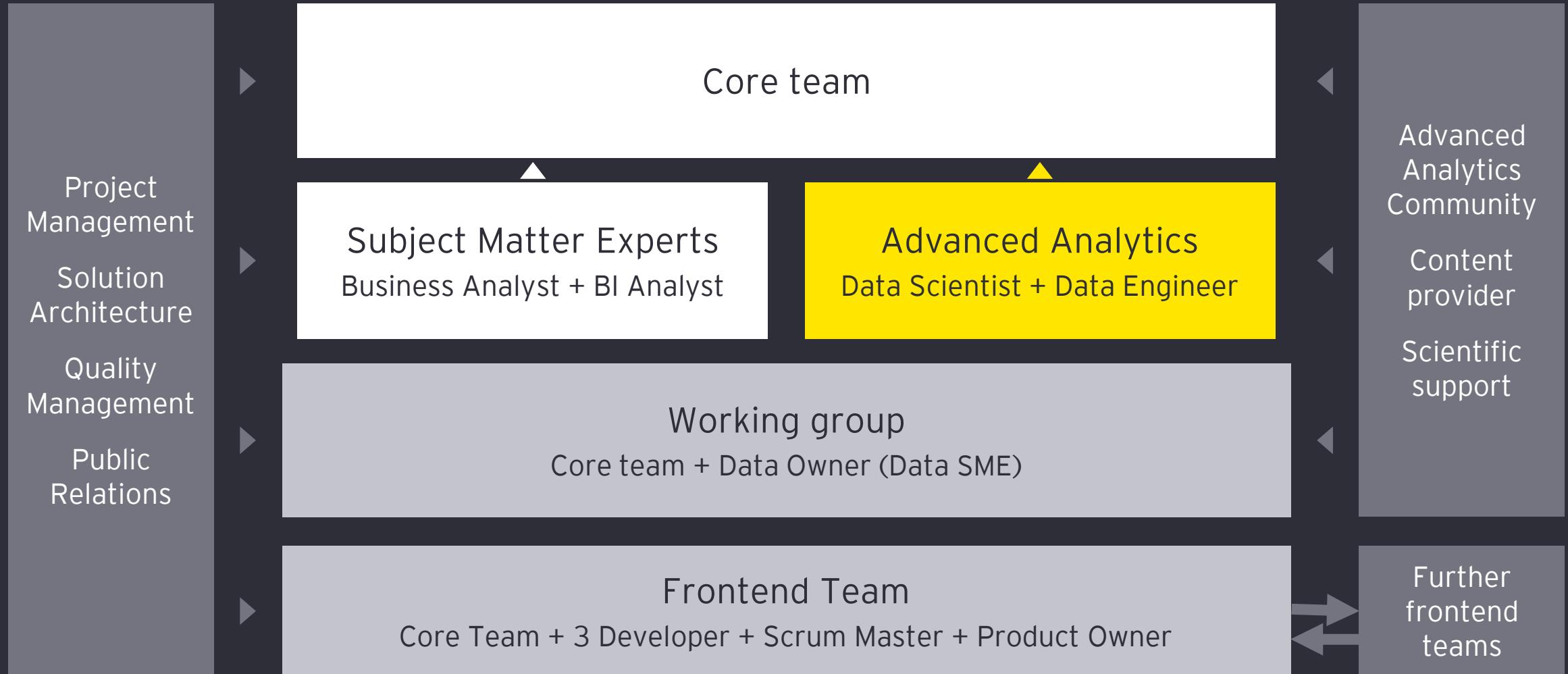
- ▶ Conceptual design of pre-defined use cases
- ▶ Implementation of an MVP version
- ▶ Agile product development

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To inspire users what other people in their situation have done and provide a low-threshold access to other functionalities of the online tool



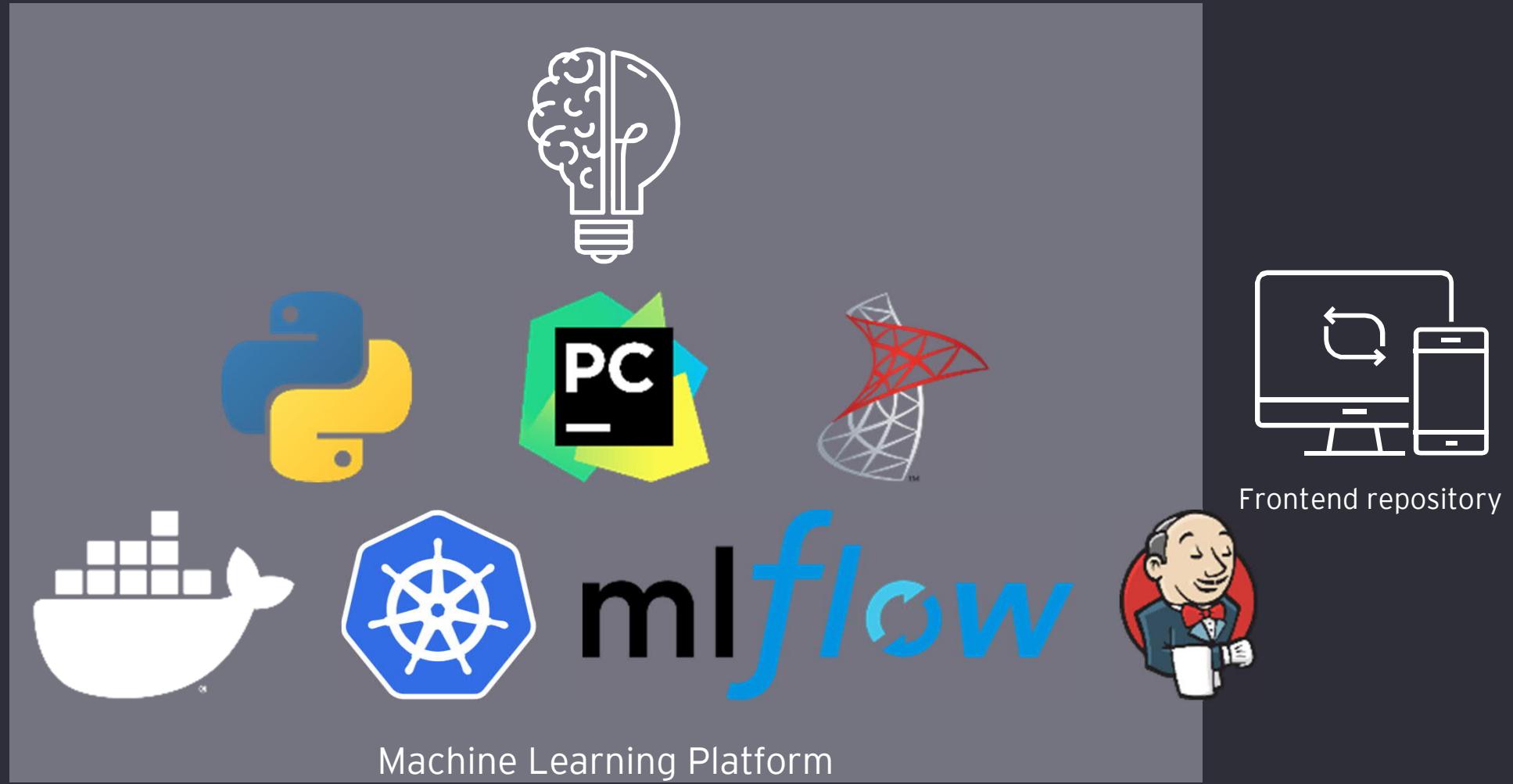
Team setup: Recommendation engine



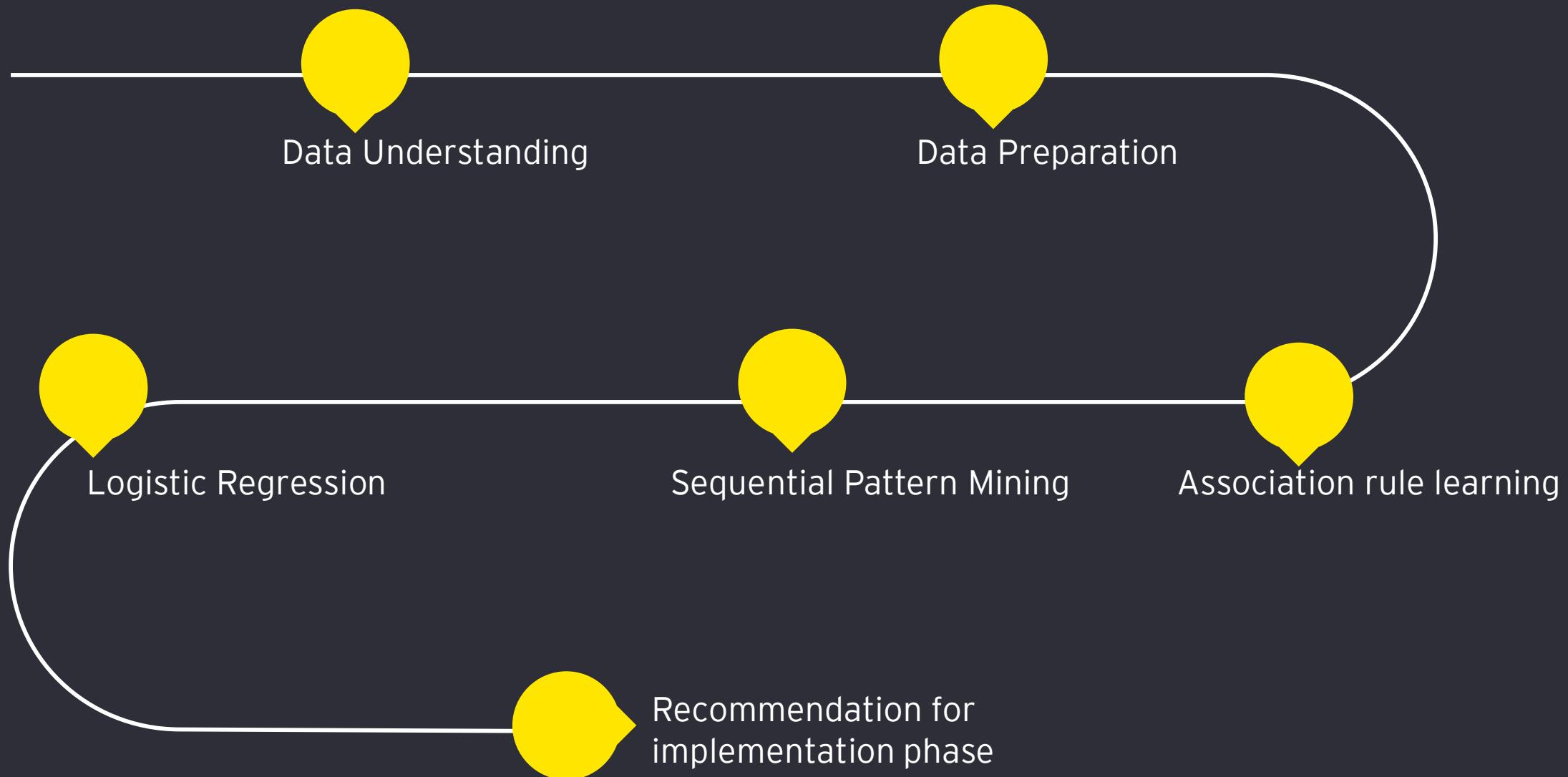
Technical setup: Recommendation engine



ORACLE®



We evaluated the feasibility of different methodological approaches



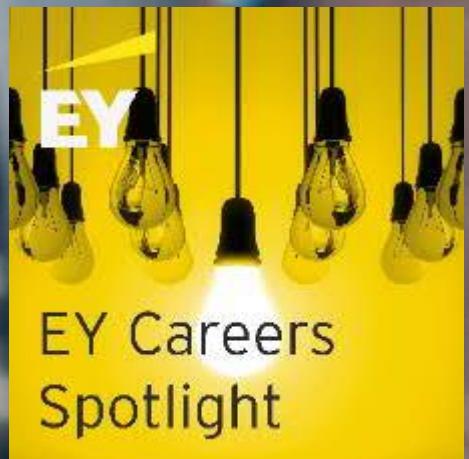


How we stay in touch

EY podcast

New every two weeks:

- ▶ Interviews with experts, thought leaders and inspiring personalities at EY
- ▶ A look behind the scenes at EY with exclusive insights
- ▶ Tips and tricks for your career



Listen now:



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- ▶ Gradual expansion into more extensive projects in changing project teams
- ▶ Entry possible at any time of year



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including certification in Microsoft or
a standard SAP module

Great practical use through

applying the lessons to project work
with clients

Time travel to the future

by visiting one of our innovation centers abroad

Direct hiring

as a consultant after the end of the program

The program **starts** on 1 October each year

Two possible specializations to choose from

Data & analytics or accounting & controlling



Stay in touch with us



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EY | Building a better working world

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