



**SIEMENS**

Siemens Advanta Consulting

# Artificial Intelligence & Data Science in Practice

NOVA IMS | March 15<sup>th</sup>, 2024

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[siemens-advanta.com](http://siemens-advanta.com)



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Senior Project Manager



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Senior Consultant

**Professional career**

2019 – present      Senior Project Manager Advanced Analytics & AI  
Siemens Advanta Consulting

2016 – 2019      Senior Auditor – Data Analytics  
Controlling Finance Audit

2011 – 2014      Commercial Project Manager  
Siemens AG, Madrid

2008 – 2011      Trainee  
Siemens AG

**Professional career**

2020 – present      Senior Consultant Advanced Analytics & AI  
Siemens Advanta Consulting

2020 - 2020      Working Student – Data Analytics  
Controlling Finance Audit

2016 - 2016      Software Engineering Intern  
Huawei Technologies, Istanbul

2015 - 2015      Engineering Intern  
Institute Industrial IT, Germany

**Academic career**

2013 – 2015      Master in Business Administration  
ISM Munich

2008 - 2011      Bachelor in Business Administration  
EWA Madrid

**Academic career**

2017 – 2020      Master in Informatics  
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2013 - 2017      Bachelor in Computer Science Engineering  
University of Marmara, Istanbul

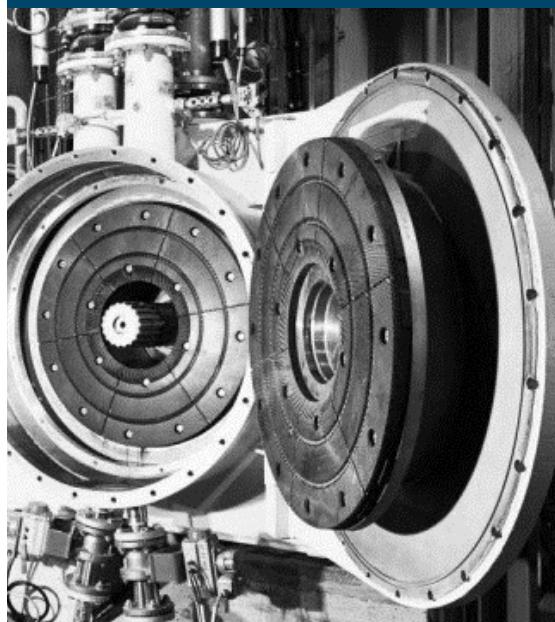
# 01

**About Siemens &  
Siemens Advanta**



# 02

**AI & Data Science in  
Practice**



# 03

**Use Case in Smart  
Infrastructure**



# 04

**Q&A**



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and use the  
**8321 5507**

**What do you associate with  
Siemens?**



1

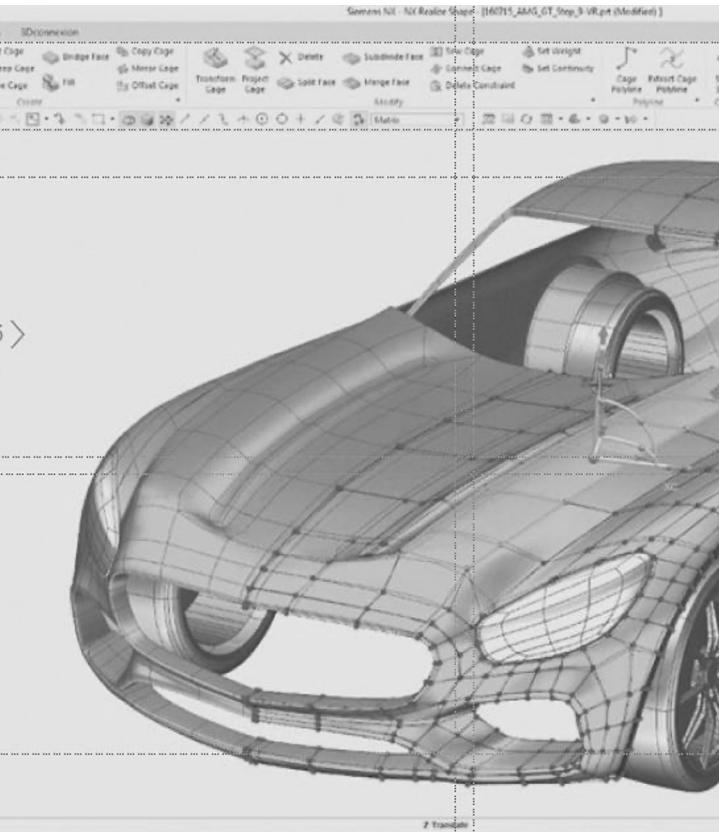


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2



3



We commute in cars,  
designed with **Siemens  
Software** ...

... built in **factories**  
**automated by Siemens**  
...

... and charged with  
renewable and  
decentral **Siemens  
Smart Grid**.

**SIEMENS**



We travel in **trains made by Siemens**

...

... or in airplanes created with the help  
of **Siemens Technology**.



We rely on **life saving medicine** to be quickly available on the markets.....

... enabled due to the **Siemens Innovations.**

# Setup of Siemens AG

## Businesses

Digital  
Industries



Smart  
Infrastructure



Mobility



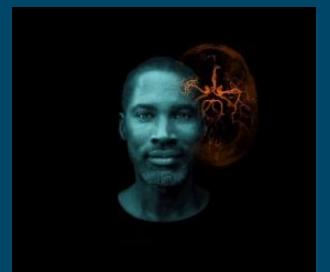
Siemens  
Advanta



Portfolio  
Companies



Siemens  
Healthineers<sup>1</sup>



## Countries

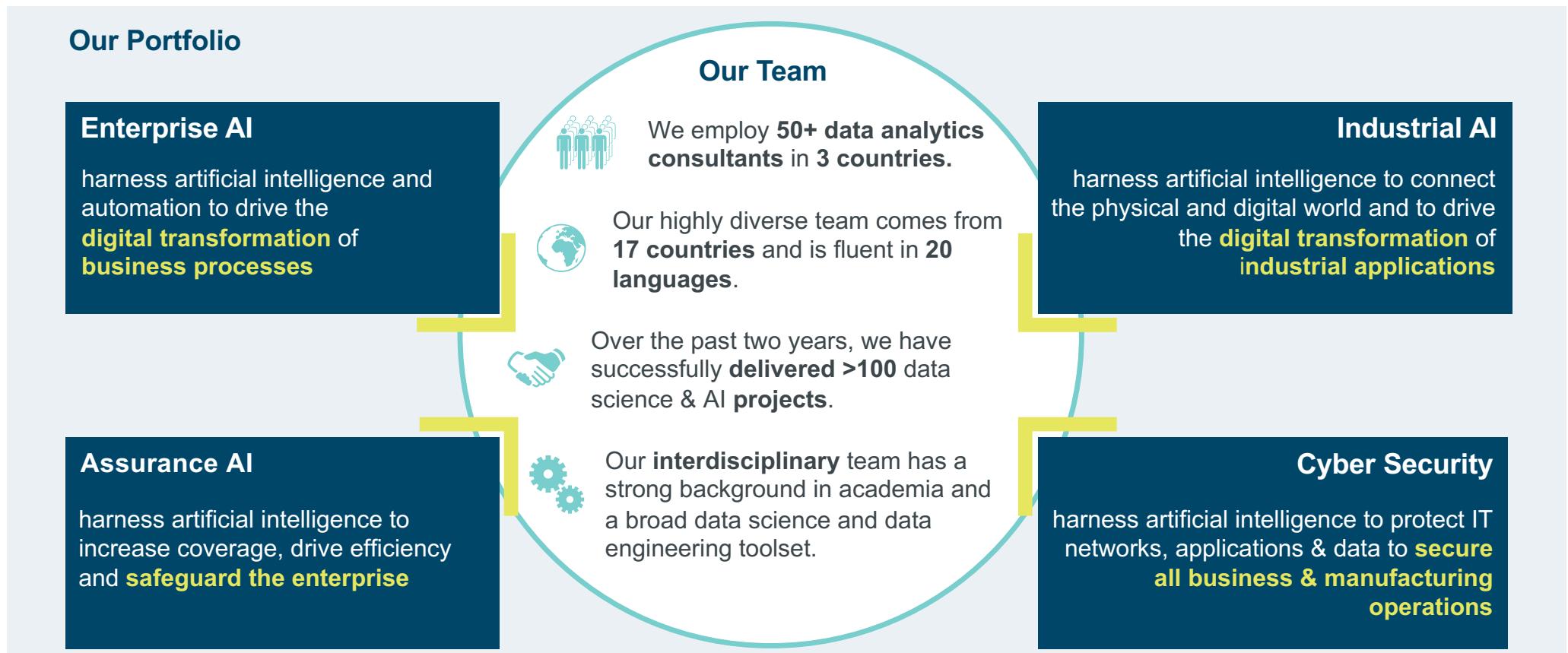
## Service & Governance

<sup>1</sup> Publicly listed subsidiary of Siemens; Siemens' share in Siemens Healthineers: 75%

# Siemens Advanta is a global consulting and professional service group with a strong focus on digitalization



# Our team is complementing the ADV Consulting strategy & digital portfolio with Data Science expertise – focusing on Enterprise & Industrial AI applications



## Our Data Analytics team



# 01

About Siemens &  
Siemens Advanta



# 03

Use Case in Smart  
Infrastructure



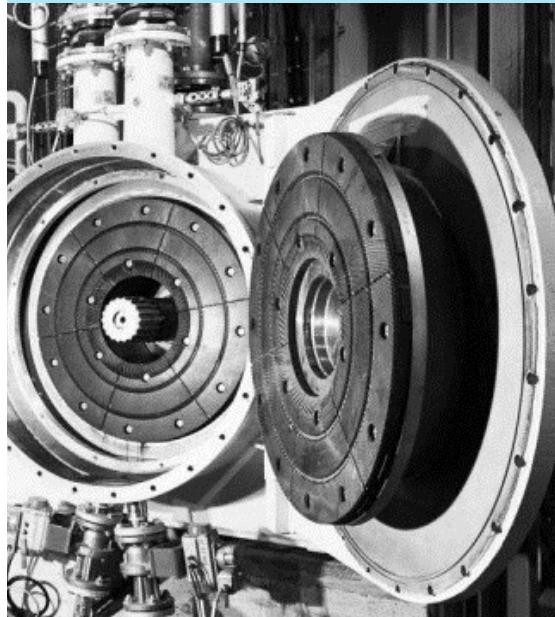
# 02

AI & Data Science in  
Practice

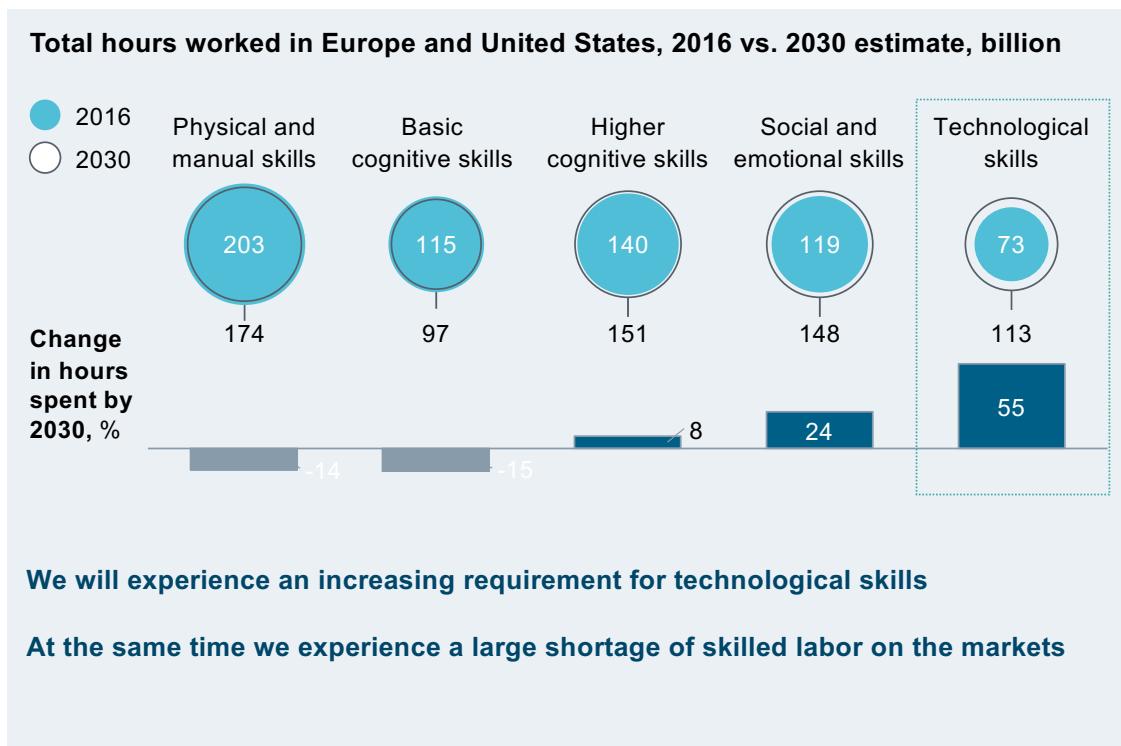


# 04

Q&A



## Times are changing and we need to adapt – what does this mean for our business world



1) Based on results of November 2017 survey of 1,549 respondents from businesses, public sector, and not for profits across regions, industries, and sectors. Survey question for private-sector organizations with >100 million USD annual revenue who view skill gaps as a top-ten priority was, "How can your organization best resolve its potential skills gaps related to automation and/or digitization over the next 5 years?" (n=197), "Don't know" responses filtered out from data set shown. Figures may not sum to 100%, because of rounding  
Source: McKinsey Global Institute Workforce Skills Model; McKinsey Global Institute analysis

**Out of 300.000+ Jobs at  
Siemens, there is not one  
that is not impacted by AI  
& Advanced Data Science**

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**What do you estimate is the percentage of Data Science projects that never go into production?**



1

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2



3

**What do you estimate is the percentage of Data Science projects that never go into production?**



Source: Gartner 2017

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**What do you think are the  
reasons for this high rate of  
failure?**



1

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2



3

**Data Analytics projects fail  
But what can you do about it?**

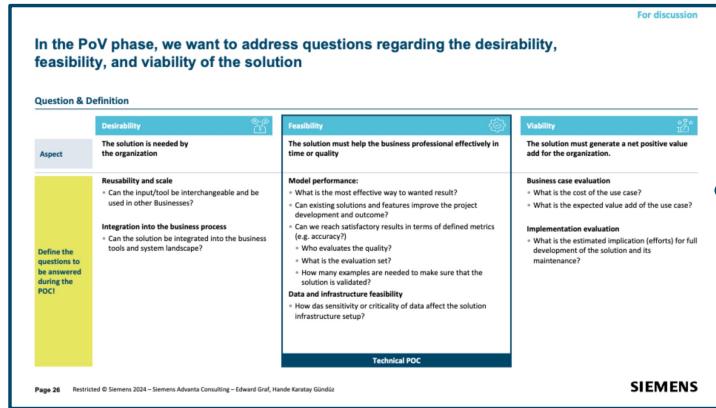


**Fail fast and make sure  
that you learn**



**Increase chances  
of success**

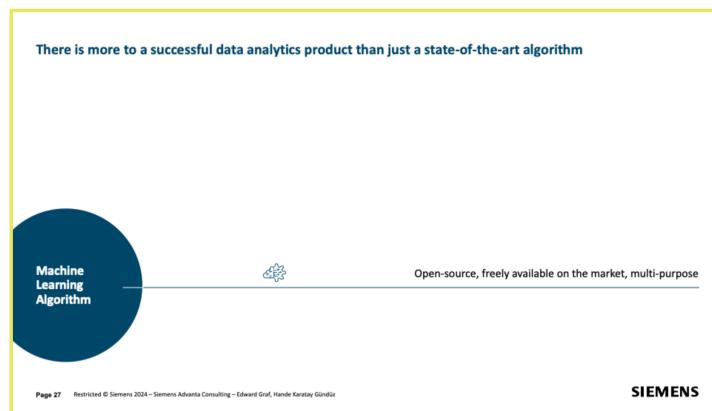
# Data Analytics projects fail But what can you do about it?



**Fail fast and make sure  
that you learn**



**Increase chances  
of success**



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## In the PoV phase, we want to address questions regarding the desirability, feasibility, and viability of the solution

### Question & Definition

Aspect	Desirability	Feasibility	Viability
	<p><b>The solution is needed by the organization</b></p>  <p><b>Reusability and scale</b></p> <ul style="list-style-type: none"> <li>• Can the input/tool be interchangeable and be used in other Businesses?</li> </ul> <p><b>Integration into the business process</b></p> <ul style="list-style-type: none"> <li>• Can the solution be integrated into the business tools and system landscape?</li> </ul> <p><b>Define the questions to be answered during the POC!</b></p>	<p><b>The solution must help the business professional effectively in time or quality</b></p>  <p><b>Model performance:</b></p> <ul style="list-style-type: none"> <li>• What is the most effective way to wanted result?</li> <li>• Can existing solutions and features improve the project development and outcome?</li> <li>• Can we reach satisfactory results in terms of defined metrics (e.g. accuracy?)</li> <li>• Who evaluates the quality?</li> <li>• What is the evaluation set?</li> <li>• How many examples are needed to make sure that the solution is validated?</li> </ul> <p><b>Data and infrastructure feasibility</b></p> <ul style="list-style-type: none"> <li>• How das sensitivity or criticality of data affect the solution infrastructure setup?</li> </ul>	 <p><b>The solution must generate a net positive value add for the organization.</b></p> <p><b>Business case evaluation</b></p> <ul style="list-style-type: none"> <li>• What is the cost of the use case?</li> <li>• What is the expected value add of the use case?</li> </ul> <p><b>Implementation evaluation</b></p> <ul style="list-style-type: none"> <li>• What is the estimated implication (efforts) for full development of the solution and its maintenance?</li> </ul>
			Technical POC

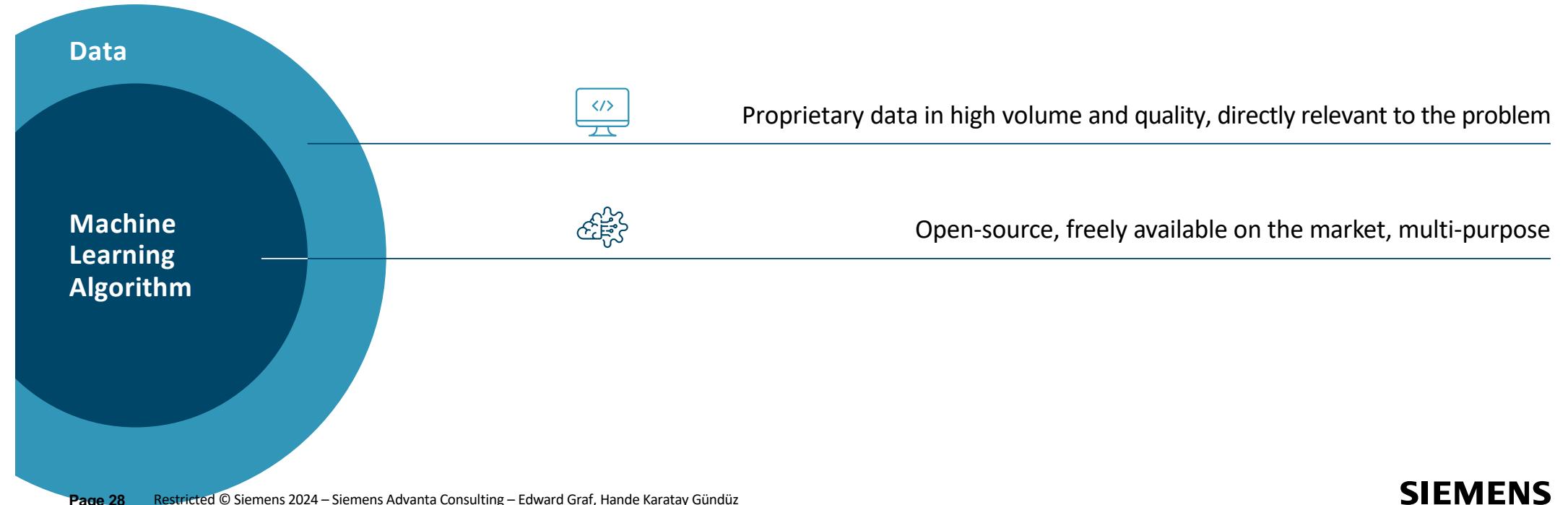
**There is more to a successful data analytics product than just a state-of-the-art algorithm**

Machine  
Learning  
Algorithm

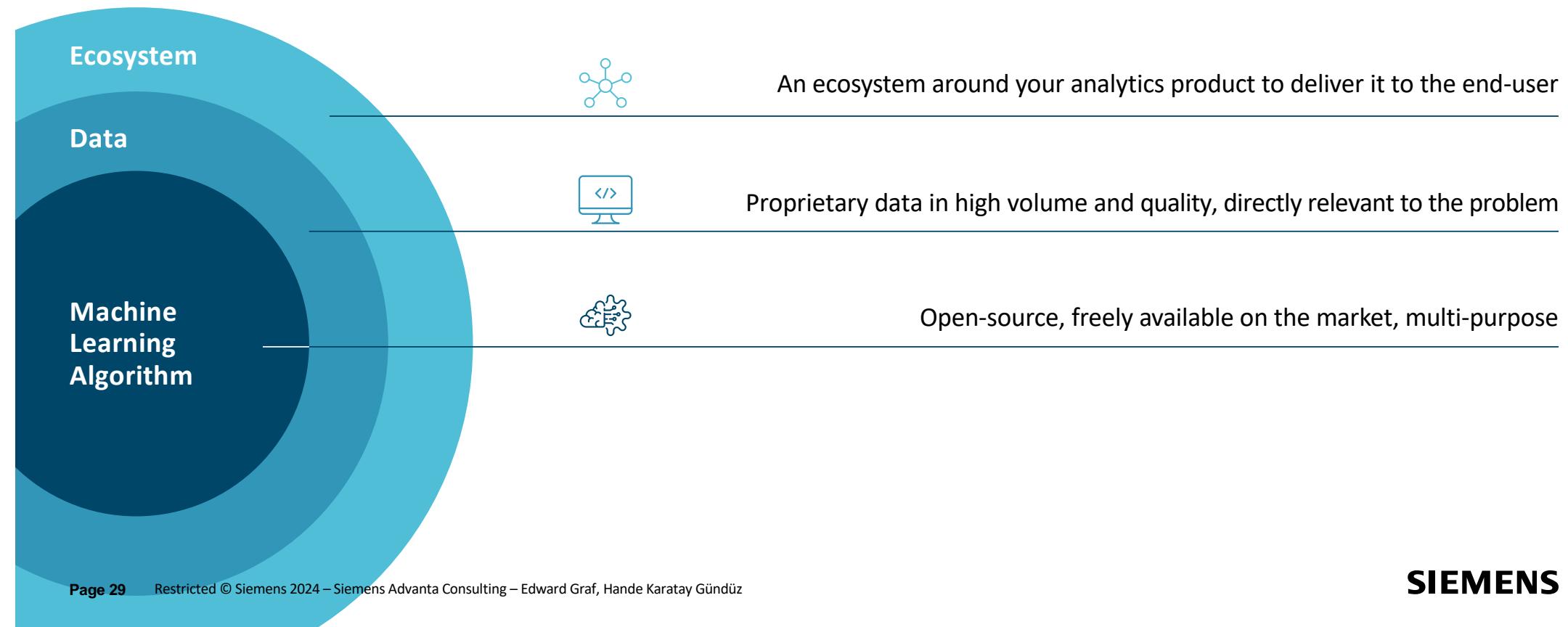


Open-source, freely available on the market, multi-purpose

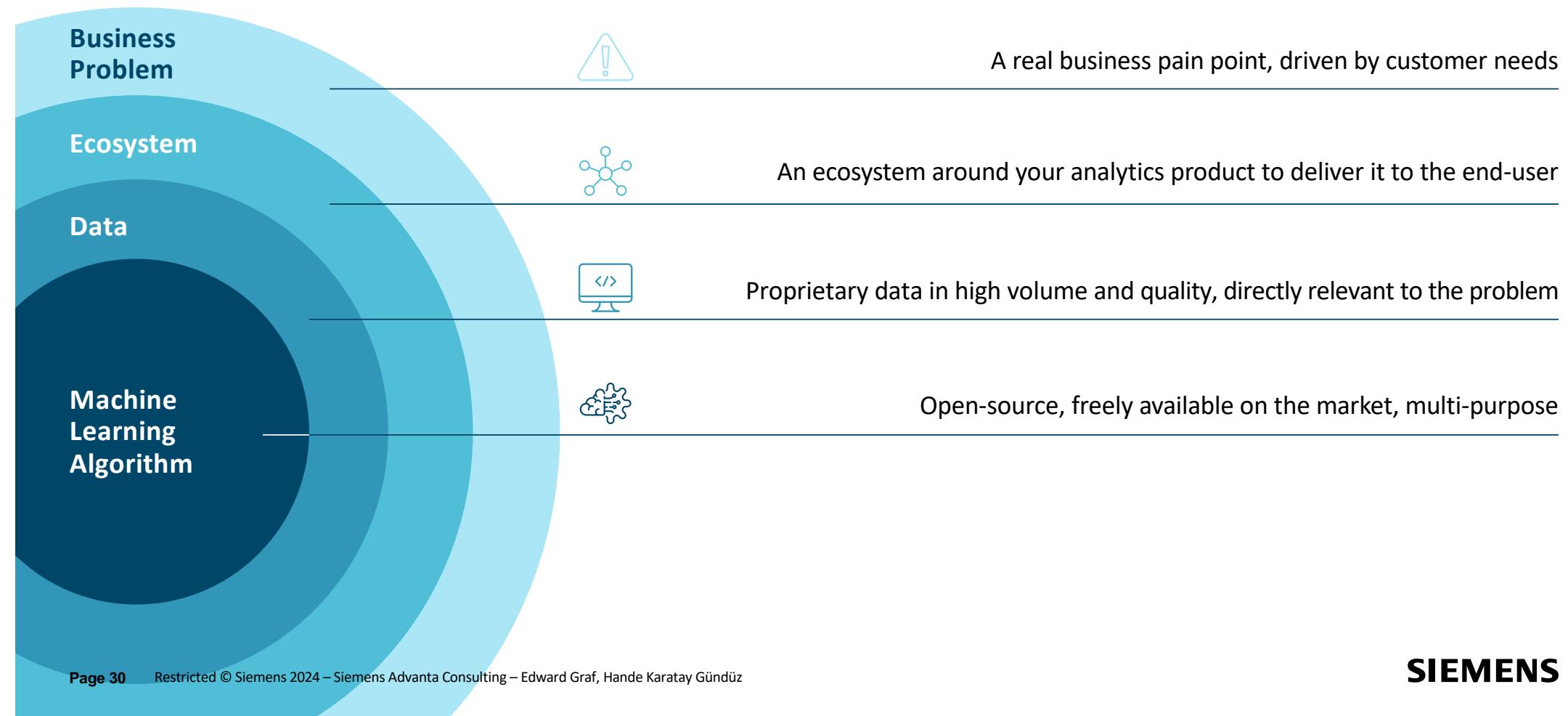
## **There is more to a successful data analytics product than just a state-of-the-art algorithm**



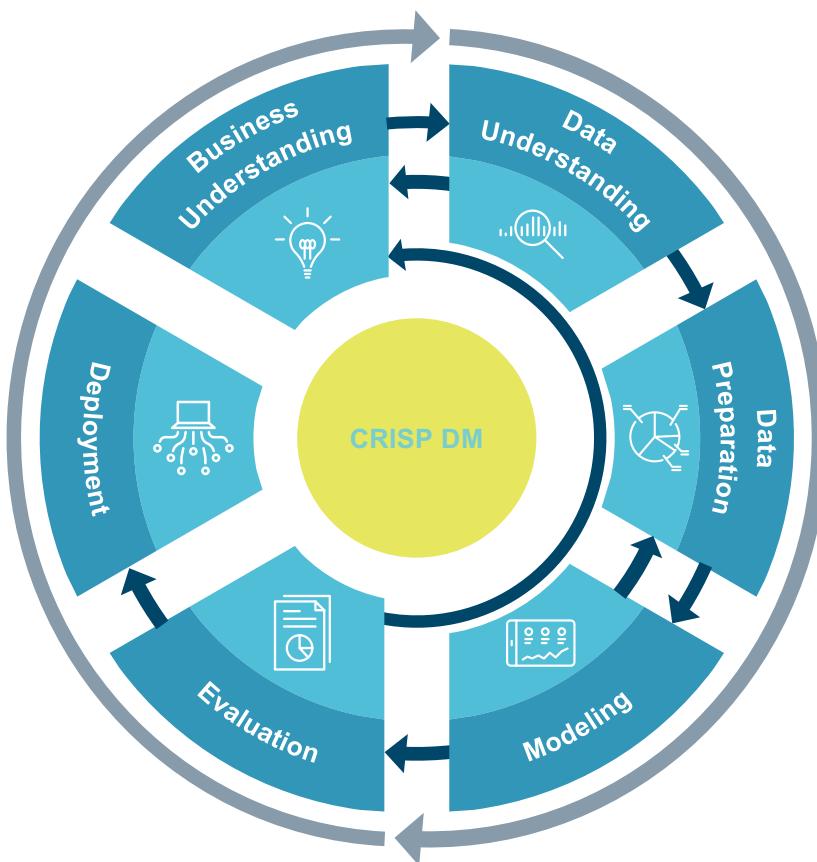
## **There is more to a successful data analytics product than just a state-of-the-art algorithm**



## There is more to a successful data analytics product than just a state-of-the-art algorithm



The reasons for Data Science projects to fail are manifold – the Cross Industry Standard Process for Data Mining (CRISP-DM) is one lever to mitigate the risk of failure



Source: CRISP-DM 1.0 (Chapman et al.)

## Time to put AI into work - towards the use of Artificial Intelligence in a comprehensive



ML & distributed analytics –  
Intelligent grid controller



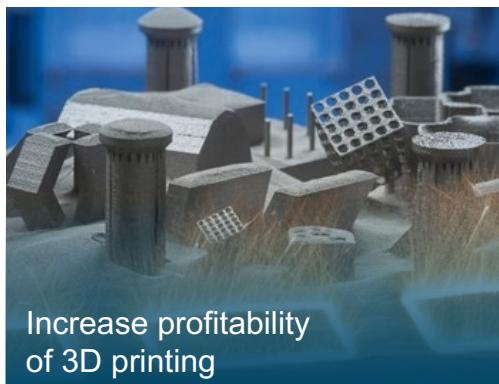
Teaching trams to drive  
autonomously



Online simulation during  
operation



Optimize operation of gas  
turbines (<15 – 20% NOx)



Increase profitability  
of 3D printing



Robots solve handling  
tasks independently



Detect, track, classify and  
count vehicles



Optimize processing  
time and quality

# 01

About Siemens &  
Siemens Advanta



# 03

Use Case in Smart  
Infrastructure



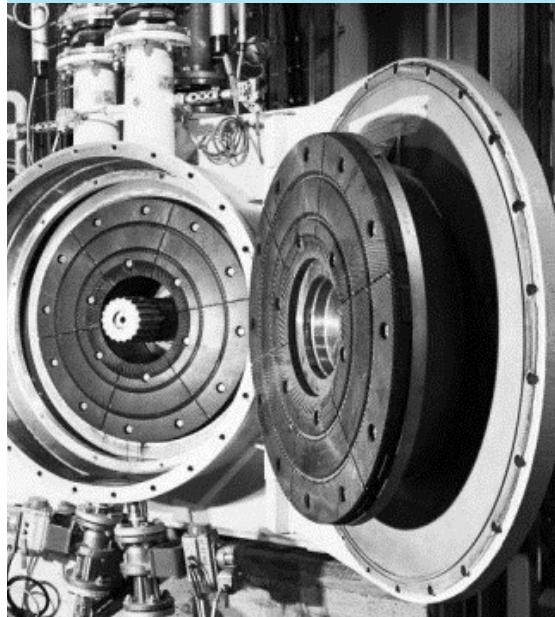
# 02

AI & Data Science in  
Practice



# 04

Q&A



# Bring the experience of the organization to the fingertips of the sales representatives



## CLIENT

Smart Infrastructure



## CLIENT CHALLENGES

Lack of consistency and transparency about quotes to customers



## OUR SOLUTION

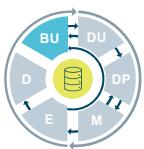
Automated price recommendation based on the history of sales offers via machine learning



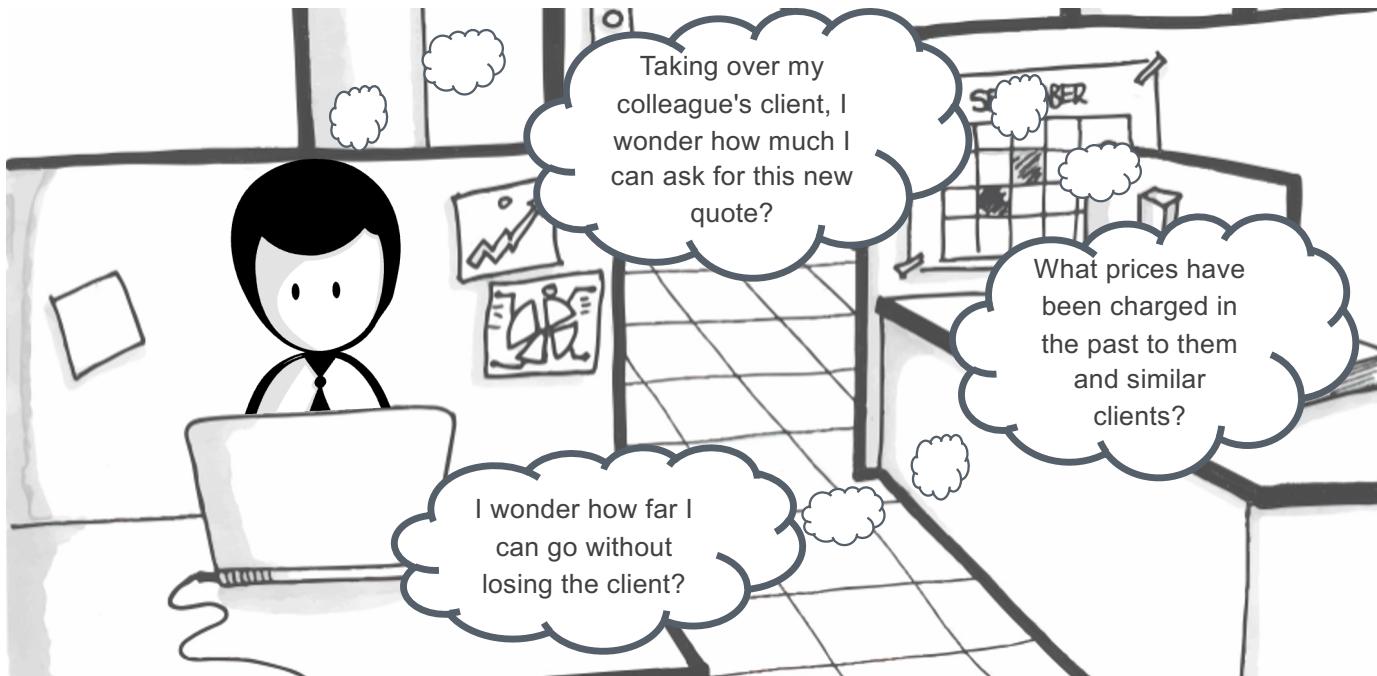
## CLIENT BENEFITS

Transparency enhancement and improvement of sales margin





## Need for decision support in offering prices to new as well as to existing customers based on historic data



### Challenges

- Understand the business process and its deviations (per country & business type)
- Identify key contacts to learn about these processes and drive them



### Approach

- Get commitment by top management and identify key contacts
- Conduct workshop(s) with business process and governance experts to understand the business process and its deviations

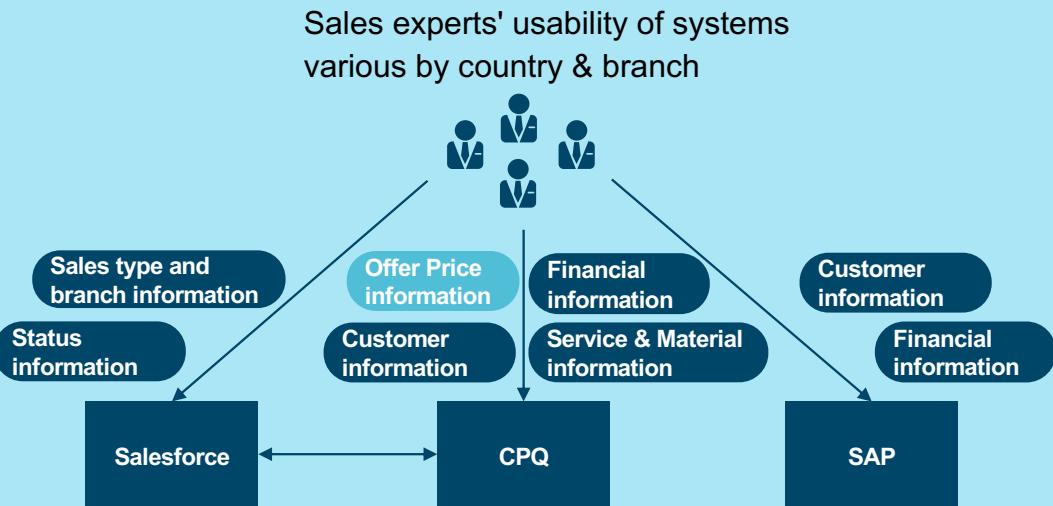
### Lessons Learned

- Business processes can vary across country even within the same organization. Pay attention to details and include the major stakeholders.





## Identifying and connecting the right data sources is one thing, assessing and ensuring high data quality another



### Challenges

- Process differences result in data differences
- Identify data experts and get access to data sources



### Approach

- Conduct workshop(s) with business / data experts to have a holistic view and identify influencing factors on the price / to data sources
- Compare expert insights with own data analysis

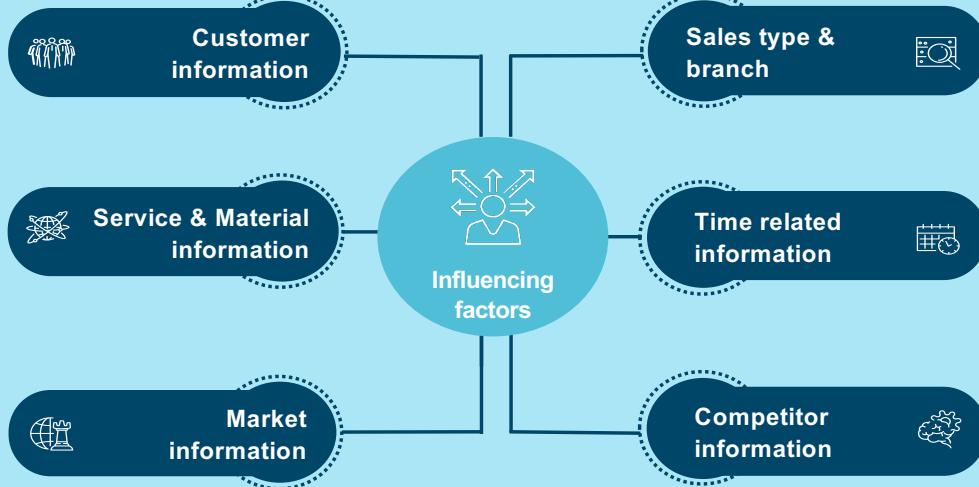
### Lessons Learned

- A good business understanding helps significantly to make sense of data. Clarify questions on data early with business to make sure you do have the right understanding.
- Well defined processes are key for consistent data quality.





## Conduct workshops with business and data experts to identify and map influencing factors



### Challenges

- Map identified features to data sources and ensure data quality
- Explainability of features



### Approach

- Ensure data quality
- Ensure explainability of features



### Lessons Learned

- Data preparation has to be done in co-creation with the business and data experts of the customer. Due to data availability & quality, many potential features have to be filtered out.





**The Price Recommender provides price and margin recommendations based on successful past offers and additionally a comparison with similar offers**

Price Recommendation		Resulting Margin			
Offer ID	Customer name	Price	Margin	Material costs	Service costs
2342355233	Kemco Kines	25,456.59	21.79%	9,262	10,648.26
2234254354	Hikari Hospice	23,580.32	13.99%	11,079.65	9,200.93
2234235355	Conductors EMC	25,338.80	19.83%	4,624.47	15,688.98
2345423535	Bengo HealthCare	24,878.91	19.57%	2,012.36	17,998.47
2323424543	Aire Fixt	25,887.88	22.70%	5,578.81	14,433.33
2367885632	Aire Fixt	23,268.42	12.68%	2,638.02	17,680.84
2234578896	Fremont Technology	22,708.54	10.93%	3,461.76	16,765.04
2346418956	Berman Automotive	26,573.21	24.47%	10,130.75	9,939.63

### Challenges

- Standardization vs. individualization
- Consideration of concept drifts (e.g. inflation and Covid)



### Approach

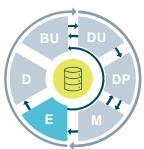
- Train model
- Conduct technical evaluation (analyze for systematical model errors)
- Conduct business evaluation (feature importance vs. business understanding)



### Lessons Learned

- Create models as individualized as necessary, but as standardized as possible! Adjustments for individual countries only if it results in high impact.





## The calculated impact expectations have been validated via an AB Testing based on real business transactions



### Approach

- Conduct AB Testing together with selected countries to prove business impact of AI solution



### Lessons Learned

- Before the final deployment of a new solution, the expected benefits for the end users must be tested, validated and proven.



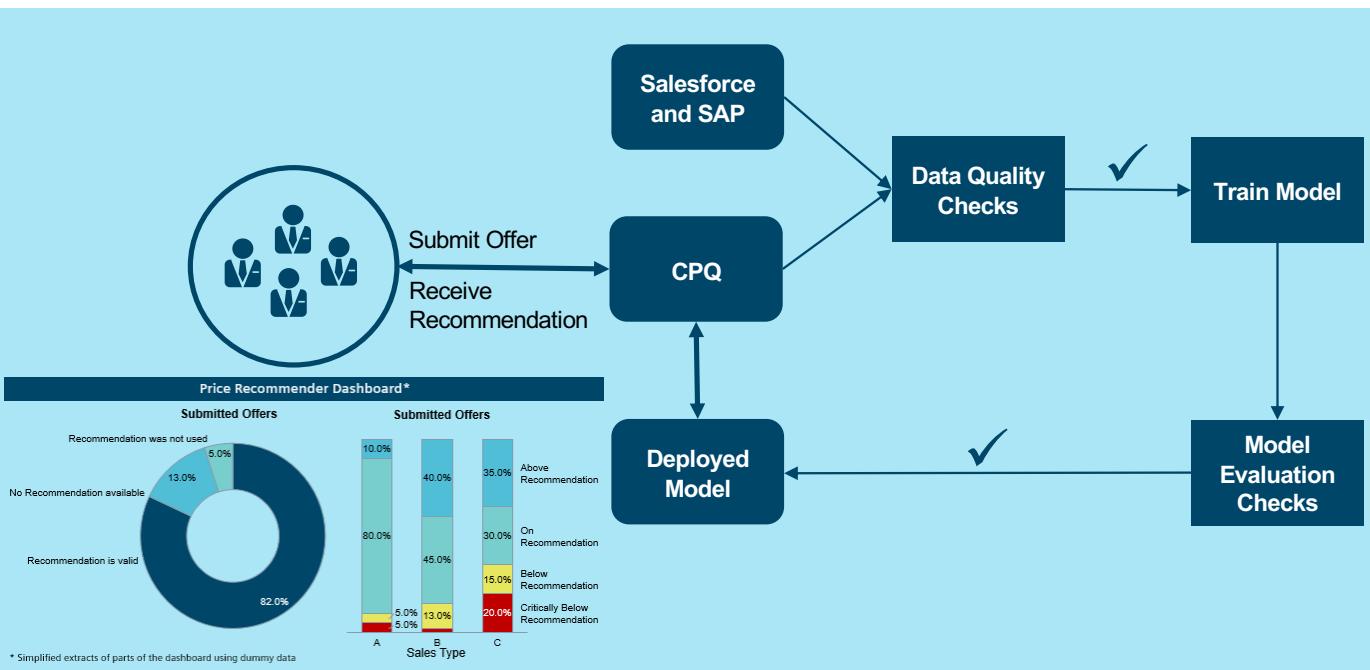
### Challenges

- Model evaluation
- Validation of business impact





## Development of a central reporting cockpit to ensure user acceptance and long-term business impact



### Challenges

- Integration into existing system
- User centric reporting cockpits



### Approach

- Customer co-creation via user stories
- Definition with meaningful KPIs that can track user acceptance and long-term business impact

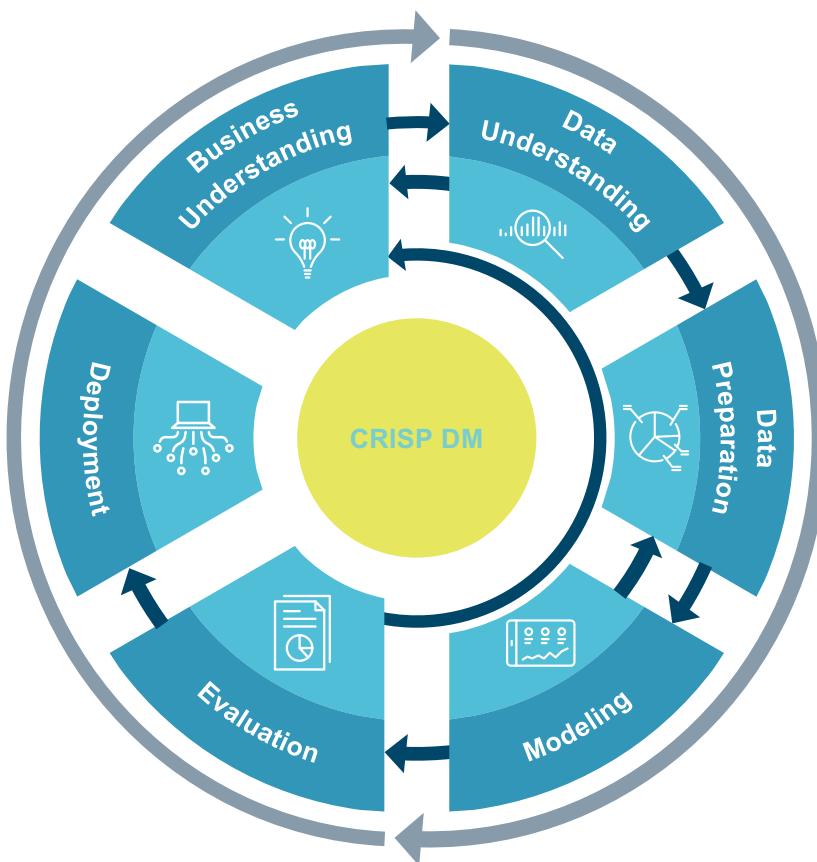


### Lessons Learned

- Only if you can ensure user acceptance and business impact, you create value with the AI solution.

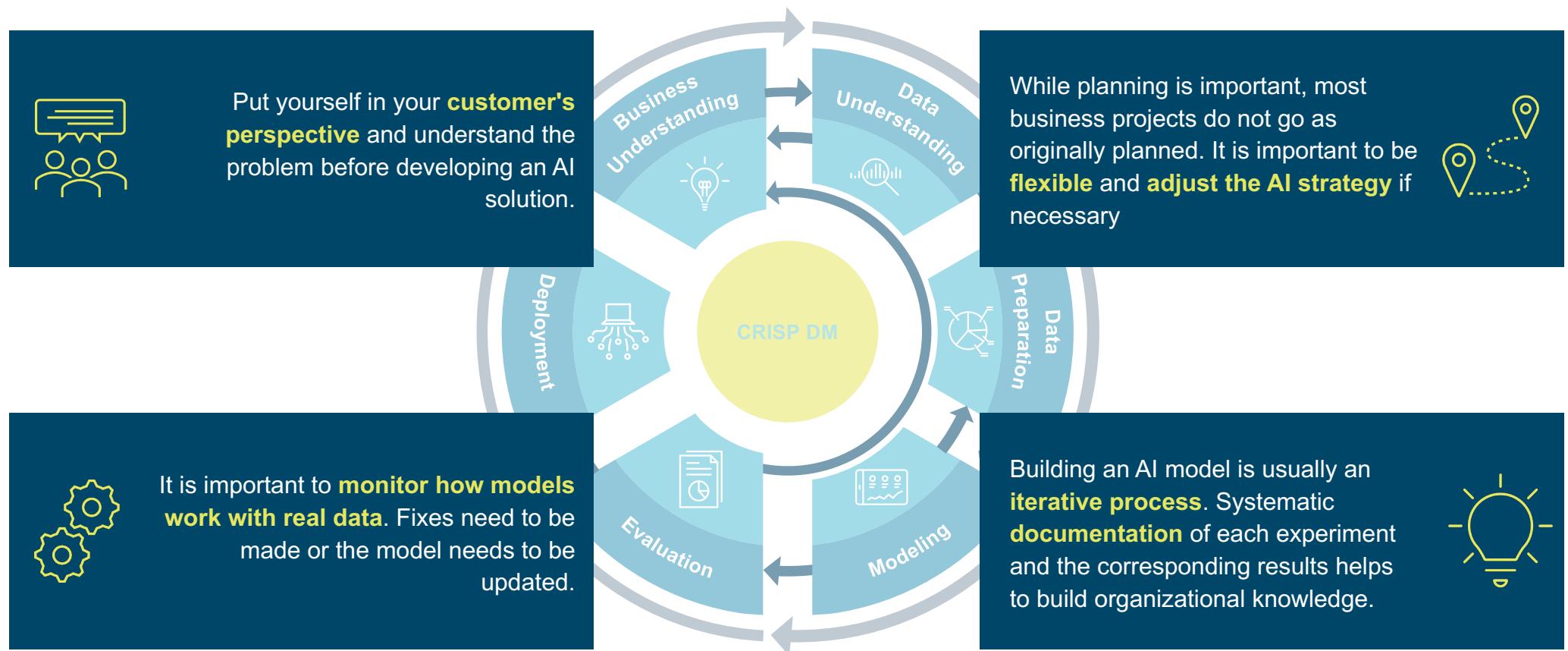


The reasons for Data Science projects to fail are manifold – the Cross Industry Standard Process for Data Mining (CRISP-DM) is one lever to mitigate the risk of failure



Source: CRISP-DM 1.0 (Chapman et al.)

## The reasons for Data Science projects to fail are manifold – the CRISP-DM framework is one lever to mitigate the risk of failure



# Thanks for listening

## What's next?

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