

# Machine Learning

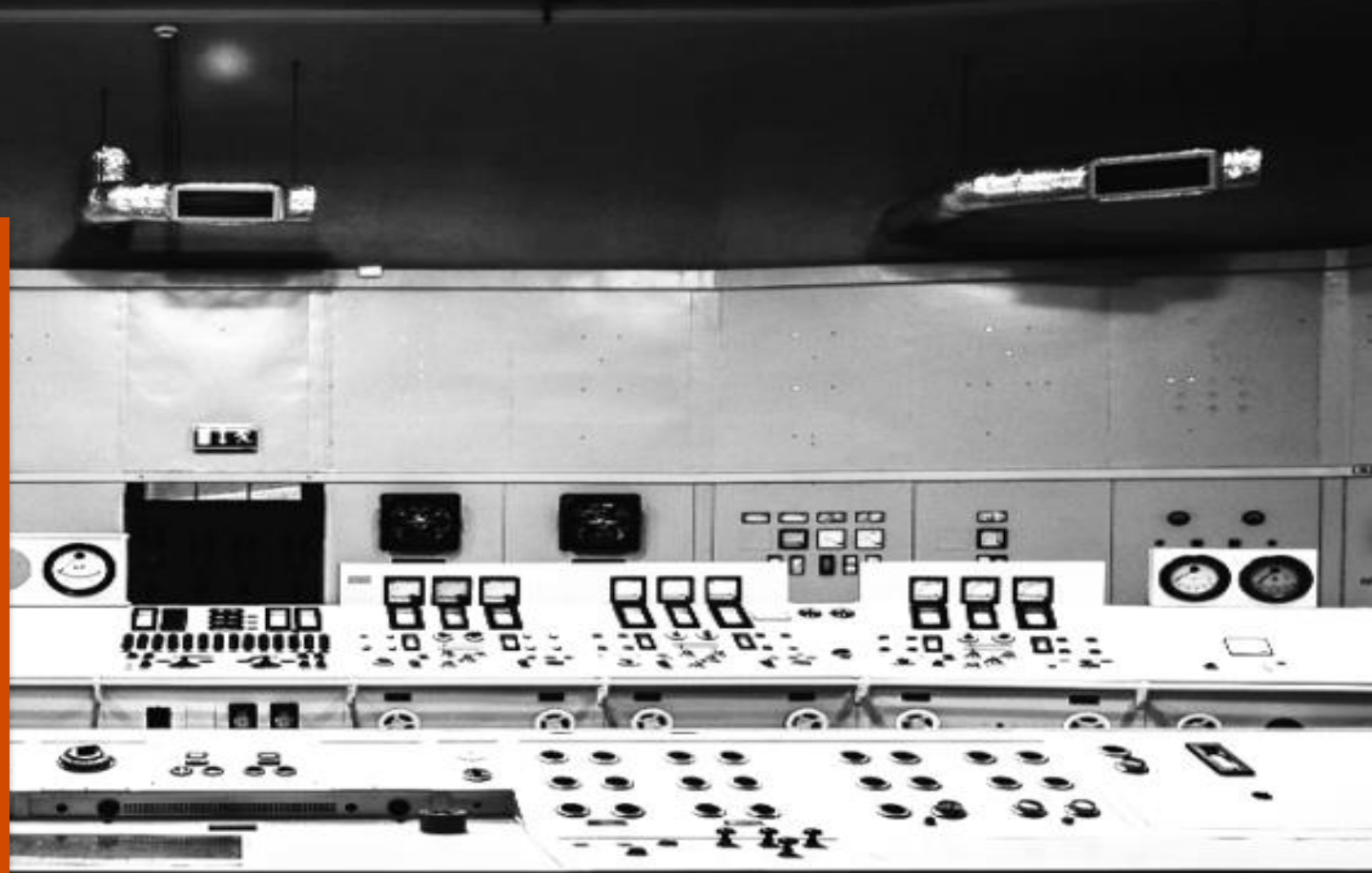
## Tech-enabled Legal Document Portfolio Review

Presentation PwC Legal NL



# 1

## Introduction Artificial Intelligence & the legal profession



“

*You have five years  
to reinvent the legal  
profession*

Richard Susskind  
2016

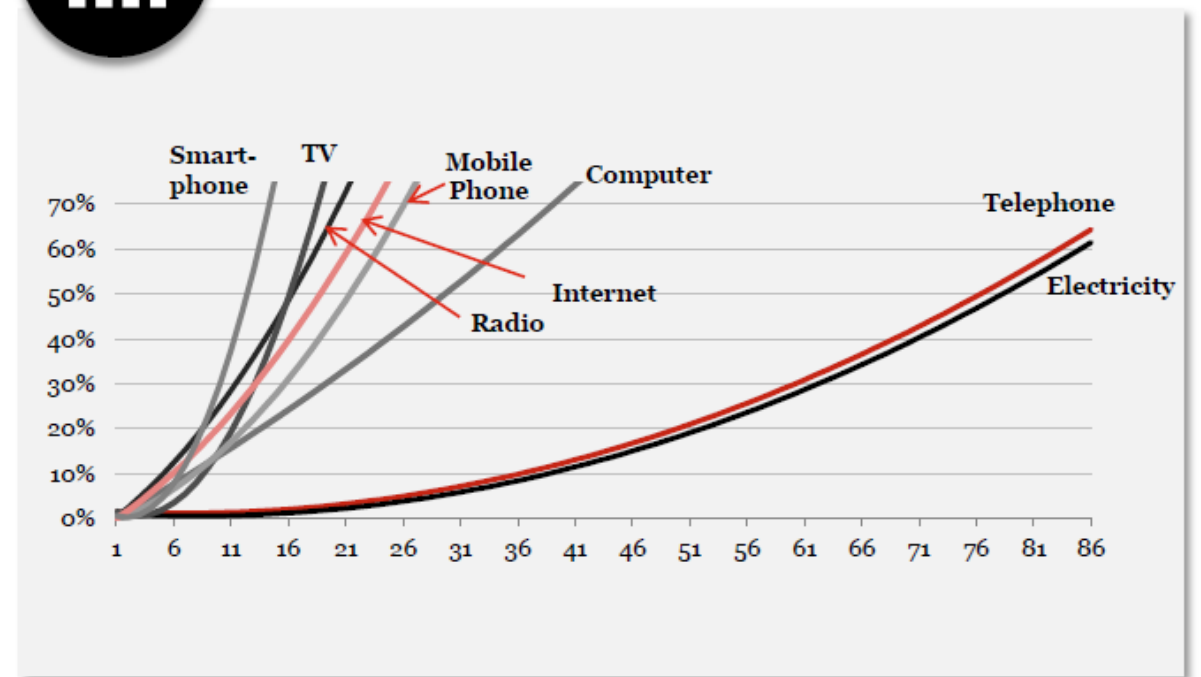


# Technology disrupts businesses at an increasing pace

The legal market needs to act fast to keep with the current pace.



Years it takes technology to be adopted by x% of US population







# Artificial intelligence

AI is an umbrella term for “smart” technologies that are **aware of and can learn from their environments** to assist or augment human decision making.

## In practice:

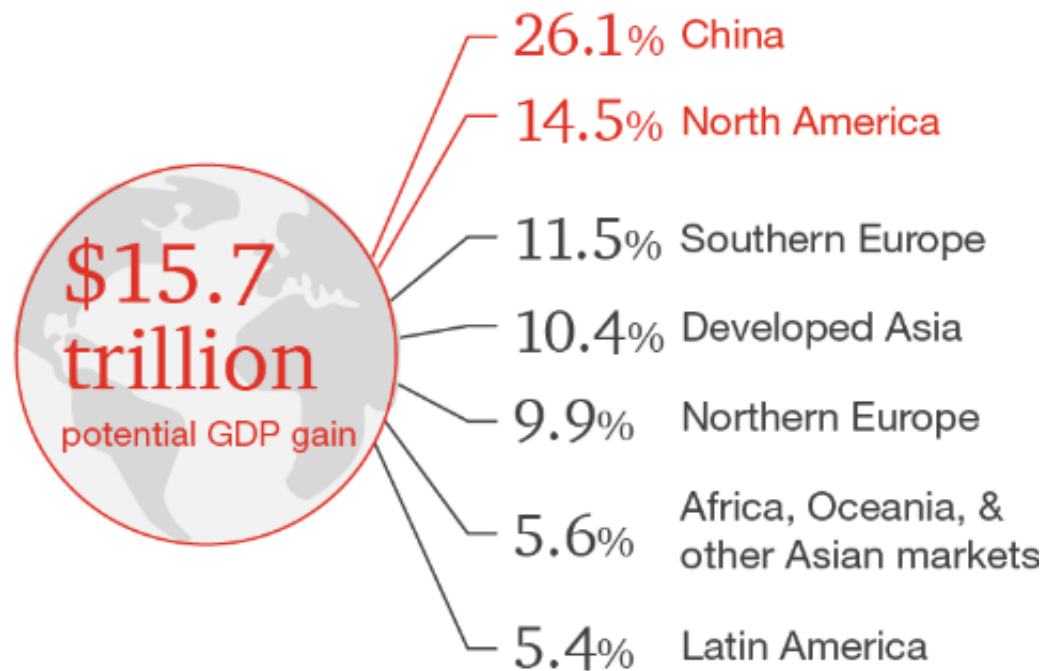
machine learning

recommendation engines

chatbots

image recognition

## China and North America will see biggest AI gains by 2030



Source: PwC Global Artificial Intelligence Study, 2017

# Artificial intelligence in the legal profession

## Investments in AI and ML software for the legal profession increase rapidly.

The continuous increase in AI related investments indicates the need for optimization of processes within the legal function. For example, AI can be used for electronic discovery, making review processes faster and more accurate.

A whopping **71%** of law departments cite the need to increase productivity without increasing headcount as their main driver for AI adoption.

*HBR Law Department Survey 2017*

**71%**

# Why AI in legal?

The use for AI in the legal profession, especially e-Discovery and document review processes, is endless. But what are the reasons to opt for AI in stead of manual processes?

1	<b>Fast</b>	Can save up to 90% of the time it takes a lawyer to do the same work
2	<b>Accurate</b>	The quality of outcome increases the more training data the algorithm has encountered. Accuracy can quickly reach a +90% level whereas a human intelligence often reaches an accuracy level of 85%.
3	<b>Meticulous</b>	The algorithm can find clauses and wordings that lawyers would normally not find or identify as risks.
4	<b>Tireless</b>	The software works 24/7 with the same speed and quality all the time. No lunch breaks or after dinner dips!
5	<b>Inexpensive</b>	In general, the costs are less than a digital data room and manual processes.
6	<b>Time</b>	Automates repetitive work; lawyers can focus on more value creating tasks.
7	<b>Business improvements</b>	Reduced costs and time spent on repetitive tasks.



PwC Legal NL

We are *the* tech-enabled legal partner for  
complex transformations



# 2

**Use case:**  
the application  
of AI in legal  
questions





# Use case: VENTURE CAPITAL INVESTOR

**PROJECT:**  
REVIEW OF DOCUMENT PORTFOLIO RELATING TO  
INVESTMENTS



# Request of the client

## Automated document review

1



### Problem

The client had **limited insight** in the differences between the legal documents (memorandum of understanding, deed of issuance of shares, SHA, articles of association) pertaining to their investments and the risks connected therewith.

2



### Data extraction

The information was stored in **different locations**, knowing that there are always four **recurring** documents per investment. The recurrence in documentation made the use case eligible for AI document review.

3



### Solution

PwC used **artificial intelligence** (with machine learning component) to go through number of categorized documents. The ML component allowed the software to learn from the SME's.

4



### Result

The unstructured data in legal documents was made structured. The structured data was used for **data analysis and visualization**. A user-friendly contract dashboard was the final deliverable.

# Phased approach

In co-creation with the client

1

Determination of the objective of the automated document review and the scope of the assignment together with the client. We organized a workshop to align all interests and ensure every party was on the same page.



2

We briefly reviewed and identified the 4 document types involved, for this particular project it pertained to several corporate documents of the target companies: the articles of association, deed of issuance for the transfer of shares, memorandum of understanding and shareholders' agreement.



3

Our SME's were trained to work with the software and to program the different recipes which will be ultimately used for review of the documents.



4

The recipes were applied to the documents by our SME's and perfected to reach an as accurate outcome as possible.



5

Reviewing the output of the software (by our SME's) to determine the accuracy and analyze the results. Performing data analysis on the contract data.



6

Structuring unstructured data and uploading the results in a user-friendly dashboard (visualization of the data).





# Using AI software in projects: approach

## Kick-off

Together with the client, we will have a kick-off meeting to align expectations and identify key issues



## Recipe

To train the recipe, we have included a subject matter expert, two trainers (associates) and a partner review on the final recipe

## Training

Training of documents with 5-30 samples per document type (depending on the ML method).

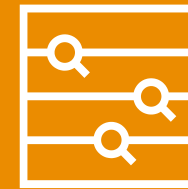


## Review

The results will be reviewed and improved by two trainers – who function as guides – and two project reviewers.

## Testing

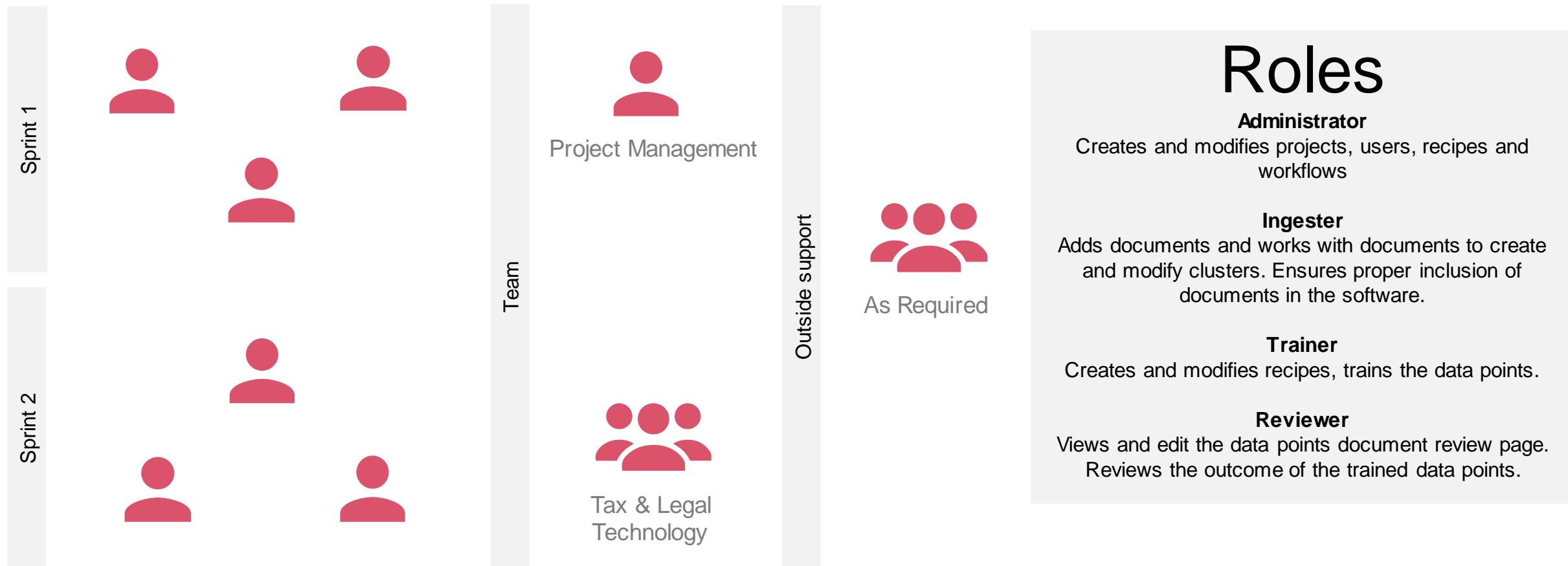
The process of training and testing continues until the wanted results are reached



## Visualisation

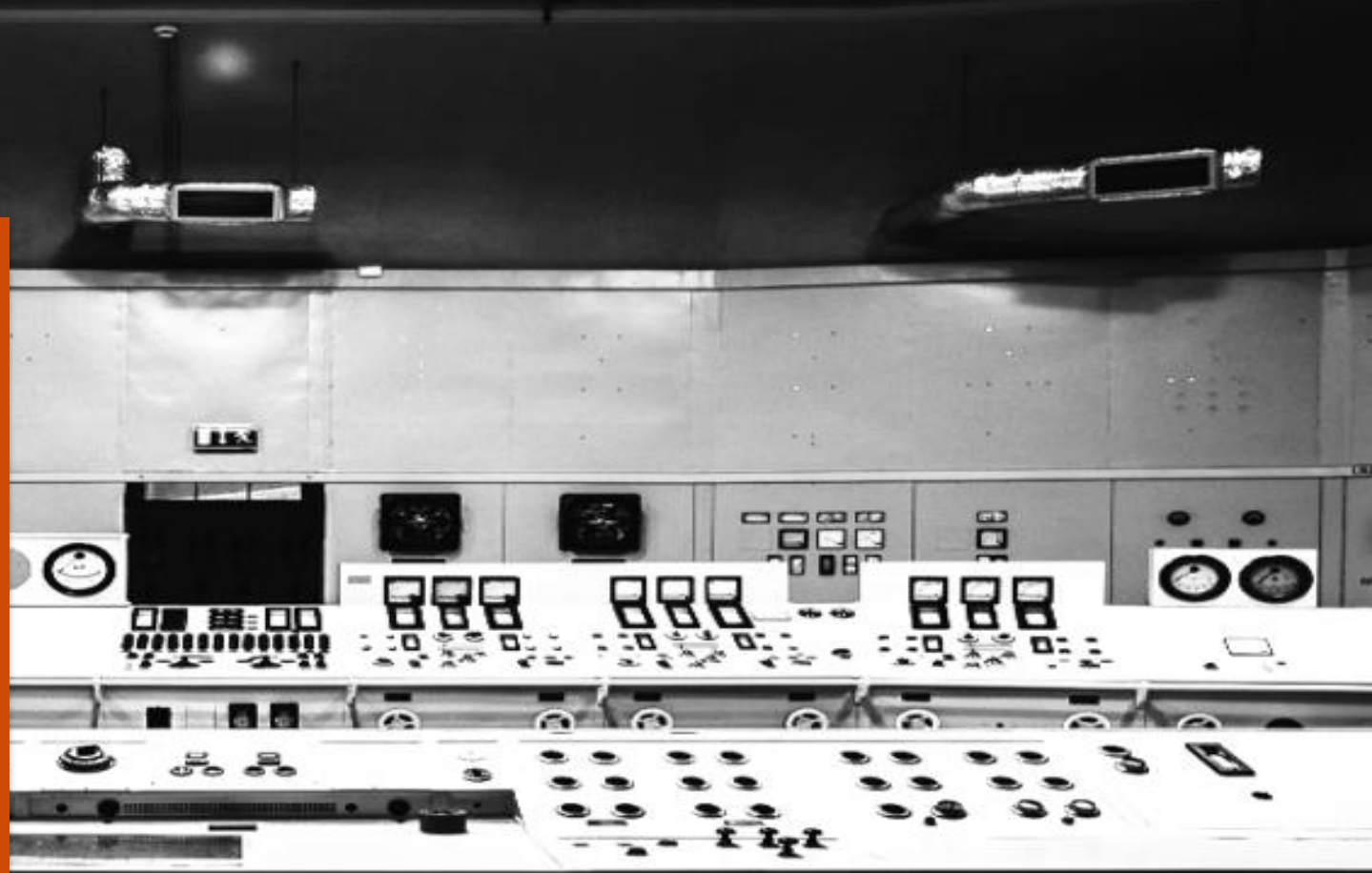
The data has gone from unstructured to structured. We can analyze the structured data and visualize this.

# Self-organizing team: Agile way-of-working



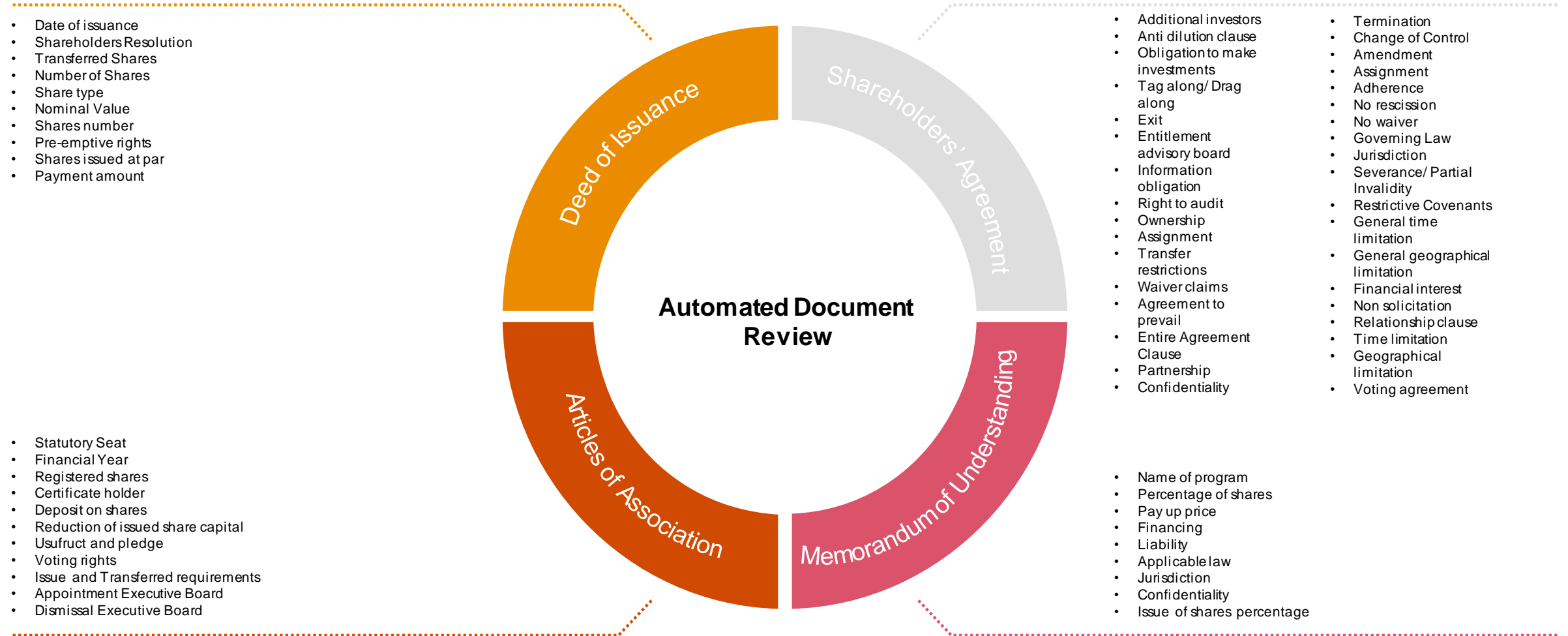
# 3

## Results



# Examples of data points

What data did we extract?





# The result: accuracy

96,25%

## Memorandum of Understanding

The memorandum of understanding gave back very accurate results. These documents were derived from the same template document.

90,36%

## Deed of Issuance

The deed of issuance in the Netherlands is a notarial document. The contents are similar, although each notary is free to choose their own wording.

82,10%

## Shareholders' Agreement

The SHA is a document in which lawyers use their own language. We found that language can differ as well as the clauses that are included in the document.

95,63%

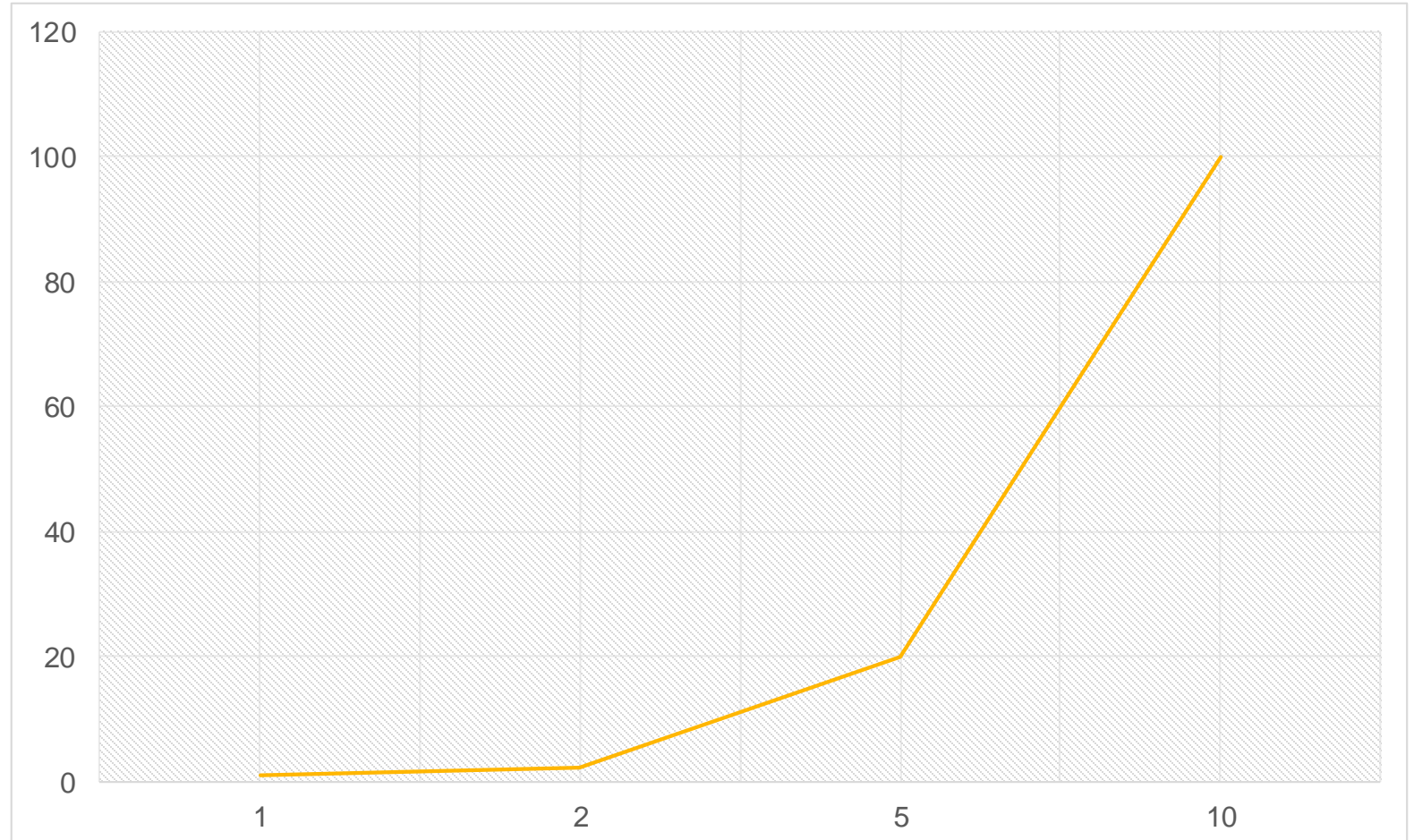
## Articles of Association

The articles of association in the Netherlands are executed by a notary. The contents are similar, although each notary is free to choose their own wording.

# Short summary of the project

## Key learnings

- A **high volume** is necessary to create (i) a reliable recipe; and (ii) obtain the desired output. Ideal volume would be over 500 similar documents.
- The recipe has an **exponential learning curve**.
- The communication between the **analytical lawyer and the binary computer** and IT support must be optimized. This will be the lawyer's responsibility.



# Thank you

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