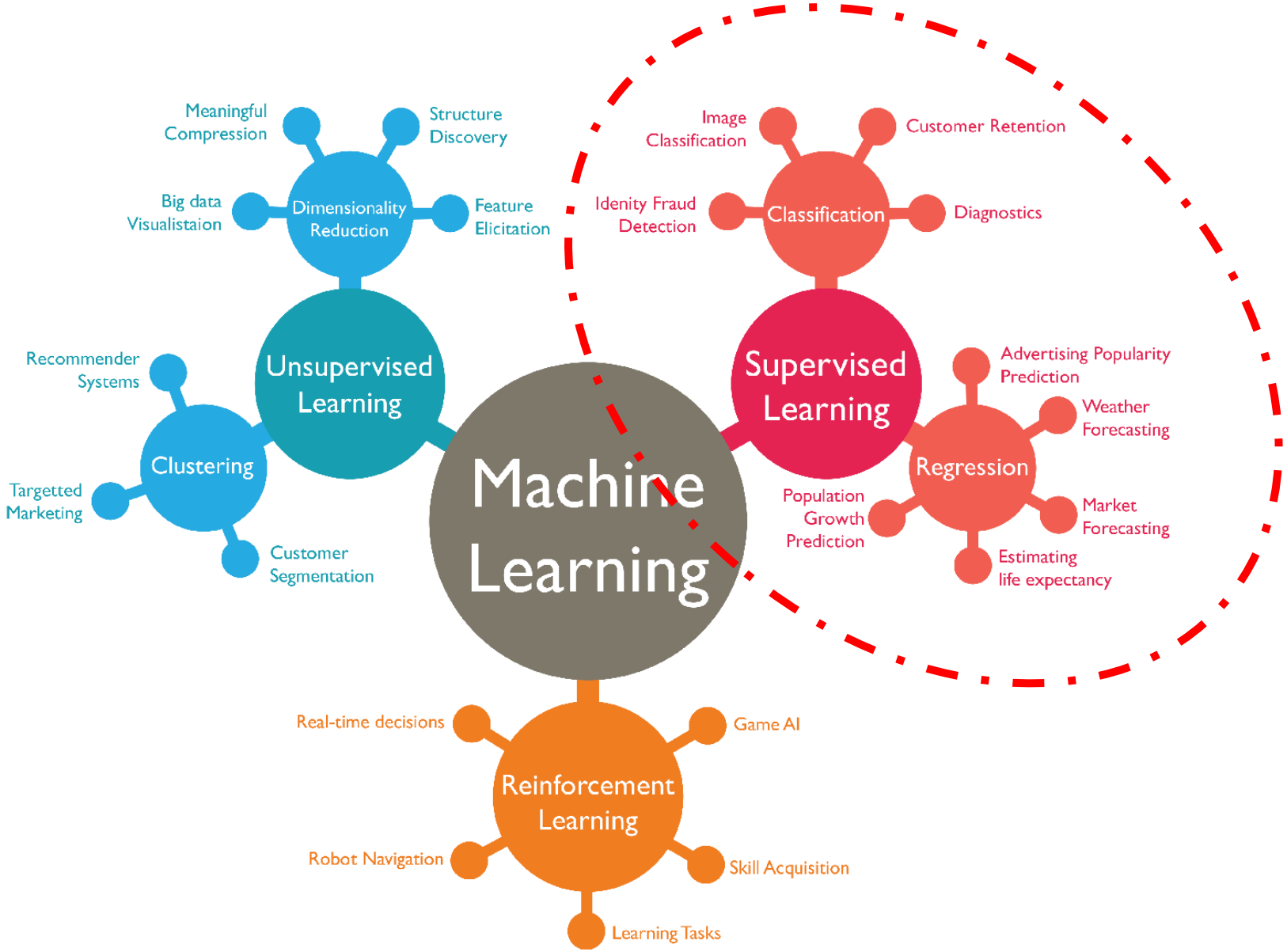
Supervised AI for court management

Turning data into actionable knowledge

Mathematics: The Science of Patterns

“A mathematician, like a painter or a poet, is a maker of patterns.”

Hardy, 1992, p. 84


Machine Learning
Unsupervised Learning
Dimensionality Reduction
Meaningful Compression
Structure Discovery
Big data Visualistaion
Feature Elicitation
Clustering
Recommender Systems
Targetted Marketing
Customer Segmentation
Supervised Learning
Classification
Image Classification
Customer Retention
Idenity Fraud Detection
Diagnostics
Regression
Advertising Popularity Prediction
Weather Forecasting
Population Growth Prediction
Market Forecasting
Estimating life expectancy
Reinforcement Learning
Real-time decisions
Game AI
Robot Navigation
Skill Acquisition
Learning Tasks

Pattern-Based Machine Learning and AI

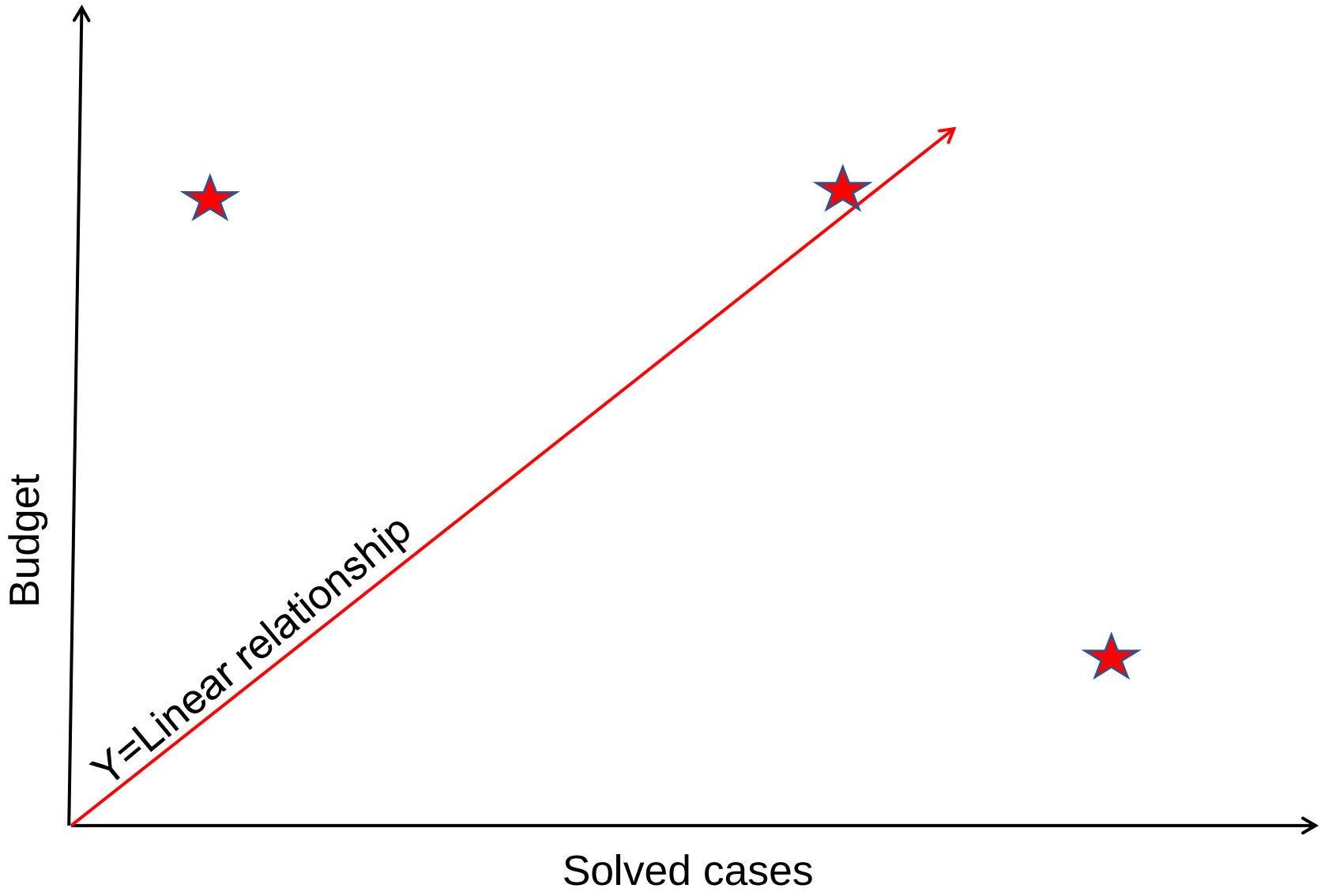
- Computers solve problems by detecting useful patterns
  - based on supervised and unsupervised data
- Pattern-based AI is an **extremely** powerful tool
- Has been used to automate many processes today
  - Driving, language translation, etc.
- This is the dominant mode of AI today.

So, how do we manage our courts? Or even more importantly,

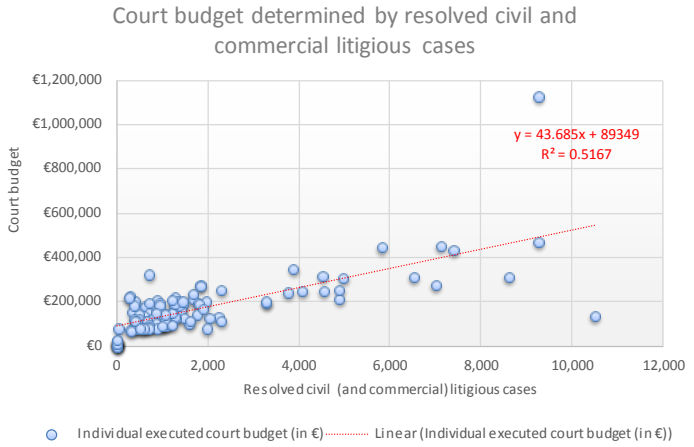
Where are our patterns?

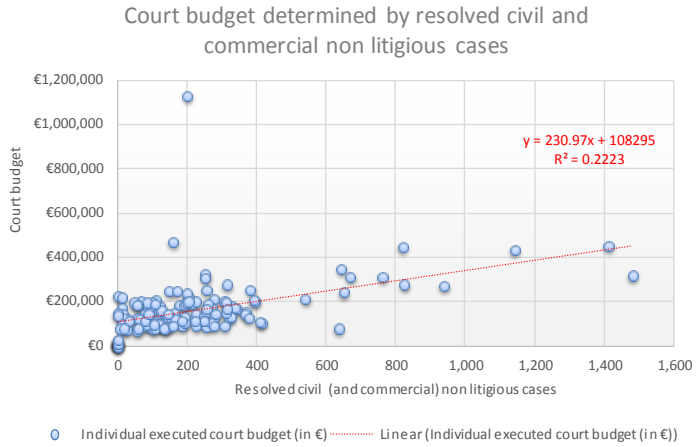
Example of simplified specialized court work process

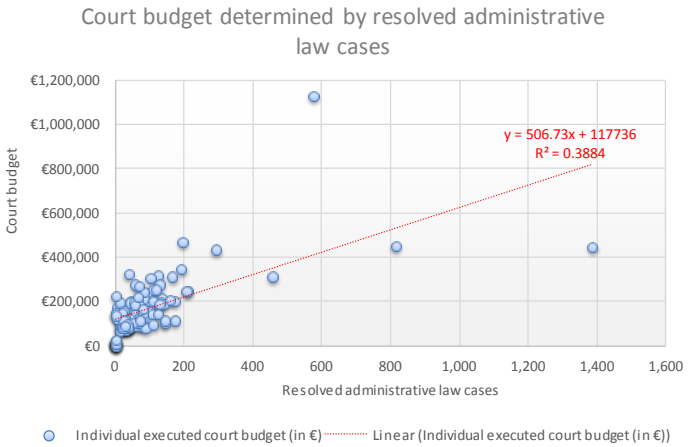
Linear relationship

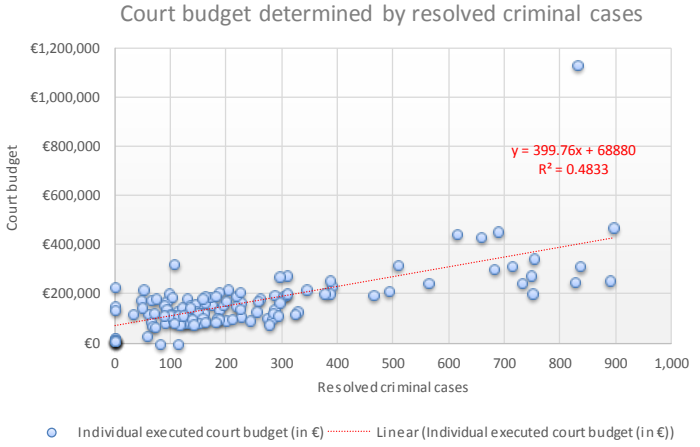


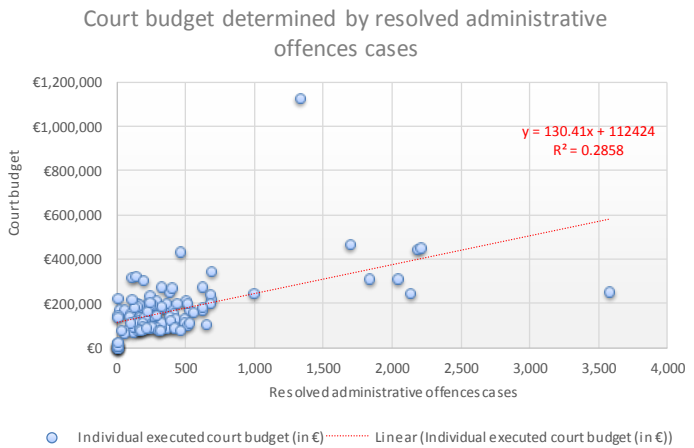
Linear relationship between budget and case type in the first instance courts in Republic of Moldova

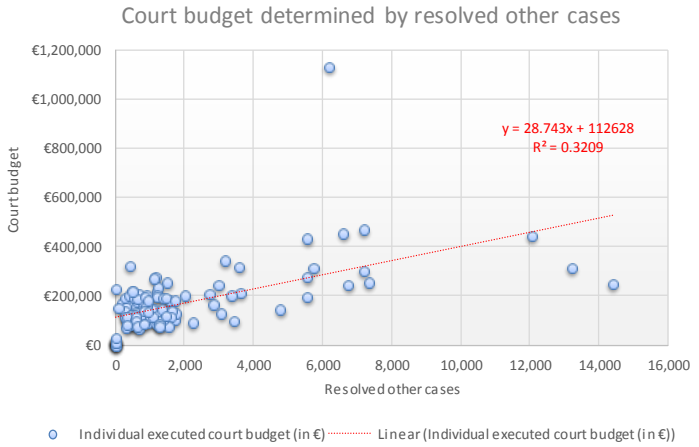




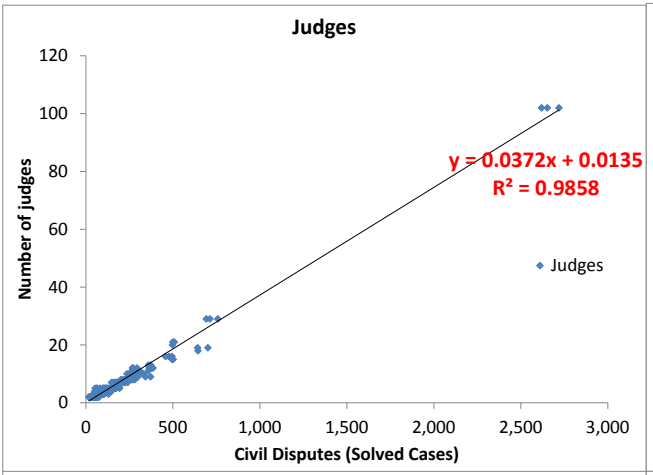


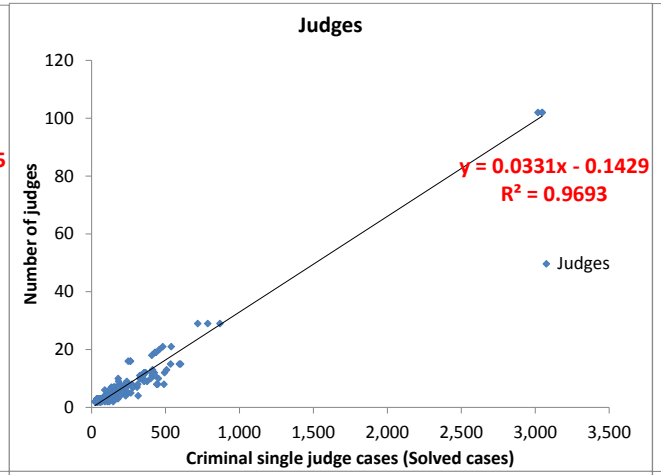


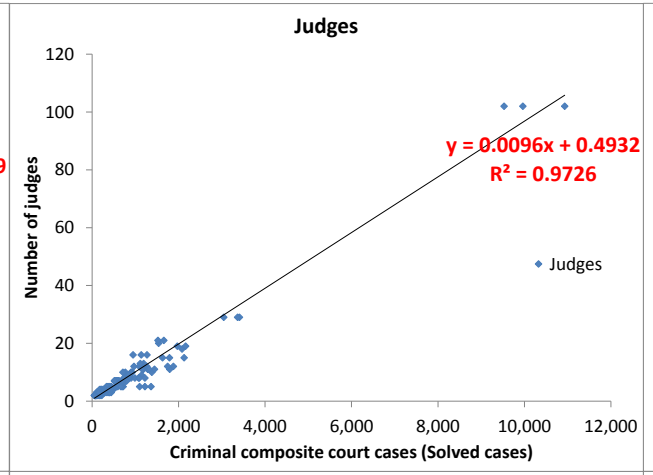


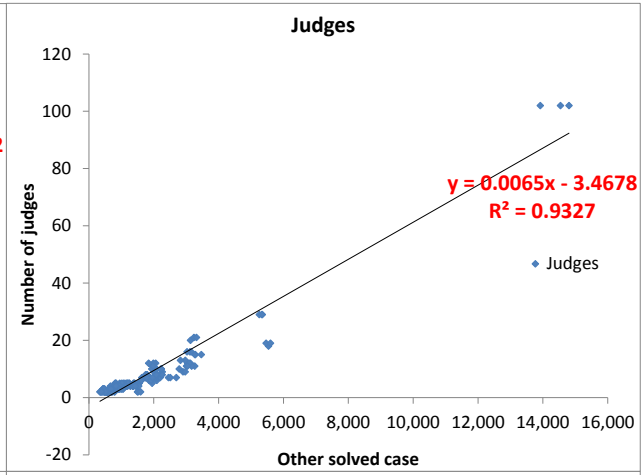


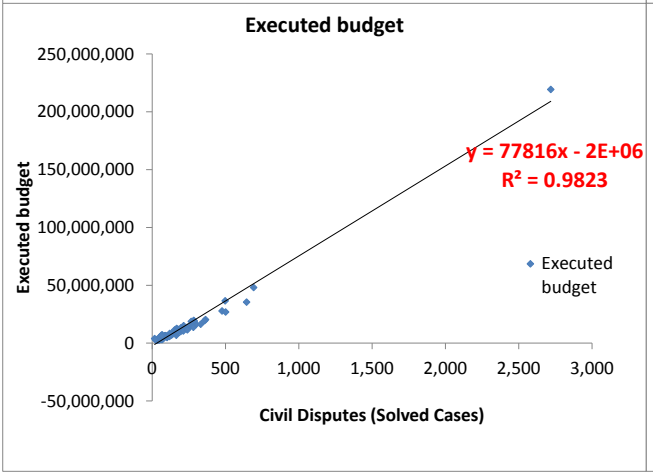
Example: Simple linear regressions per number of judges, budget and case type in the first instance courts in Norway

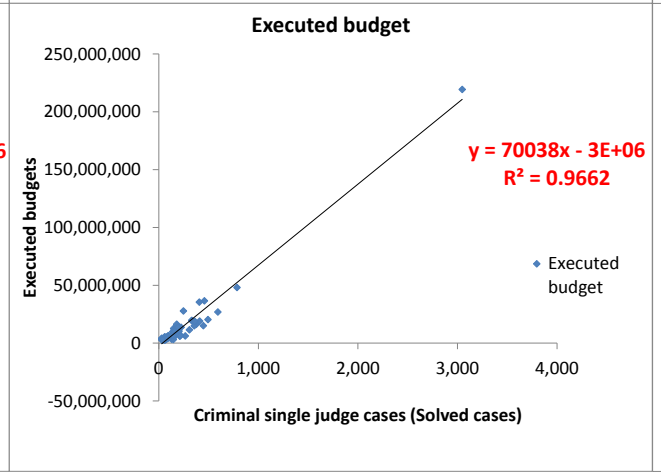


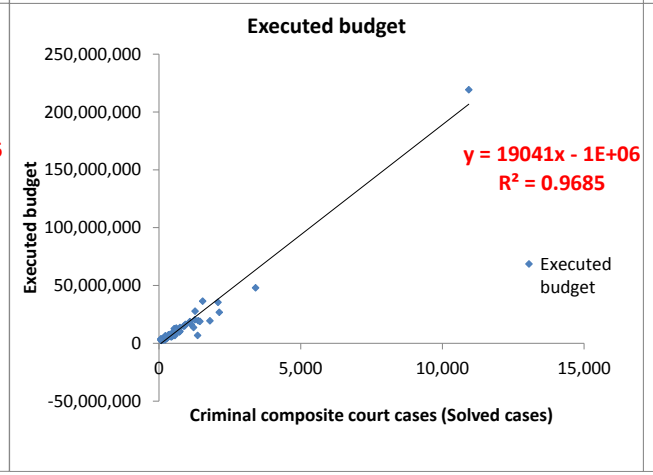


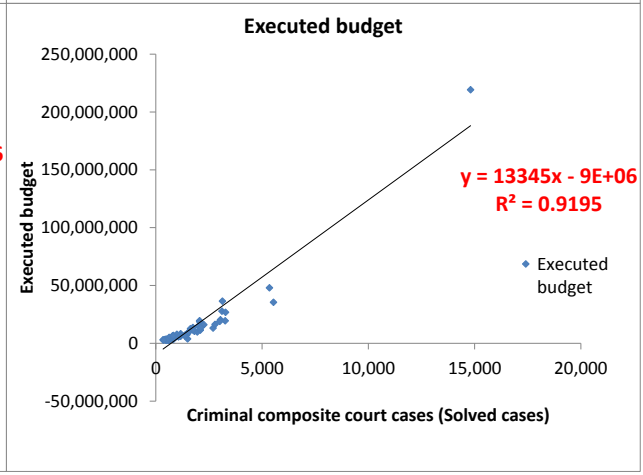




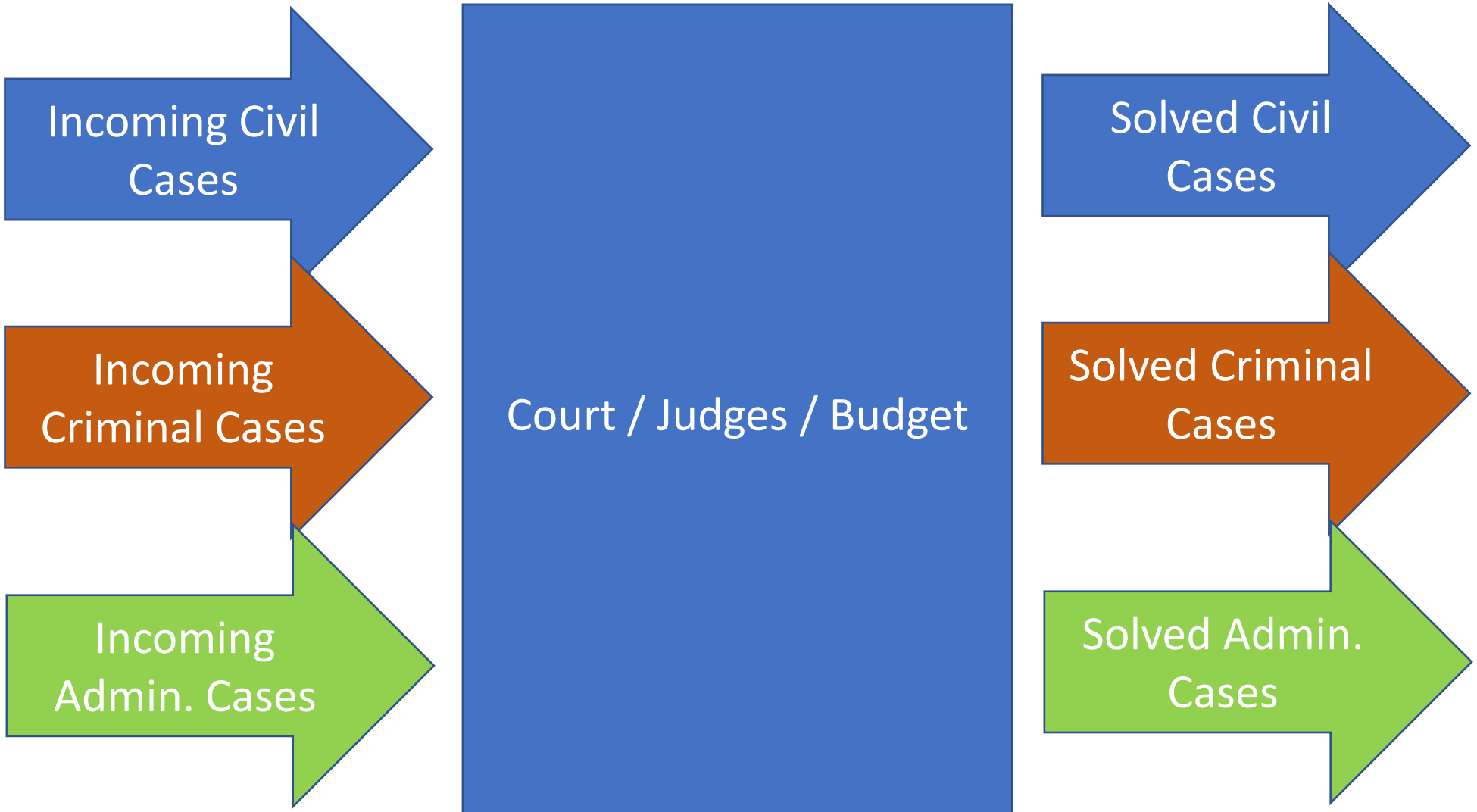








Example of simplified general jurisdiction court work process.



How to solve this one?

Two levels of Supervised AI for court management

LEVEL 1: REGRESSION

Estimating resources based on performance including forecasting of number of judges and court budgets using past performance and mathematical modeling

LEVEL 2: CLASSIFICATION

Clustering of courts in different groups based on use of resources and performance.

1. REGRESSION: First level of the Supervised AI

Performance

Ability to handle incoming cases (clearance rate)

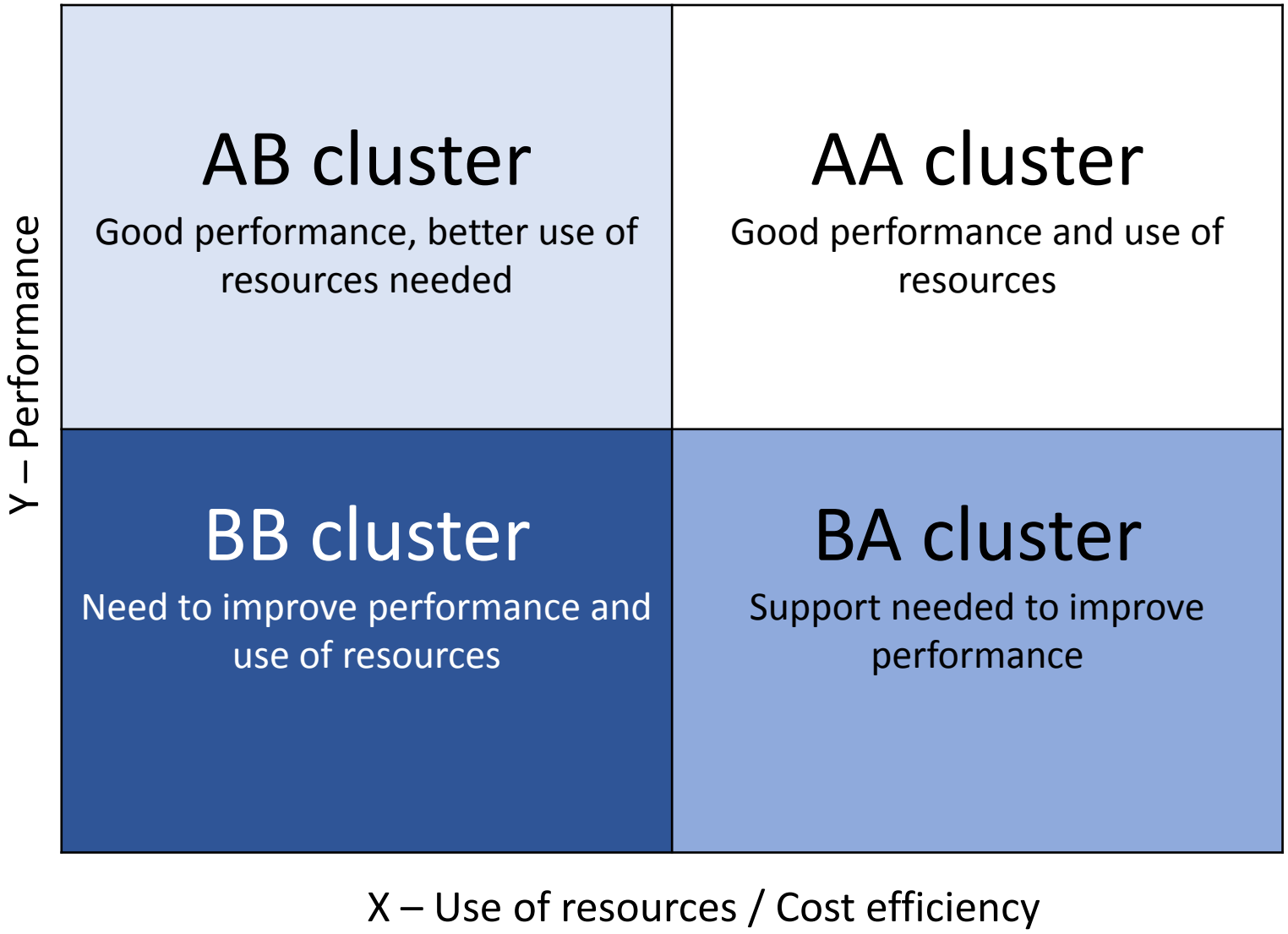
Length of proceedings (disposition time)

Use of resources

Productivity (weighted case types – judicial quotas)

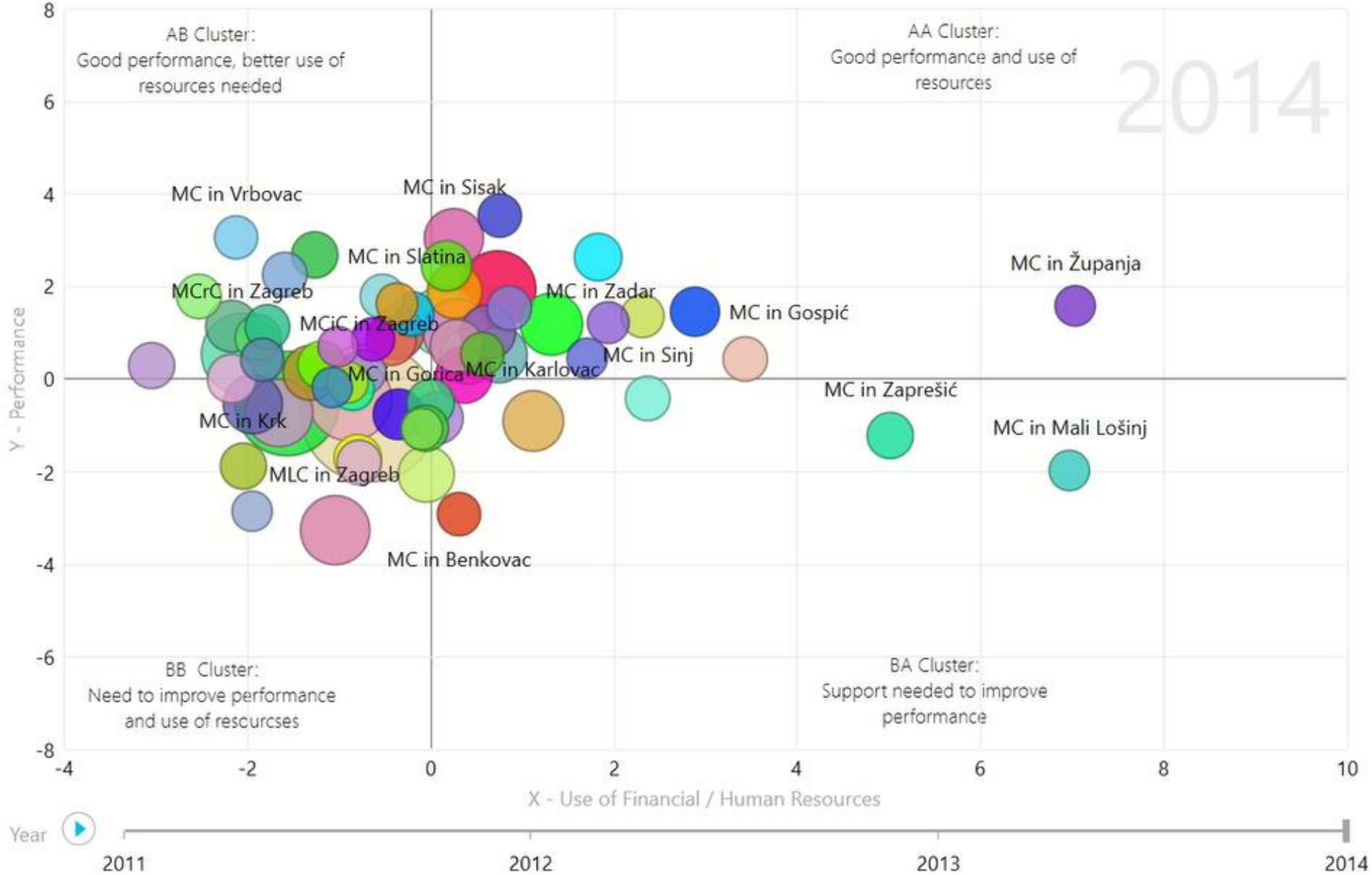
Cost efficiency

2. CLASIFICATION: Second level of the Supervised AI

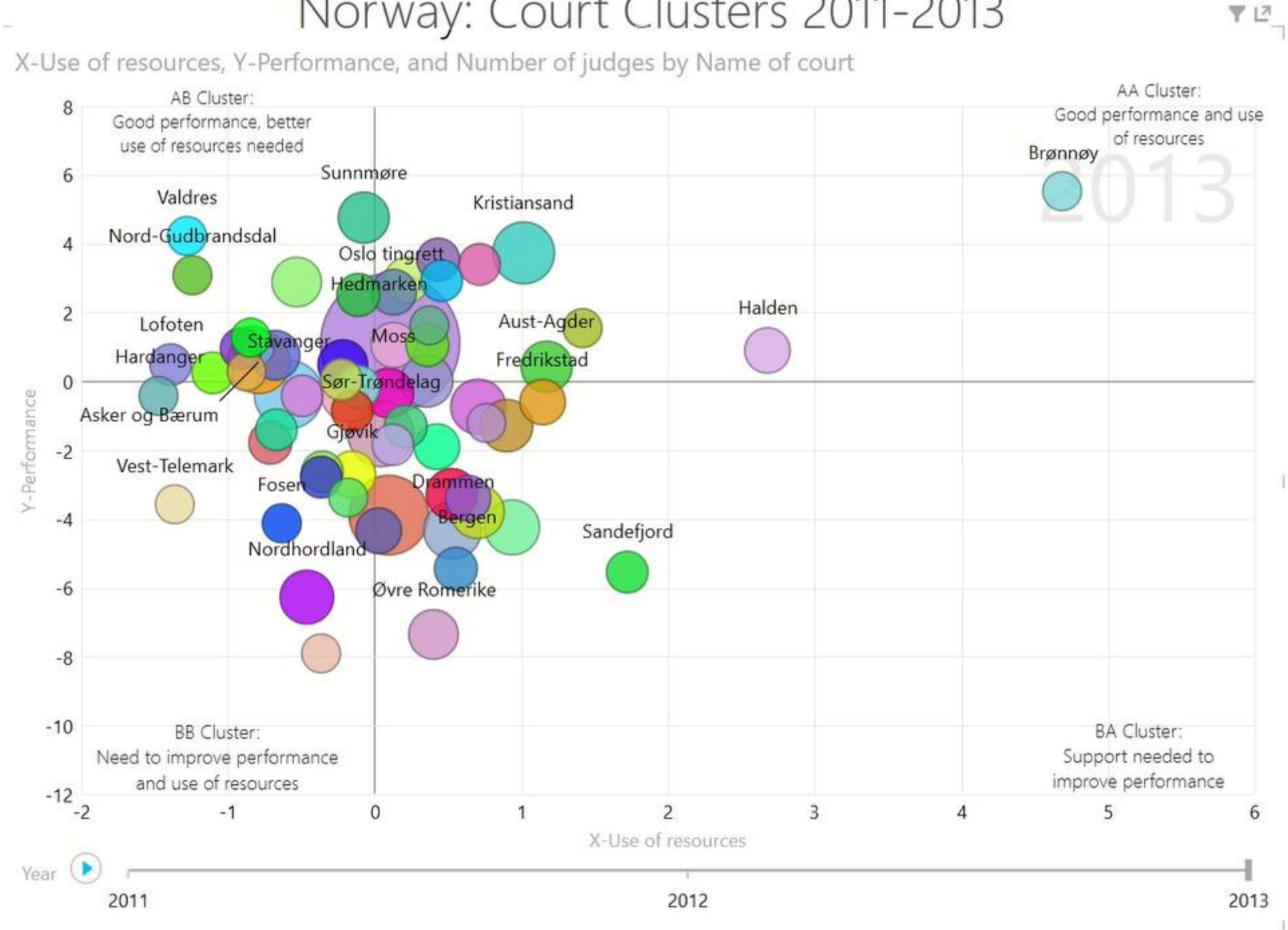


Municipal Courts in Croatia: Court Clusters 2014-2011

X - Use of Financial / Human Resources, Y - Performance, and Number of judges in the individual court by Name of



Norway: Court Clusters 2011-2013



Benefits of Supervised AI for court management:

Justice sector level

- monitors the **impact** of legal and judicial reform aimed at improving performance;
- provides policy makers with performance data for needed for **policy decisions**;
- enables stakeholders to **monitor** the performance of the justice sector;
- Introduces **umbrella** performance management system,

Benefits of Supervised AI for court management:

Court level

- rewards **innovation** and improvements,
- able to detect **microinefficiencies**,
- establishes platform for business process **reengineering**,
- creates service oriented courts and judicial **culture**,
- enables **evidence-based** decision-making;
- calculates needs for financial and human resources among the courts **fairly**.

Supervised AI is not about ranking,

it is about machine learning that provides actionable knowledge from your existing data.

Implement Supervised AI, without hurting yourself :)

- Define Performance Framework and Always Measure Results
  - How will you know if your project was worth the effort if you do not define key performance indicators?
- Remember Business Process Management
  - Putting a system on top of inefficient processes is futile. Benefits realization is tied to process improvement.
- Take Care of Your ICT system
  - Design and implement your ICT system always having in mind that is must serve your strategic goals.

Final points:

- Raising the awareness of the possible use of « AI » for the administration of justice.
- Providing knowledge from available data through machine learning for human decisions.
- Data science and machine learning: Statistics used as a basis, not black-box neuronal network approach. For the sake of a bit more precise results we would lose control over the process.
- Humans remain in control of the system, from the stage of selection of data to final court management decisions: In a way, this is why we talk of « supervised » AI.

Thank you for your attention

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