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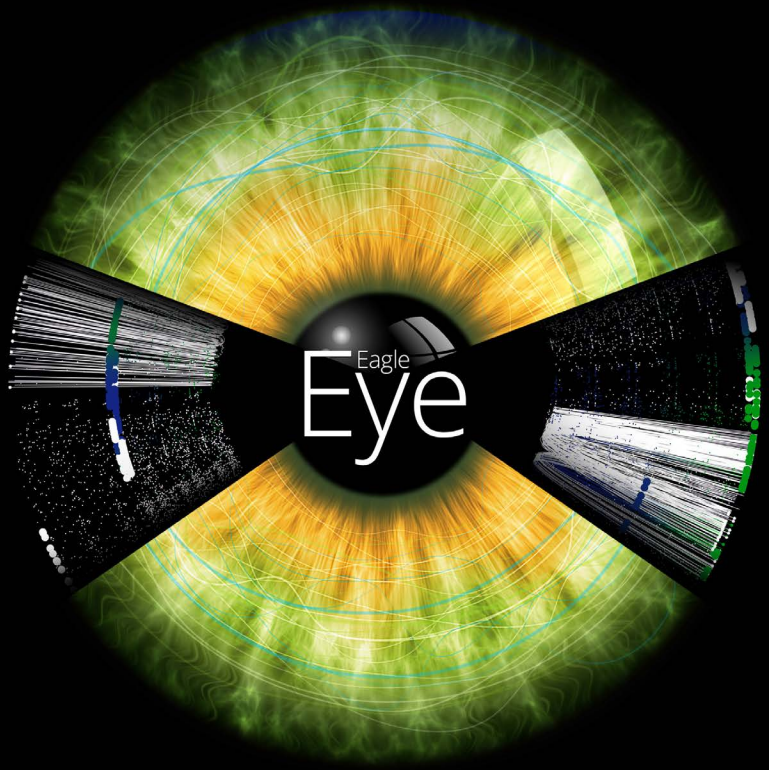
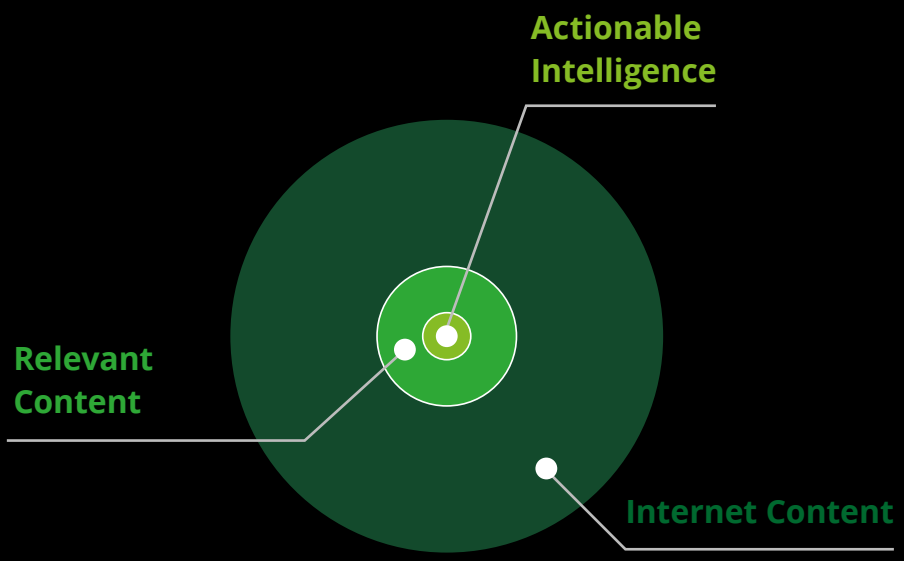



# **Advanced Early Warning Systems** for Financial Distress

Imagine the vast amount of information that already exists on the Internet. What if this information could directly affect day-to-day business operation or even lead an event?

Companies could be publishing information on new products, which is relevant for the competition, shareholders, their banks and insurers. Newscasts could be reporting on an event such as fire of a production plant, creating a chain reaction from a claim on the insurance policy to the financial statements to the reputation of the plant itself.

Now imagine that you could automatically analyse and digest this ocean of data in different languages to make actionable business decisions.



## Use Cases

Being able to derive actionable intelligence from open sources (so called OSINT or Open Source INTelligence) creates an entirely new set of business opportunities. Since it utilises open sources it does not violate any IP or privacy / data protection regulation. Management of large corporations will have access to the following types of information:

1

Real-time risk detection relating to millions of companies and geolocations

2

Continuous trend analyses of markets, brands, products, technologies – not survey based

3

Socio-economic and geo-political analyses using advanced sentiment and context

4

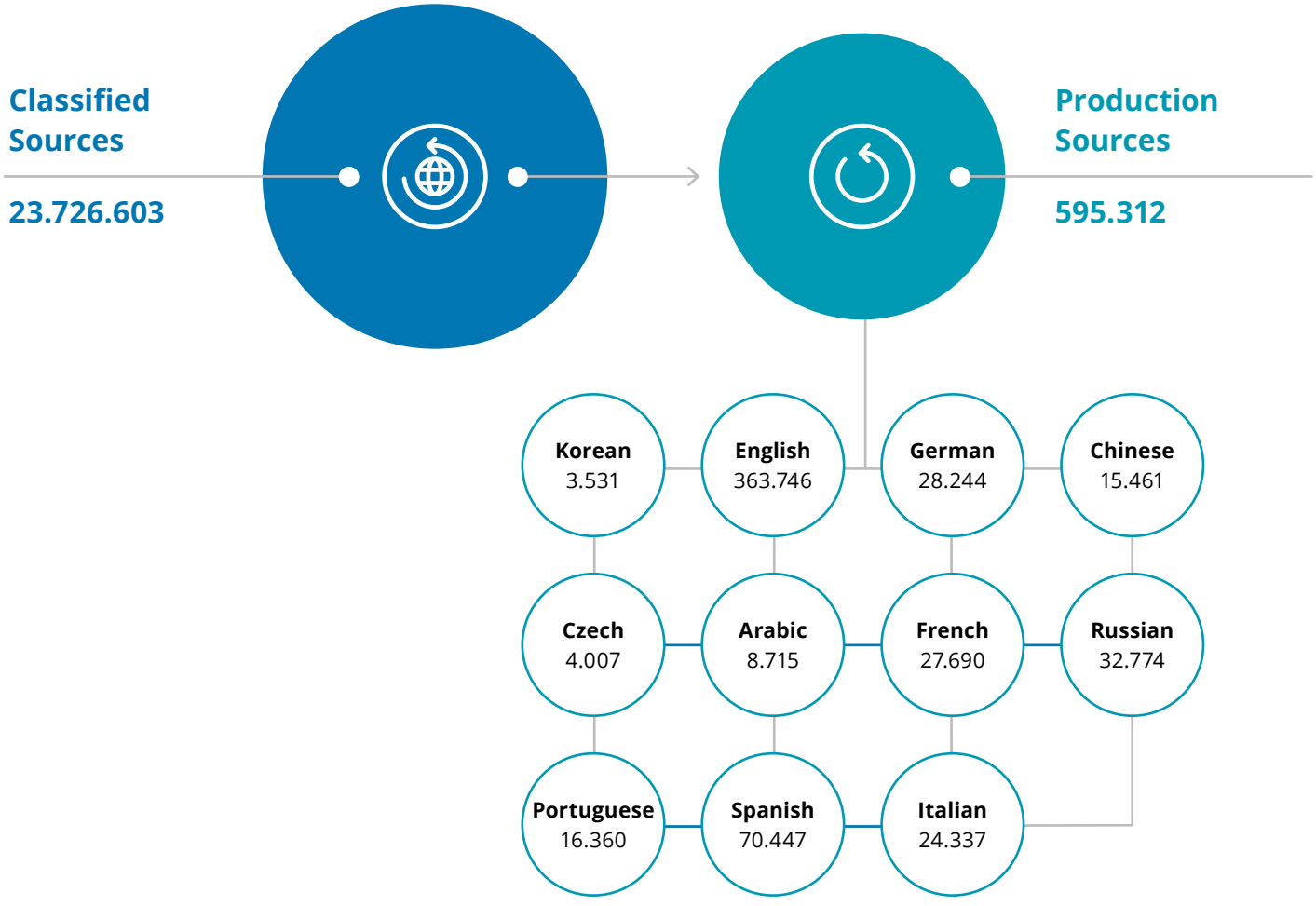
Detection of innovations structured by hundreds of industries and scientific fields

5

Real-time decision-making support based on correlating history risks with currently detected risks

## Open Source Intelligence

Automated OSINT is a perfect source for new generation of solutions utilising both supervised and unsupervised Machine Learning, a discipline of Artificial Intelligence. By computer managed source discovery, content extraction, semantic analysis and threat/opportunity scenario detection and together with over 10 years of OSINT data archive, we are able to collect over 500.000 Internet media source in 11 languages. This gives us visibility on vast majority of the Internet media content and allows us to "take the pulse of the planet".

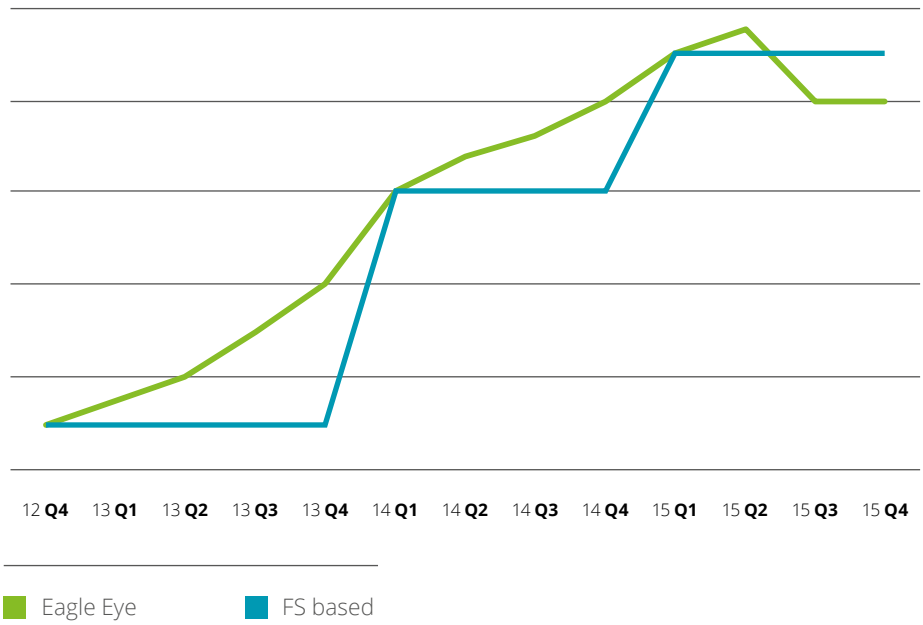


One of the use cases of such technology is the ability to create a structured information or an informative signal to predict earlier corporate insolvency for mid-sized and large corporate loan portfolios. The resulting system, "Eagle Eye", can be used as a direct indicator or combined with existing scoring models, or transactional and behavioral monitoring that exist in advanced credit risk departments.

Eagle Eye aims to automate the analysis of open source information related to corporations, correlate it with the risk of credit default, eventually combine it with existing scoring and improve Early Warning Systems and credit management processes.

Eagle Eye was successfully able to prove there are risk signals in Internet that can be observed well upfront the financial distress is noted in financial statements.

**Periodical review vs. Early warnings**




The table below present Eagle Eye findings from a first Proof of Concept based on corporate loan data. When comparing the traditional early warning model with the incorporation of OSINT data, the model with OSINT data was able to predict much more accurately.

| **Model** | **Early warning** | | **Early warning + OSINT data** | |
|---|---|---|---|---|
| Predicted default rate classification groups: | Number and share of companies | Actual Defaults and default rate in group | Number and share of companies | Actual Defaults and default rate in group |
| 0%–1% | 1,533 (25%) | 30 (2.0%) | 5,327 (85%) | 192 (3.6%) |
| 1%–10% | 3,500 (56%) | 185 (5.3%) | 387 (6%) | 94 (24.4%) |
| 10%–100% | 1,213 (19%) | 409 (33.7%) | 531 (9%) | 341 (64.2%) |
| **Gini Index** | **0.661** | | **0.762** | |

The total exposure for the 10–100% predicted default band equated to over 18 million EURO. The model was able to predict 64.2% of these, worth over 11 million EURO of potential bad loans before traditional transactional monitoring. With the use of Eagle Eye, the bank was then able to react, restructure, and avoid loss.

**The usual approach to build a predictive model such as Eagle Eye is the following:**

### Identify suitable portfolio

- Mid-sized to large companies
- Measuring media coverage

### Collect internal and external data

- Historical performance of related parties
- Company database
- OSINT data

### Prepare data structures

- Quality check input data
- Transform to modelling structures

### Identify predictors

- Computer assisted process to generate and validate significant predictors for the model

### Build the Predictive model

- Define the potential combination of existing models and Eagle Eye predictors
- Design the additional model component and the adjusted models
- Validate suitability for the use case and adjust credit monitoring processes
- Potential use of Advanced Credit Modelling
- Integration in regulatory IRB frameworks
- Articulation with NPL policies

### Back test results

- Compare real-world events with the predictive model results
- Refine credit scoring models and/ or Early Warning Indicators
- Adjust credit monitoring principles

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