

The Evolution of Re/insurance Pricing in a Disrupted Environment

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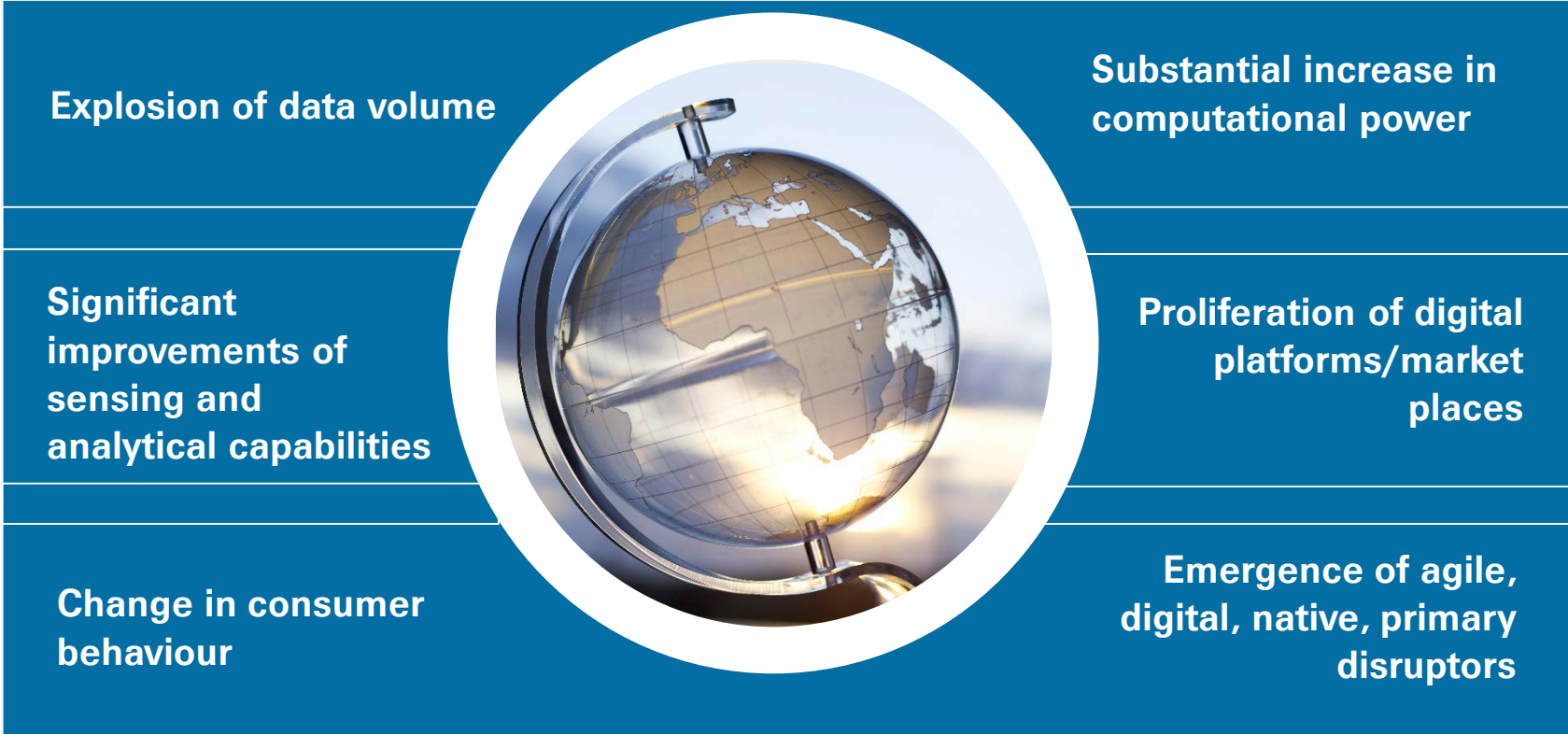
Content



- **Digital Trends**

- Examples of Analytics Use Cases
- Conclusions and Future Outlook

Swiss Re recognizes key trends which are transforming the insurance industry



Technological shift and behavioural shift

Four basic approaches (1/2)

1. Big data methods

- These are fundamental to digital transformation, using a blend of internal and external technologies and data sources.
- The more data we have, the better the (intended) end result.
- Challenge: keep finding new ways to include more good data in the analysis

2. Text analytics

- Convert text into machine-readable form & structure to extract information.
- If structured data is big, unstructured data is huge.
- Need better ways to aggregate information from multiple sources
- Uses: deliver new insights, improve efficiency and quality of business processes and to enable new types of digital services

Basic approaches and toolkits (2/2)

3. Machine learning

- Enhance historical use of statistics to assess risk and make predictions to improve predictive modeling
- Learn from data while making fewer assumptions
- This enables improved accuracy and granularity of our predictions

4. Visual analytics

- Extract business value from large complex data sets
- Interactive visual interfaces enhance human cognitive abilities that help us identify correlations and features hidden in the data
- Communicate results

Content



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General P&C Examples

US Hail – exposure and severity trends

- using big data analytics on 30 years of weather data plus economic data we were able to better understand these trends

Monitor cyber exposure via large volume of contract documents

- cyber wording analysis used advanced text analytics to evaluate coverage and exclusions in our portfolio

Multi-level portfolio visualization

- descriptive and visual analytics to provide insights on exposure, rate adequacy and accumulation

Optimized underwriting rules for professional liability

- identify triggers with low predictive power to optimize underwriting by reducing the number of rules that trigger manual review

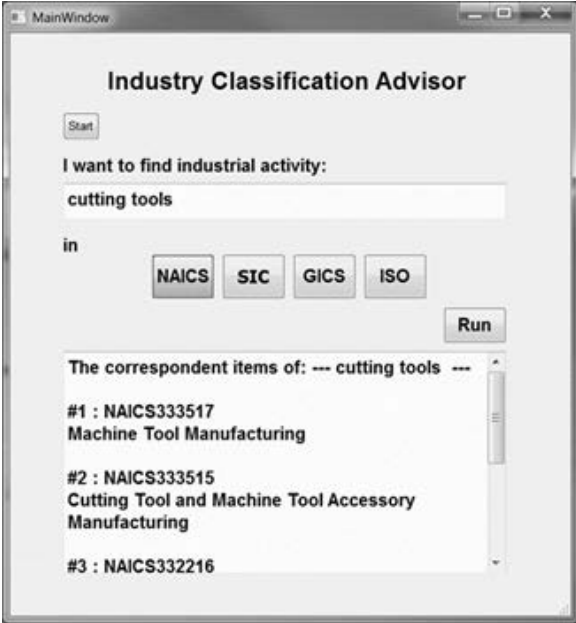
Automating claims and accounting documents

- automation for unstructured documents to improve accuracy and efficiency

Time to Make it Real

Example #1

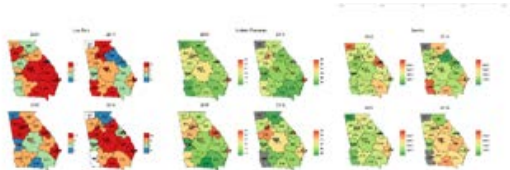
Industry Classification Advisor



Example #2

Zip Code Motor Risk Analysis

Heat Maps



A Closer Look – Example #1

The situation:

- The underwriter has a description of a risk, which needs to fit into an industry classification present in the pricing tool. This apparently simple task can lead to a significant impact on costing results.
- The costing tool has a defined number of alternatives.
- After finding out what Joinery Manufacturing actually means, you could reduce the choice to two possibilities: "Construction - Special trade contractors" and "Manufacturing – Furniture and Fixtures".
- Which one would you choose?
- What would your colleague choose?
- What if you choose different industries in different years or for different submissions?
- The impact to the expected loss can be quite large.
- And this is just a very simple example.

Industry classification

What is it?

IC organizes companies into groupings based on certain criteria



Manufacturing



Food Mfg.



Transport Equipment Mfg.



Electronics Mfg.



Motor Vehicles Mfg.



Motorcycles Mfg.



Aircraft Mfg.

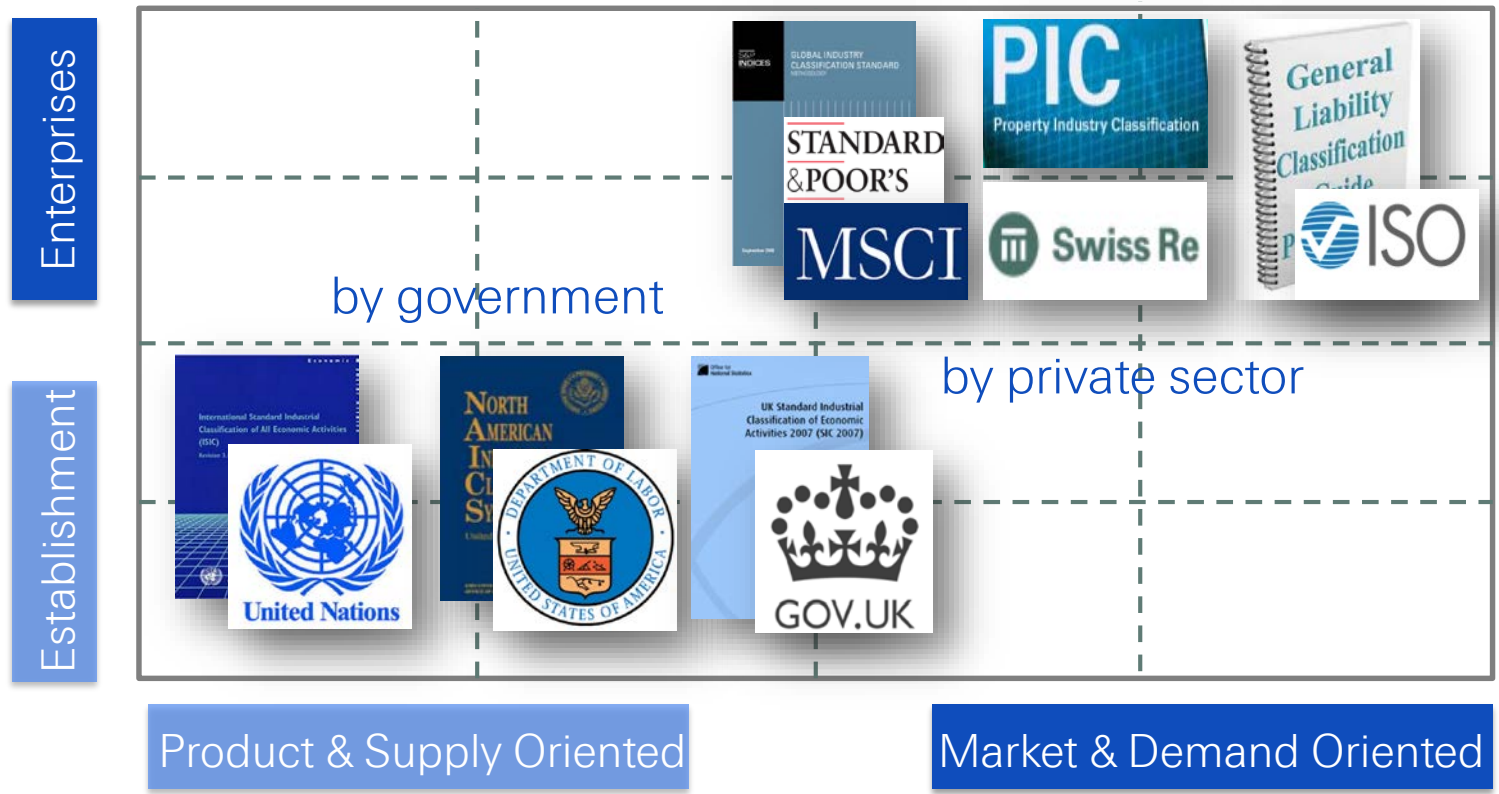
100 major groups

1000 industries

Industry Classification

Different types of industry classifications

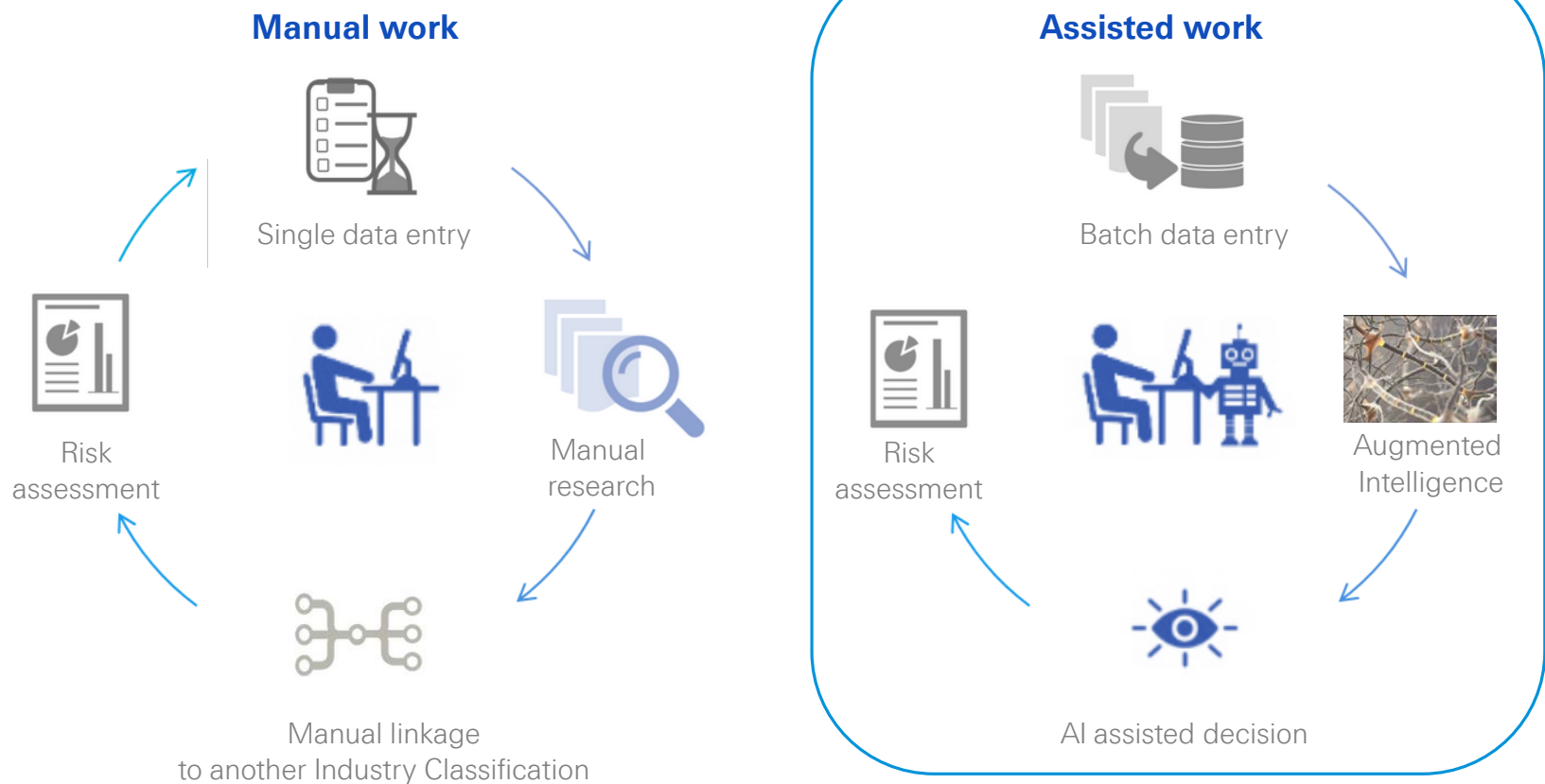
ICs developed by government and private sector have different scopes



Industry Classification

Challenge and solution

Manual work is time consuming and inconsistent



Our newly developed tool:
Industry Classification Advisor (ICA)

A Closer Look

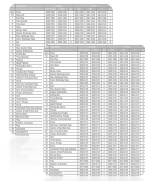
The solution:

- The tool provides an industry classification for a given description. The input can be an unstructured text such as from a website or application.
- Augmented Intelligence is a cognitive approach that allows AI to assist humans to make the most of their data and accelerate the decision-making.
- It employs two main algorithms in a novel manner:
 - Word2vec, and
 - term frequency/inverse document frequency (TF-IDF).
- Word2vec: assigns a vector in a multidimensional semantic space to a word. Vectors of words with similar syntactic and semantic information lie closer to each other. This is extremely useful for different natural language processing applications, such as search engines.
- TF-IDF: assigns a weight to each word in a given document or context which represents its relevance. The two algorithms combine to find the correct industry in a target classification by checking which "industry vector" is closer to the vector calculated for the description in the user input.

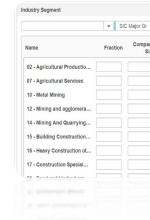
Solution and Business Cases

Evaluation by experts

Expert quality recommendation – ICA correctly identifies relevant industry



Available data:
Annual report
 Sandvik Machining Solutions
 is the leading supplier in the
 global **cutting tool** industry



Swiss Re tool:
 Requires 6-digit NAICS code



Tedious report reading



333517 Machine Tool Manufacturing ✓



Type keywords into ICA (i.e. "cutting tools")



333517 Machine Tool Manufacturing ✓
333515 Cutting Tool and Machine Tool
 Accessory Manufacturing ✓

Solution and Business Cases

What to expect from ICA

Efficient, scalable, high quality, user friendly solution



Efficiency

- **Substantial** time saved
- Cost saving through batch process



Scalability & Scope

- Scalable to **any classification**



Quality

- **Consistent** and systematic
- Reliable, expert quality



User Experience

- **Easy** to use, interactive
- Focus on decision making

Zip Code Motor Risk Analysis – Example #2

The problem:

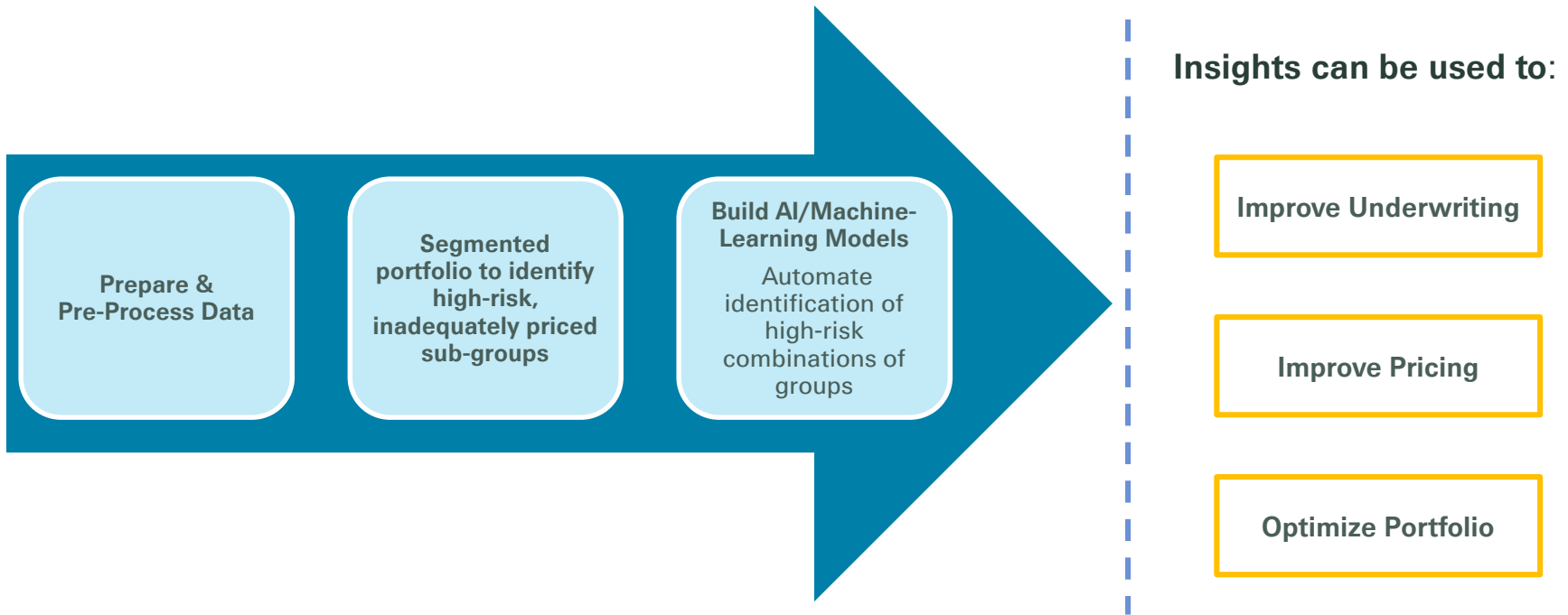
- The insured personal auto portfolio contained sub-segments that were negatively affecting overall performance
- How to specifically identify these segments and define the appropriate remedial action?
- 11 million claim and policy records

The solution:

- Analyze and visualize detailed claims and policy data by utilizing AI
- Identify target areas for portfolio improvement

High-Level Project Roadmap

Portfolio segmentation and visualization, with an overall objective of building a sophisticated AI/machine-learning model to reveal high-risk groups within the portfolio

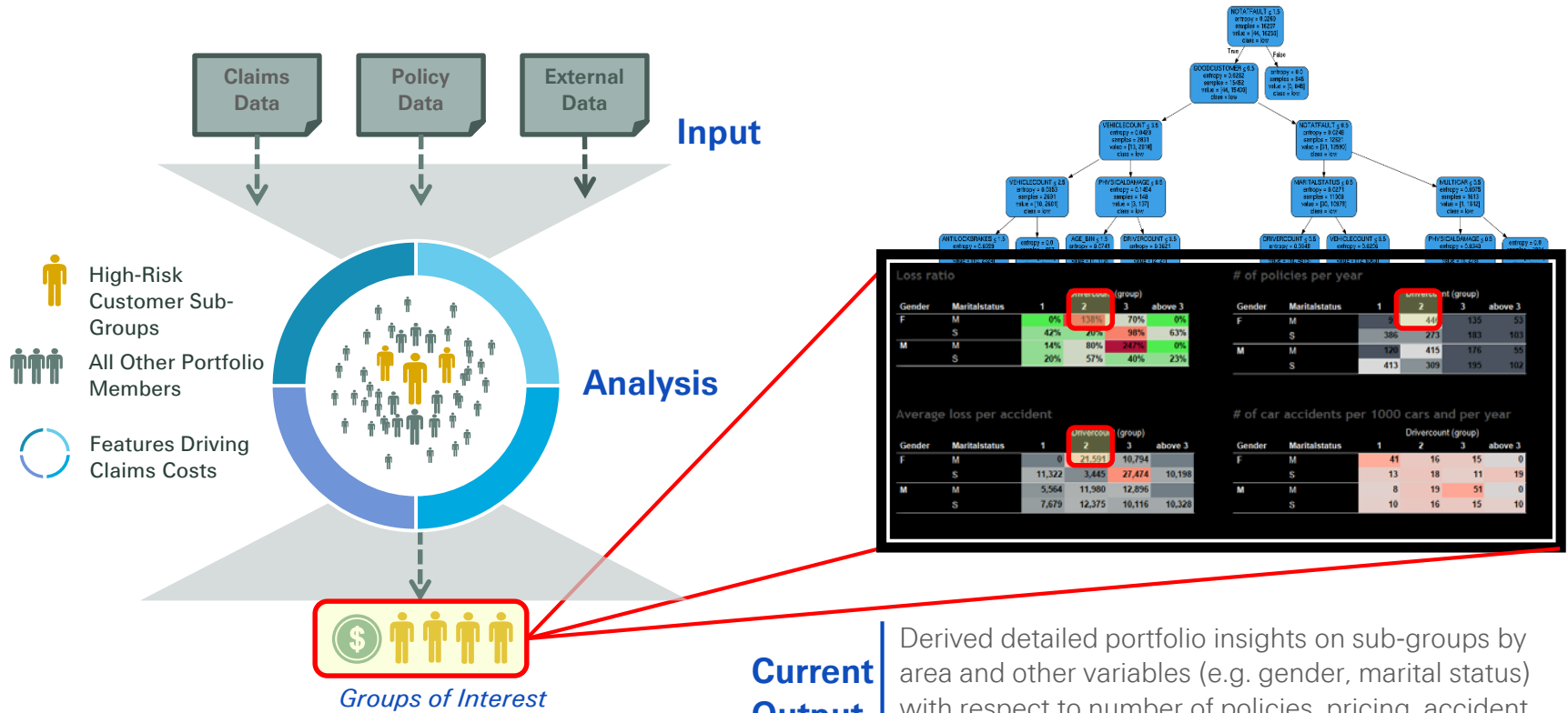


Zip Code Motor Risk Analysis – A Closer Look

- Analyzed internal claims and policy data supplemented with external data (census)
- Machine learning algorithms uncovered the key drivers for likelihoods to have car accidents given the policy information and the external data.
 - external data do matter very much!
- Identified key attributes associated with claims activity (driver age, type of vehicle, age of vehicle, etc.)
- Analyzed frequency and severity trends
- Compared expected loss ratios by 3 digit zip code to the state average (above or below)

Results

Segmented high-risk consumer sub-groups in client portfolio and created a dashboard to visualize these segments



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- **Conclusions and Future Outlook**

Conclusions

- It may just be 'automation' but it works
- Focus on solving business problems instead of the technology
- Visualization of data and results helps deliver the message
- Continuously scout for new relevant technology (acquire or build)
- Remain flexible to adapt to new technology trends
- Explore new ways of working >> pop-up teams
- Legacy systems and technical skills gaps present significant challenges to innovation but these can be overcome

Try it! Move fast! Throw it away if it doesn't add value!

Future Outlook

- Users may not need to have advanced data scientist skills but rather be able to use algorithms from existing toolkits and libraries with minimal customization
- Demand for geospatial imagery is only growing
- Big data is the oxygen we increasingly rely on. But not all data is equal.
- Smart-loss detection devices are working.
- Predictive analytics has many promising applications. It's up to us to figure them out and put them to work.

Thank you.



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