

2017 Predictive Analytics Symposium

Session 24, General Insurance Applications of PA

Moderator:


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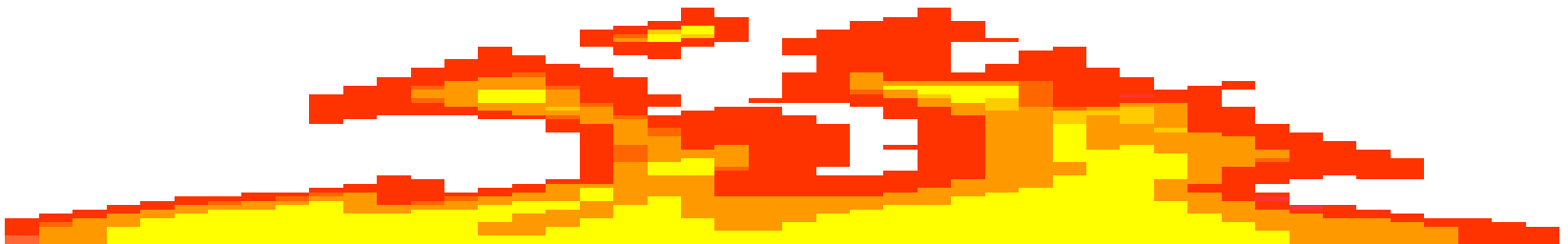
**General Insurance
Applications of
Predictive
Analytics: Past,
Current, and
Future**

**2017 SOA Predictive Analytics Symposium
Chicago, September 2017**

Peter Wu, FCAS, ASA, MAAA, CSPA
Managing Director

Theme

- Data analytics in the U.S. Property and Casualty insurance industry is HOT!

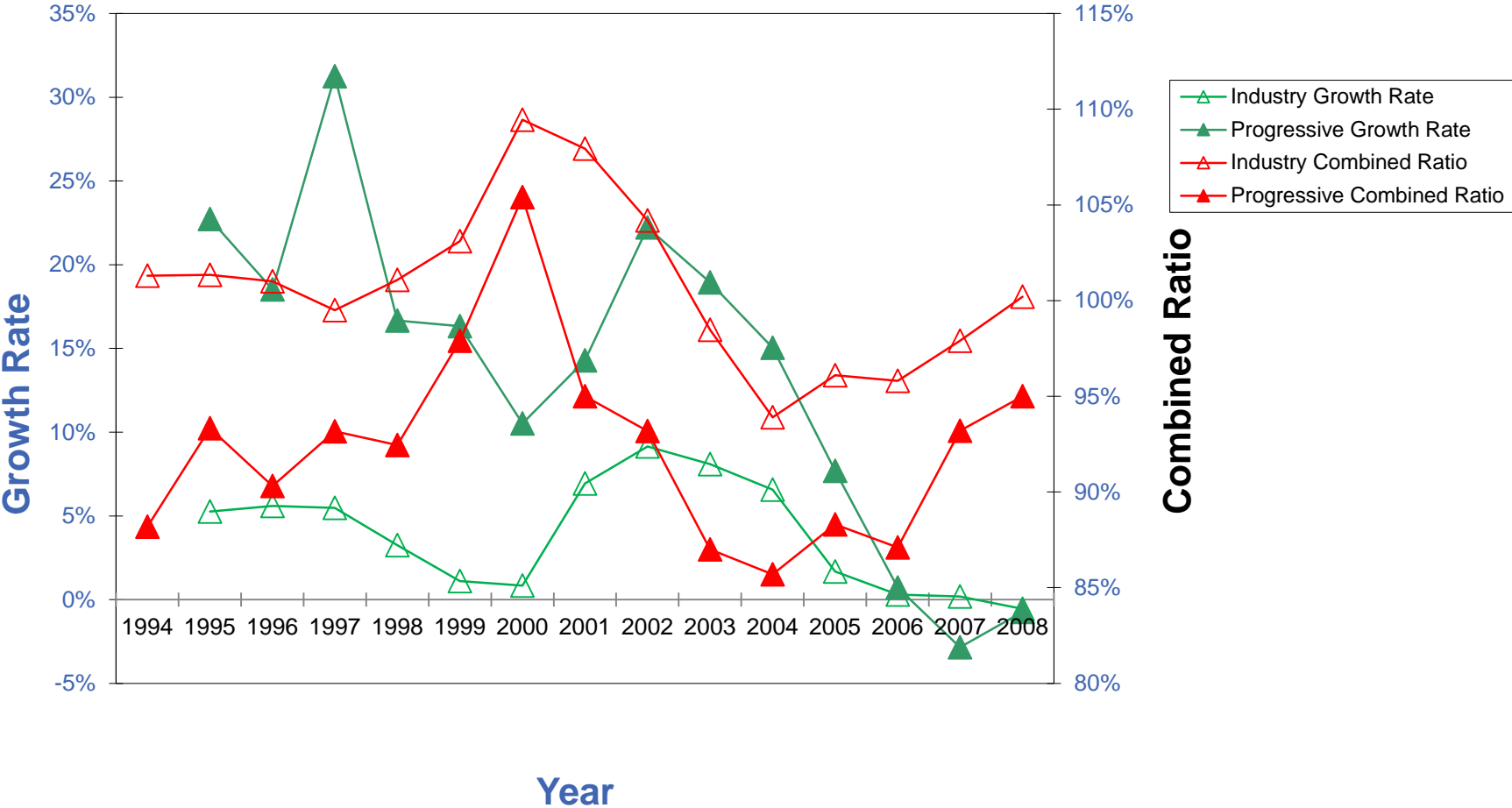


- Why?

Because P&C insurance is a “zero sum” game, and data and analytics will create “adverse selection” for the companies who are not doing it!”

A Success Story - Credit Score Revolution

Guess Which Company is It?



The Evolution of P&C Insurance Data Analytics

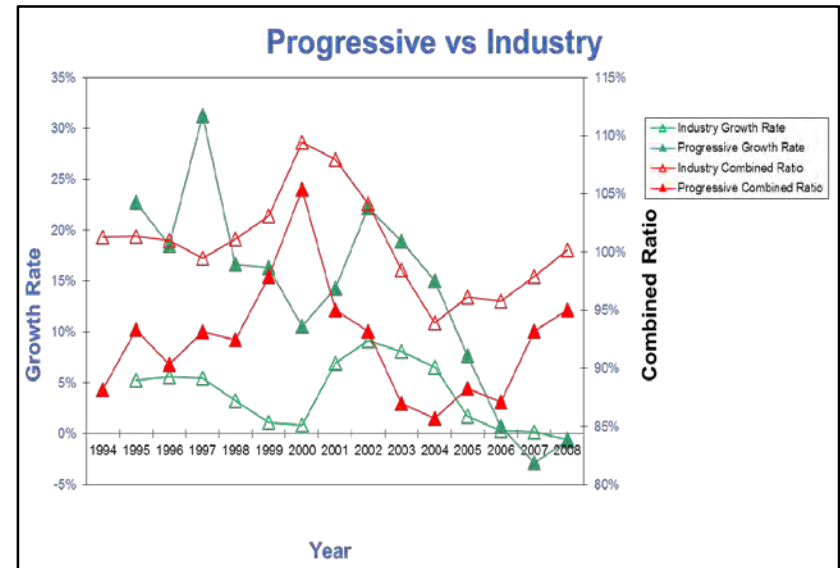
Advanced analytics along with leveraging large amount of internal and external data have become mainstream over the last 20 years in several industries within financial services. Property and Casualty insurance has been one of the leading industries in the integration of advanced data analytics into core operations.



Credit Score Revolution

Credit Score for Auto Insurance Application

- Introduced in late 1980 and early 1990s
- First important factor identified over the past 2 decades
- Strongly correlated with P&C insurance loss
- Composite multivariate score vs. raw credit information
- Viewed at first as a “secret weapon”
- Quiet, confidential, controversial, black box, ...etc



Early believers and users have gained significant competitive advantage!

1997 NAIC/Tillinghast Study of 9 Companies' Data Loss Ratio Relativity of the Best and Worst 20% of Credit Score

	Co1	Co2	Co3	Co4	Co5	Co6	Co7	Co8	Co9	Avg
Best 20%	-38%	-29%	-19%	-15%	-14%	-34%	-22%	-22%	-36%	-25%
Worst 20%	48%	20%	32%	30%	46%	59%	20%	22%	95%	41%

Credit Score Revolution

Credit Score- A composite score that usually contains 10 to 40 credit characteristics

- ❖ Payment pattern information, account history, bankruptcies/liens, collections, inquiries, bad debt/defaults...
- ❖ Formula scoring or rule-based scoring
- ❖ Industry scores vs. company proprietary scores

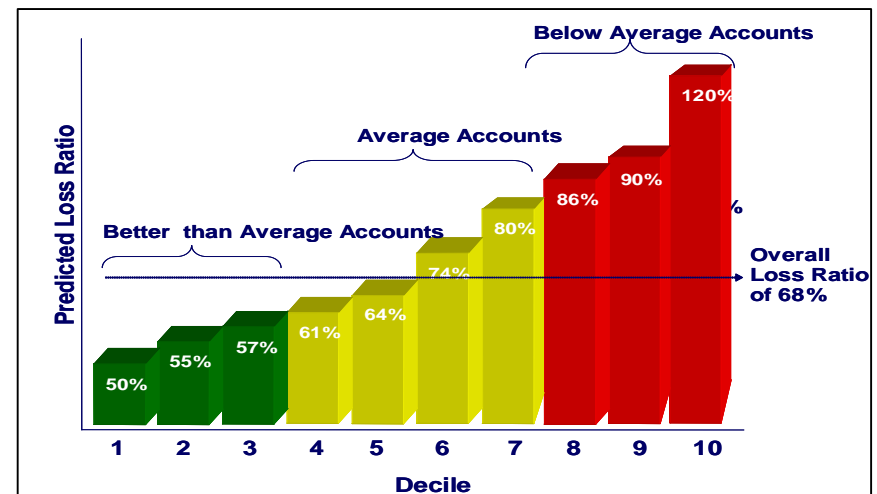


Sample Equation: $.4591 - 0.053 * (\text{Account Years}) + 0.037 * (\text{Number of Late Payments}) + 0.026 * (\text{Law Suits}) - 0.075 * (\text{Credit Limits}) + 0.025 * (\text{Number of Collections}) - 0.038 * \dots$

Transform to Final Scale



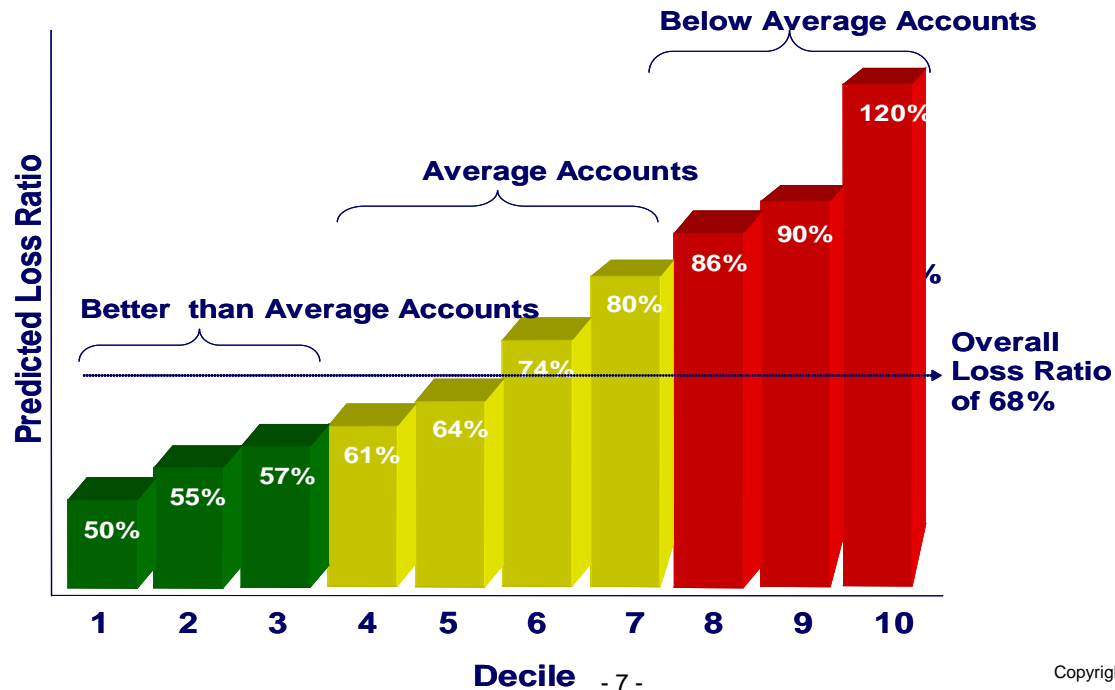
500 – 900



Credit Score Revolution

Why is “credit score” so successful?

- “Large scale” “multivariate” scoring using “external data sources”, a classic example of advanced data analytics applications
- A significant behavior economic characteristic translated into a powerful Auto insurance class plan factor
- “Brilliant” marketing approach for credit score:
 - ❖ Benefits/ROI are measurable and lift curve can be translated into bottom-line benefit
 - ❖ Blind test and independent validation can be done to verify the benefit



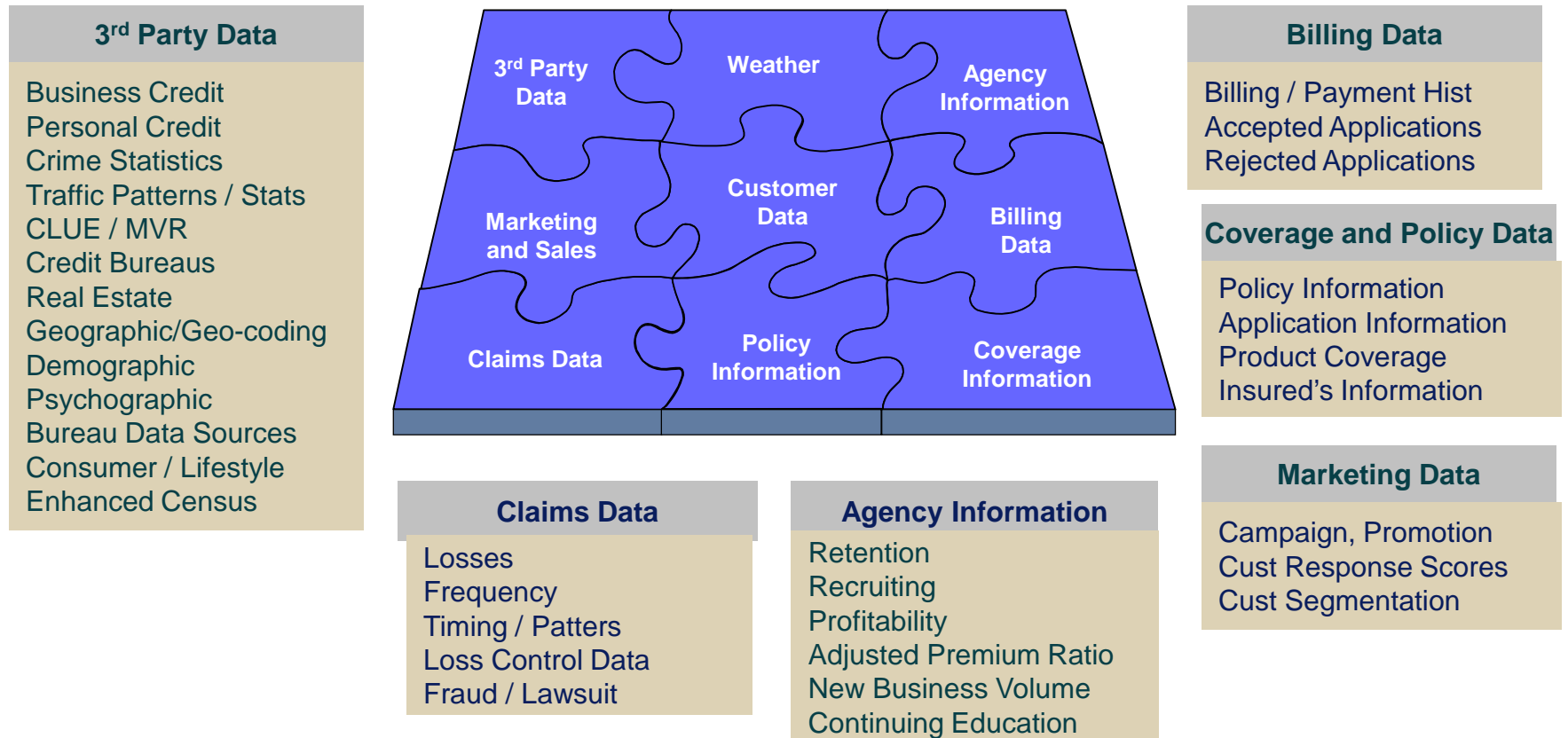
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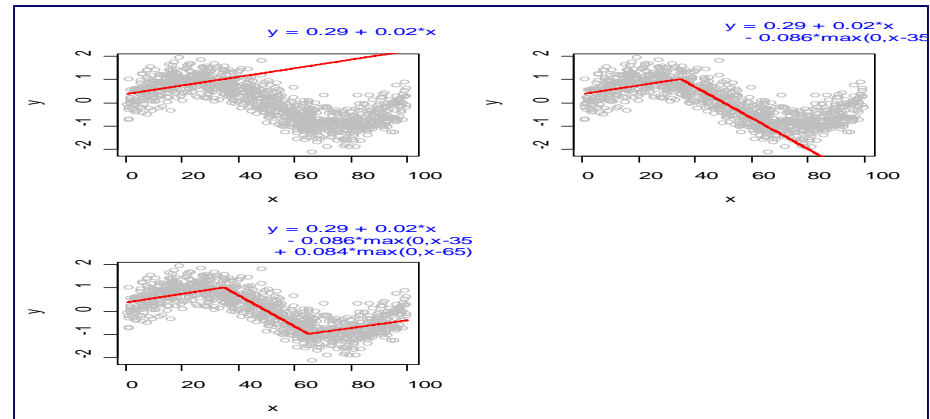
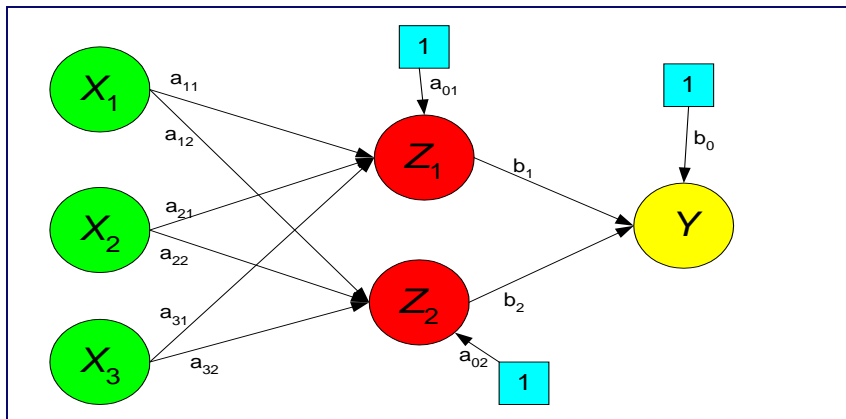
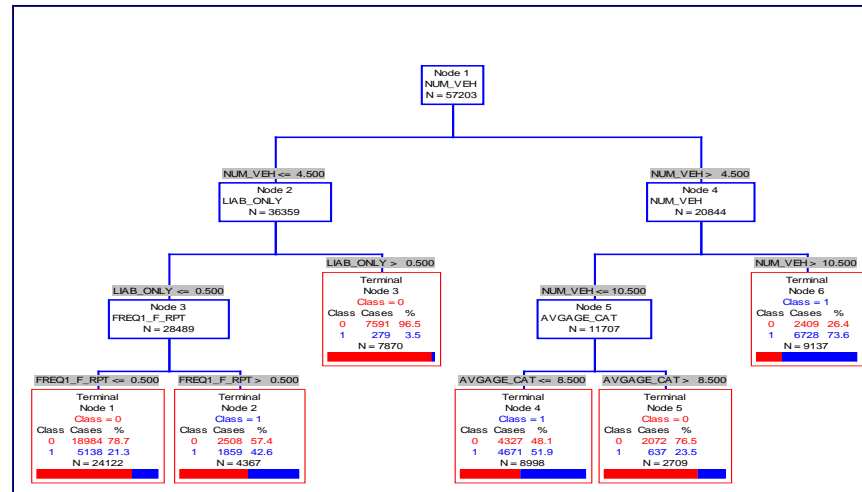
Data Analytics Transformed P&C Insurance Industry

- Insurance industry contains large amount of data and is ideal for DM and PM applications.
- Information age provides a wealth of external and 3rd party data sources

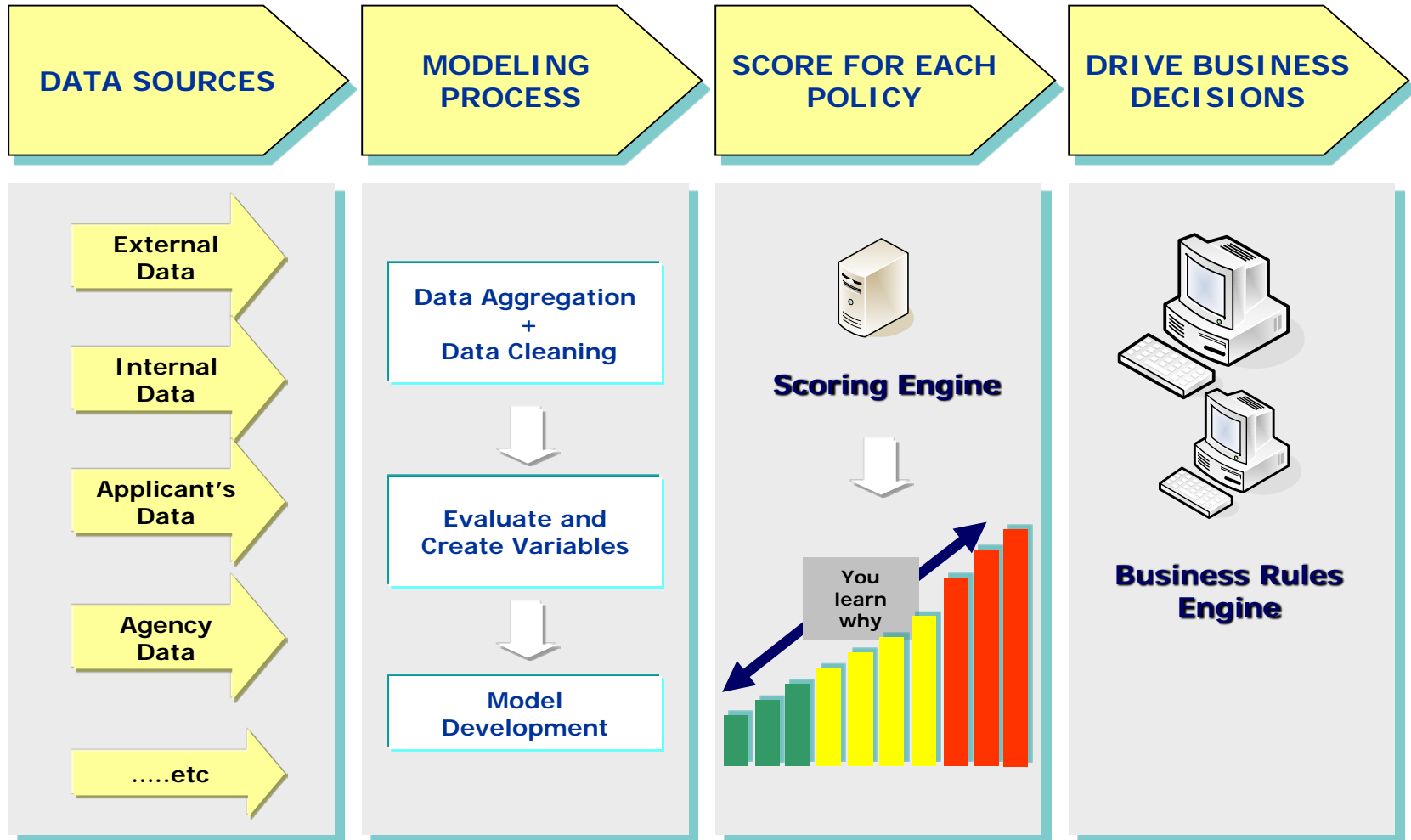


Data Analytics Transformed P&C Insurance Industry

Adoption of a wide range of new and powerful modeling and data exploration techniques- GLM, Neural Networks, Decision Trees, Clustering Analysis, MARS, etc.



Data Analytics Transformed P&C Insurance Industry



Data Analytics Transformed P&C Insurance Industry

P&C Insurers' Public Statements on the Benefits of Predictive Modeling

Safeco

"85% of our new products are automated with predictive modeling, which enhances underwriting consistency and makes it easy for our commercial agents to do business with Safeco"



Hartford

"Fully launched Customized Pricing, our predictive pricing model that automatically provides the most appropriate price for a new small business submission"

"Achieved overall written premium growth of 4%."



CNA

"Strong performance in our core Property & Casualty Operations via portfolio optimization, data-driven underwriting, cross-sell, claim excellence, and catastrophe exposure management"



Selective

"Commercial lines NPW grew 3% for Q2, driven by \$83M in new commercial business, up 13% compared to Q2 2006."

"The dramatic improvement is a direct result of our multidisciplinary WC improvement strategy and predictive modeling"



Hanover

"The quality of our property, WC, auto, and specialty mix is continuing to improve as we use predictive analytics"

"Agents are giving us preferred shelf space vs. weaker competitors"



Travelers

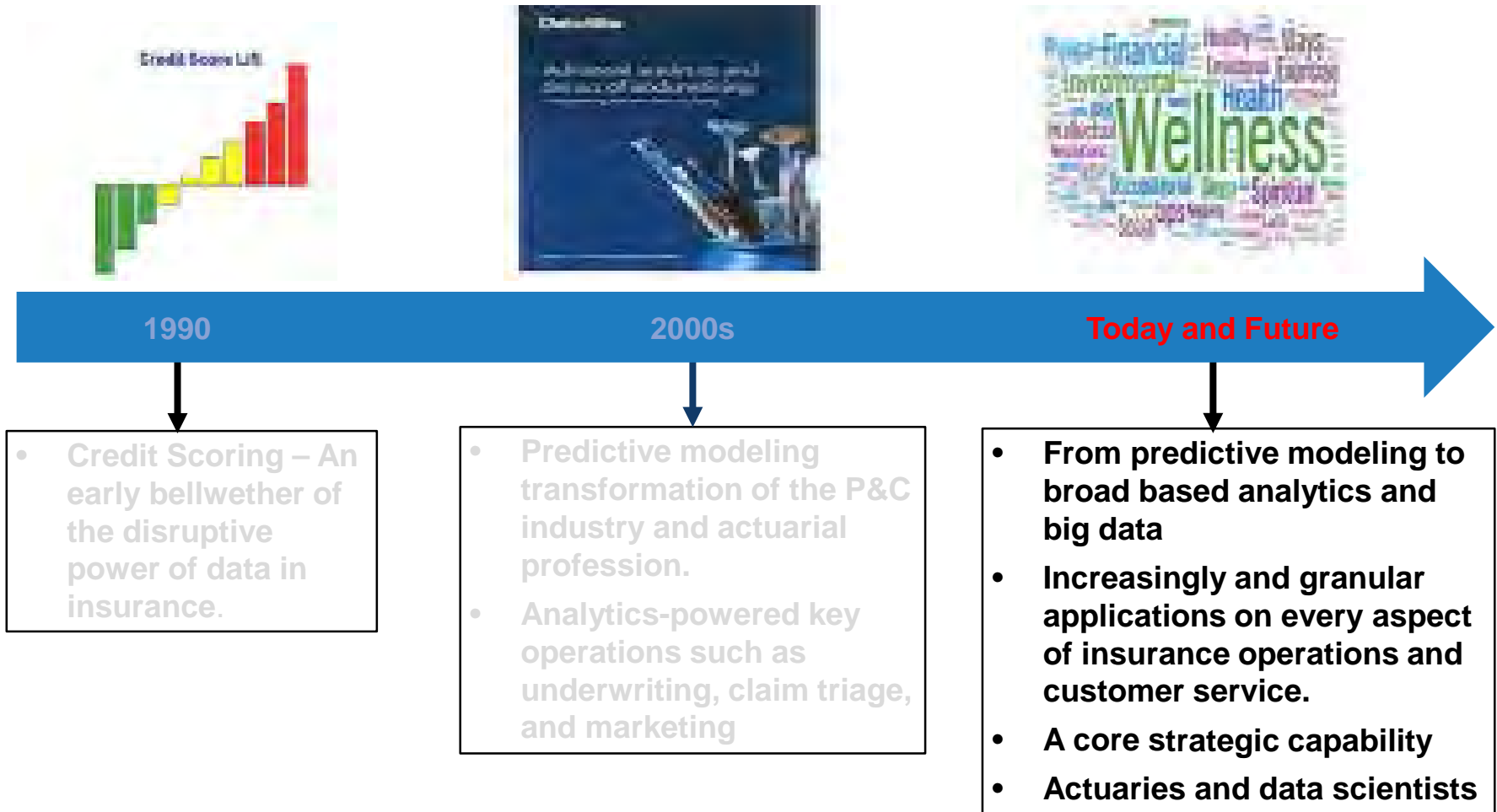
"Increased ease of use through faster decisions, streamlined processing, and expanded account rounding"

"Reduced system quote to issue time through dynamic questions, improved agent interface, and autom"



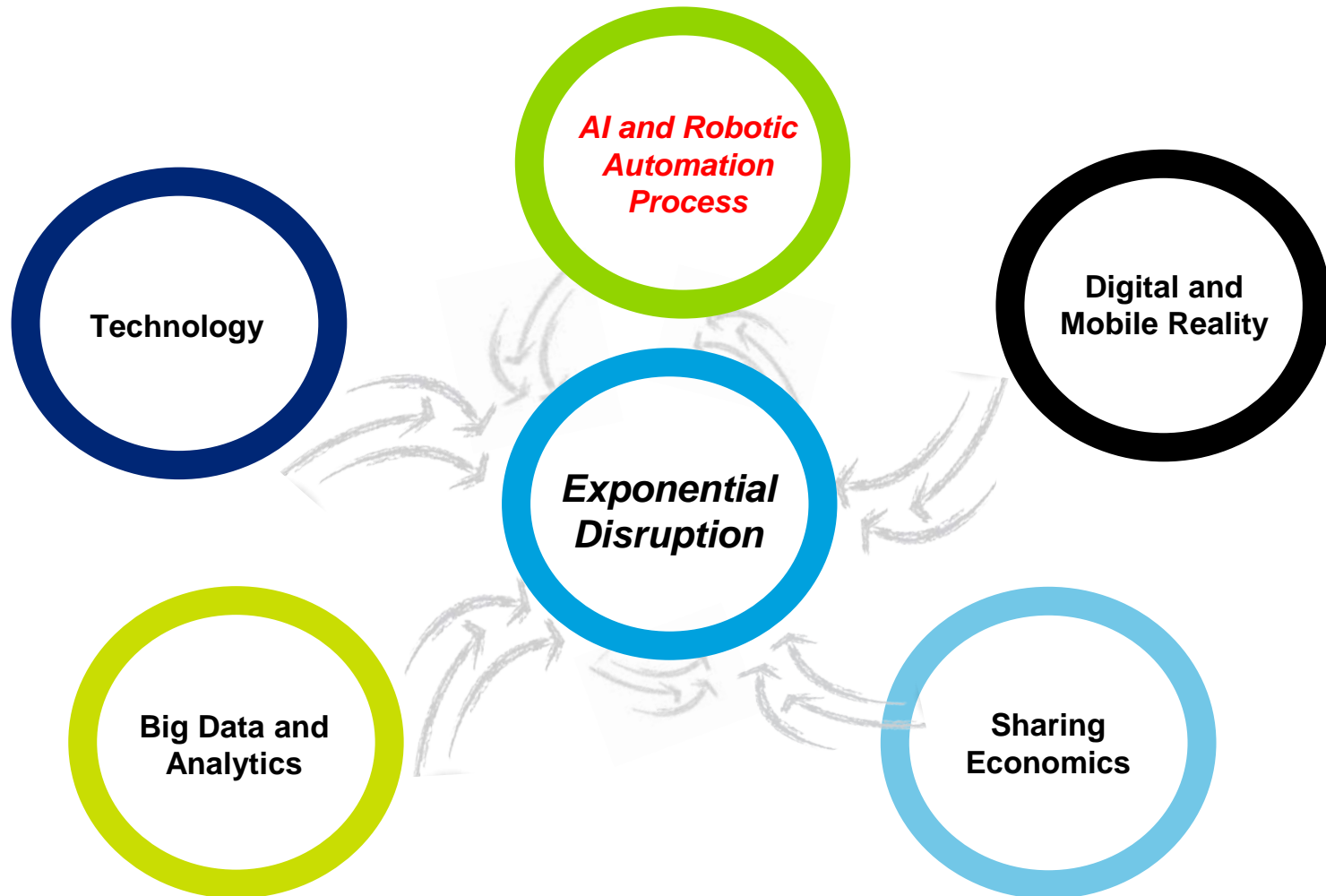
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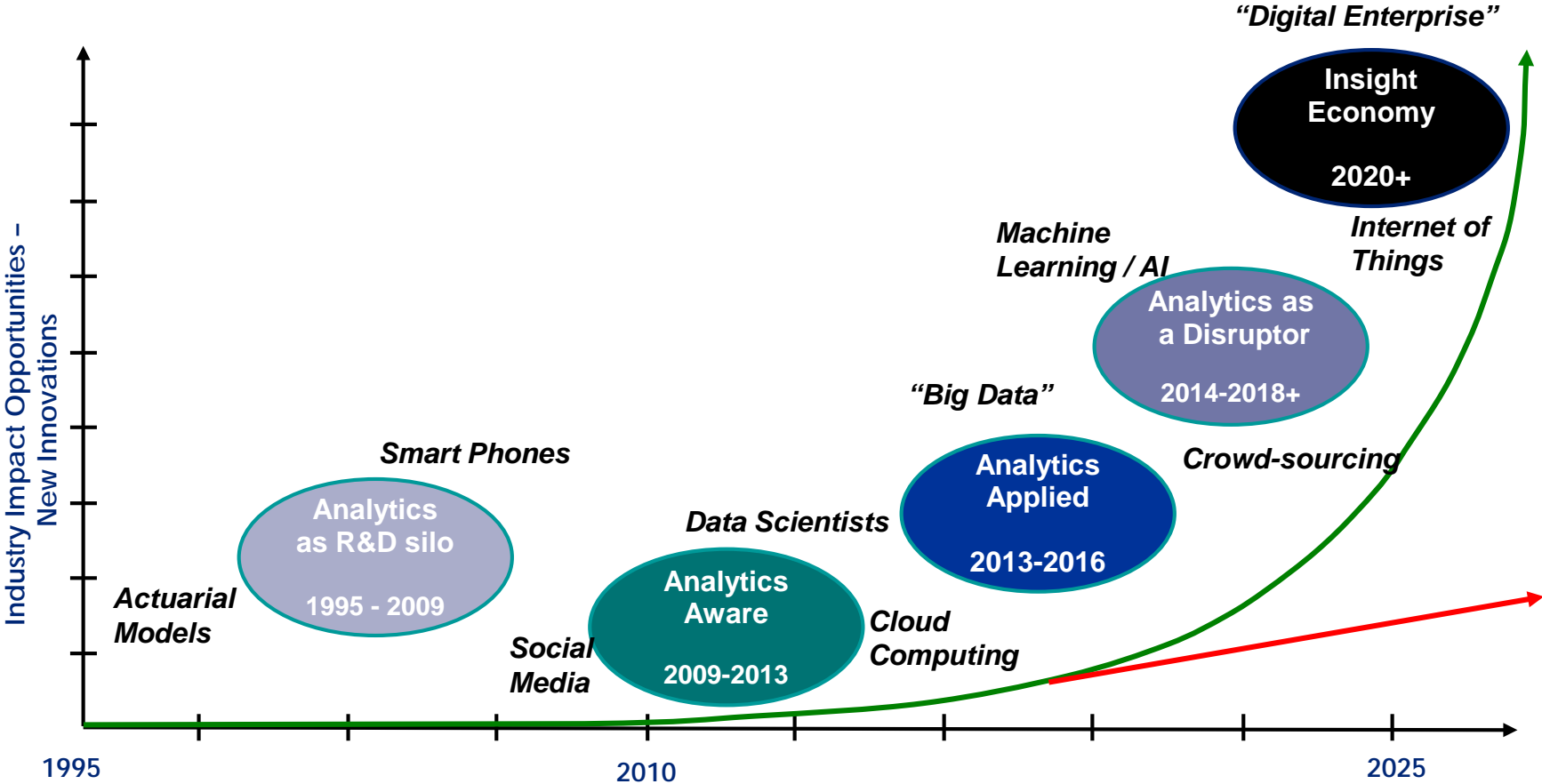
Today and Future: Many Disruption Forces

The P&C industry continues to experience disruption due to various driving forces:

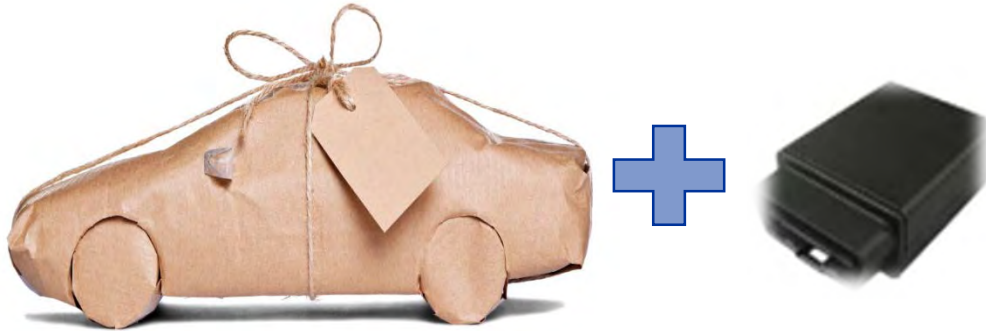


Today and Future: ..and Accelerating at an Exponential Rate

Perception: Analytics evolving **LINEARLY**. Reality: Occurring **EXPONENTIALLY**



Today and Future – Technology Reshaping Every Industry



- Fatigue
- Speeding
- Night Driving
- Traffic Condition
- Drivers DNA

Telematics

Mobile App



Autonomous Driving

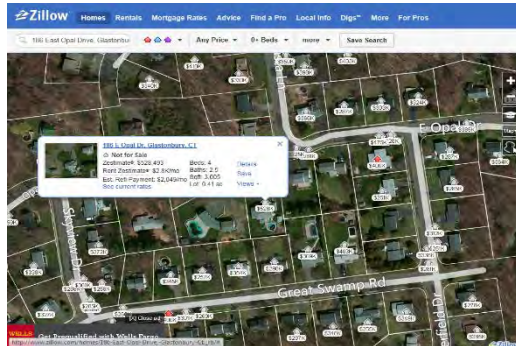
Google's modified Toyota Prius uses an array of sensors to navigate public roads without a human driver. Other components, not shown, include a GPS receiver and an inertial motion sensor.

LiDAR
A rotating sensor on the roof scans more than 200 feet in all directions to generate a precise three-dimensional map of the car's surroundings.

POSITION ESTIMATION
A sensor mounted on the left rear wheel measures small movements inside the car and helps to accurately locate its position on the map.

VIDEO CAMERA
A camera mounted near the rear-view mirror detects traffic lights and helps the car's onboard computers recognize moving obstacles like pedestrians and bicyclists.

RADAR
Prius is equipped with a rotating radar sensor. It's in front and out in the rear, help determine the positions of distant objects.



Today and Future: More Access to Data for Insurance Companies

Google

Public Data

Datasets

Metrics

Any data provider (128)

- Eurostat (10)
- Destatis (7)
- Statistics Iceland (6)
- U.S. Bureau of Labor Statistics (5)
- Central Statistics Office, Ireland (5)

My Datasets

 <http://www.data.gov/>

 Agriculture	 Consumer	 Education	 Energy	 Finance	 Geospatial
 Global Development	 Health	 Jobs & Skills	 Public Safety	 Science & Research	 Weather

 Massachusetts Health Data Consortium				
				



Today and Future – Big Data, More Data, More Modeling



Big Data

Logos for Big Data companies: cloudera, TERADATA, hadoop, software AG, YarcData, EMC², splunk, Hortonworks, data, Bit Yota, Zettaset, IBM, Pivotal, DATASTAX, MAPR, and talend.

Email Marketing

Logos for Email Marketing companies: MailChimp, Constant Contact, LivelIntent, campaigner, STRONGVIEW, Bronto, dotMailer, yesmail, SMART FOCUS, tower@ta, zeta, Stream, Send, Return Path, JangoMail, padirect, pure360, Email on Acid, profusion, emma, acxiom, Campaign Monitor, VerticalResponse, LeadSpend, epsilon, Experian, bluehornet, CalmSea, rapidmail, Movable, Ink, and Customer.io.

Marketing Data

Logos for Marketing Data companies: Experian, epsilon, acxiom, NETPROSPEX, ALLANT, zoominfo, HARTE HANKS, InsideView, D&B, SalesLoft, leadspace, infogroup, informatica, OwnerIQ, salesgenie, LEADS Explorer, DATALINE, datalogix, factual, LiveRamp, AccuData, GNP, VisualDNA, salesforce.com, Freebase, IRI, Lead411, spoke, DATA SIFT, and STRIKE IRON.

Mobile Marketing

Logos for Mobile Marketing companies: airpush, hipcricket, Tapjoy, vibes, SponsorPay, ShopPad, tapad, adelphic, momentfeed, dotMobi, URBAN AIRSHIP, REVMOB, LeadBolt, mojiva, MARCH EX, FLURRY, mobileStorm, millennialmedia, tatango, velti, Trumpia, PlaceIQ, INMOBI, OpenMarket, ePrize, kahuna, waterfall mobile, and VERVE.

Today and Future: A Core Strategic Capability

Increasingly Data Analytics Applications on Every Aspect of Insurance Operations and Customer Service



- Claim Modeling
- Fraud Detection
- Salvage Rate Modeling
- Loss Control Modeling
- Warranty Modeling

- Demand Modeling
- Cross Sale and Upsale Modeling
- Marketing Mix Modeling
- Customer Segmentation and Retention Modeling
- Lifestyle Base Analytics
- Customer Lifetime Value Analytics

- Workforce Analytics
- Workers Safety analytics
- Business Information Analytics
- Competitive Analysis

- Underwriting Modeling
- Pricing Modeling
- Account Modeling
- Premium Audit and Leakage Modeling

Lessons Learned from the P&C Analytics Journey

What Analytics IS NOT

- A Black Box approach by quants only
- Replacement for people
- A shining complex math equation
- A single variable magic bullet
- Actuarial and/or systems projects
- One of the many projects
- Model complexity drives results
- Short live hype
- POC

What Analytics IS

- An approach with transparency and communications
- Tools and capability for underwriters and actuaries
- A wide range of internal and external data is gold
- Relationship among many variables is power
- Business and strategic initiatives
- Senior management support and all hands on deck
- Implementation drives results
- Stay for a long time and will get even bigger and better
- Mature and proven to be impactful

For Life Insurance Industry: Growing Applications for Data Analytics

Growth in Life Insurance Applications for Data Analytics

Fraud Detection:

- Application fraud for non-smoker discounts
- Fabricated death claims discount
- Fake applications for agent rewards

Inforce Management Analytics:

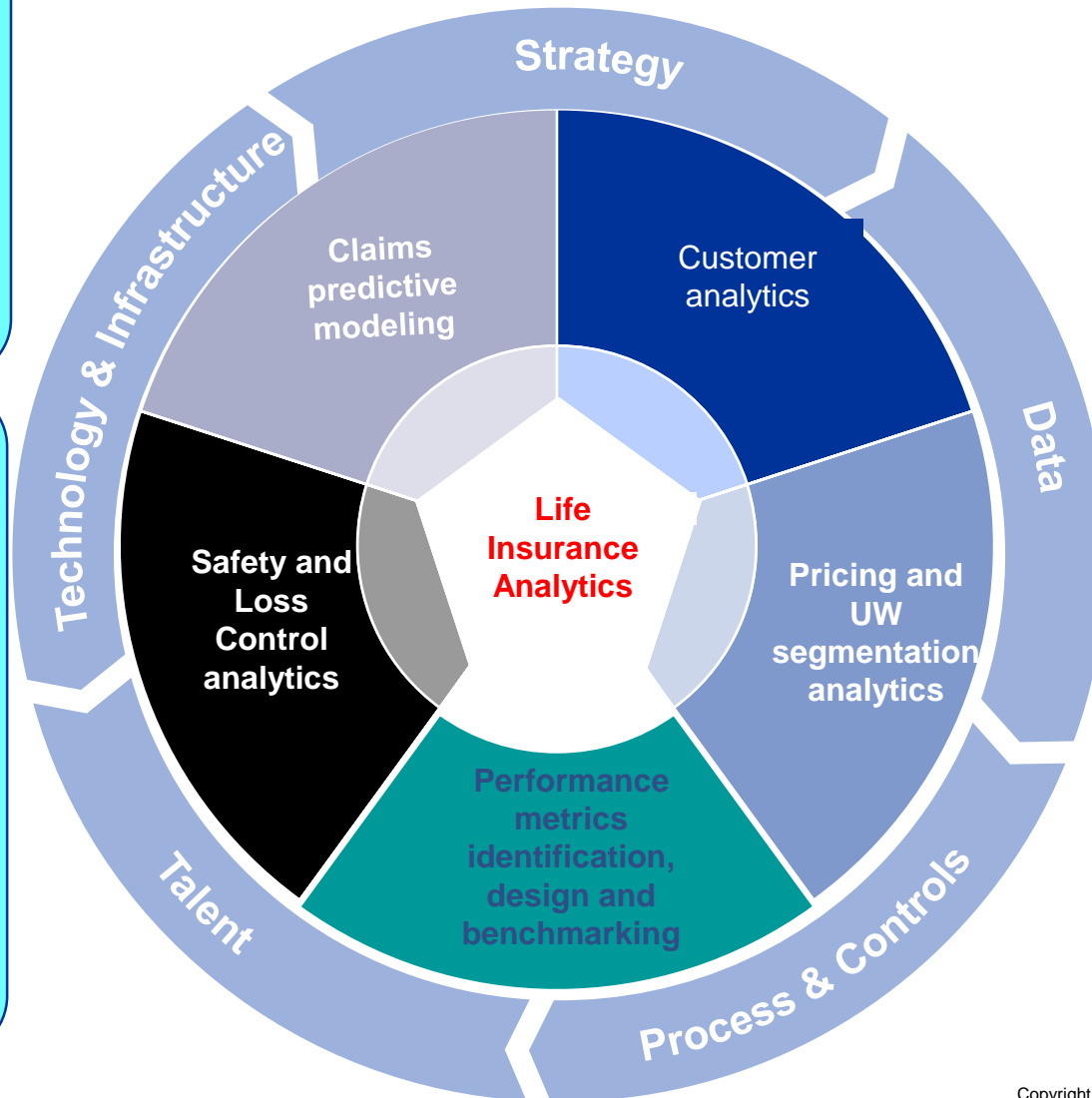
- Retention models to identify insureds with potential high risk of lapse
- Identify cross sale, up-sale opportunity to increase business and retention of existing policyholders.

Group Life Mortality Assessment:

- Large scale modeling on group life insurance mortality experience
- Goal is to develop more accurate pricing tool on exposure rating in addition to experience rating
- Identify additional pricing factors beyond traditional factors

Application Triage Analytics:

- Using external data to identify preferred customers for fast track underwriting
- Significant time and cost saving and more accurately placing policyholders' risk status



Learning and innovation go hand in hand. The arrogance of success is to think that what you did yesterday will be sufficient for tomorrow”

-William Pollard

Q&A