Advancing Your Analytics Capabilities

2013 Casualty Actuarial Society
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Discussion Topics

- Overview

- Emerging Trends in Predictive Analytics

- Developing Sustainable Capabilities

- The Changing Role of an Actuary

- About the Speakers

- What is Predictive Analytics

- Predictive Analytics in P&C Insurance

- Realizing Benefits

We reflect and learn from the past, we live for today, but it is the promise of tomorrow and the unknown associated with it that really intrigues us.

While some future events will always remain unknown, there are certain events in the future that we can do a better job of predicting without having to be fortune teller.
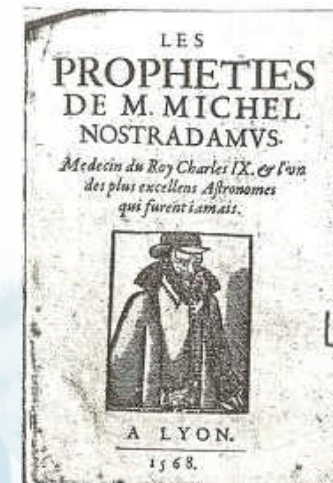
Analyzing large volumes of data using advanced statistical techniques and today's computing power brings us closer to bridging the gap from living for today to knowing what will occur tomorrow.

One of the greatest assets for a company is the data they collect, whether it is about their internal operations or their external customers. For years, companies struggled to determine how best to manage and analyze the vast volumes of data and transform this important asset into a strategic differentiator.

Predictive Analytics, the process by which raw data is transformed in such a manner that relationships in data can be synthesized such that signals in data can be used to predict a future actionable outcome, has transformed the way companies view this critical asset. The insurance industry is one industry that has significantly benefited from the value of predictive analytics. No longer a pure personal lines application, predictive analytics in the insurance industry is being used across the entire insurance life-cycle from distribution, pricing, underwriting, claims and overall risk management.

Predictive Analytics starts with data but ends with a strategic business application. To fully realize the benefits of predictive analytics, organizations must embed analytics insight at the point of decision making and apply them consistently.
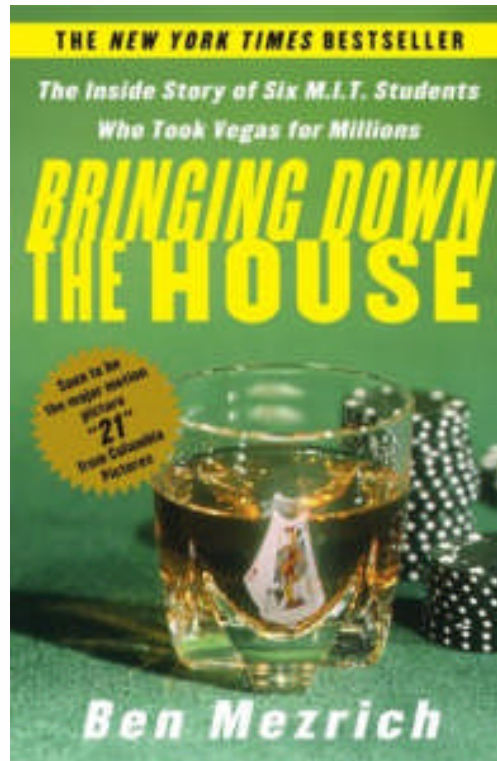
Predictive Analytics is not Data Mining. Data Mining or Knowledge Discovery in Databases (KDD) is the process of analyzing patterns of data and is a component of predicted analytics.

Predictive Analytics is not Business Intelligence. Business Intelligence involves organizing historical and current data in a manner to allow organizations to report on and analyze results in the form of operational metrics. Many experts believe that predictive analytics will one day replace business intelligence as companies look to analyze "what will happen" vs. "what did happen".

THE NEW YORK TIMES BESTSELLER

The Inside Story of Six M.I.T. Students
Who Took Vegas for Millions

BRINGING DOWN THE HOUSE

Soon to be the major motion picture "21" from Columbia Pictures

Ben Mezrich

The story of six MIT students that used a simplified card counting scheme and a group counting approach to take Vegas for millions and resulted in casinos changing how the game of Blackjack is played,

| Card Strategy	2	3	4	5	6	7	8	9	10, J, Q, K	A
Hi-Lo	1	1	1	1	1	0	0	0	−1	−1
Hi-Opt I	0	1	1	1	1	0	0	0	−1	0
Hi-Opt II	1	1	2	2	1	1	0	0	−2	0
KO	1	1	1	1	1	1	0	0	−1	−1
Omega II	1	1	2	2	2	1	0	−1	−2	0
Zen Count	1	1	2	2	2	1	0	0	−2	−1

Contrary to the popular myth, card counters do not need unusual mental abilities in order to count cards because they are not tracking and memorizing specific cards. Instead, card counters assign a point score to each card they see that estimates the value of that card, and then they track only the sum of these values.

What can we learn from the students at MIT?
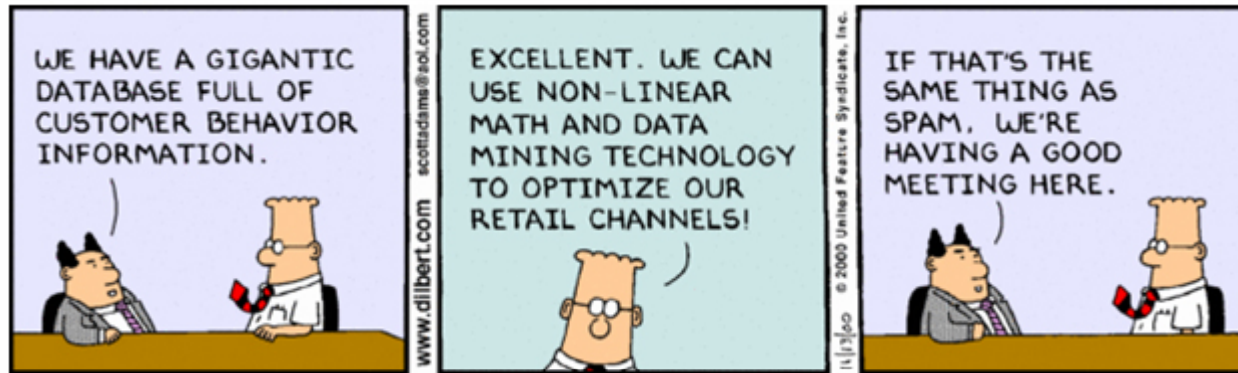
True or False….

- Actuaries can build a perfect rating plan
- A simple model will beat underwriting judgment most of the time
- You don't need to be 100% accurate to have effective predictions
- A regression model built on historical data by itself does not equal business value

People operate….with beliefs and biases. To the extent you can replace them with data, you gain a clear advantage.

- Michael Lewis, author of Moneyball: The Art of Winning an Unfair Game

One of the most common predictive analytics techniques is General Linear Models which represents the equation of a straight line as depicted below:

$$y_i = \beta_1 x_{i1} + \beta_2 x_{i2} + \cdots + \beta_p x_{ip} + \varepsilon_i,$$
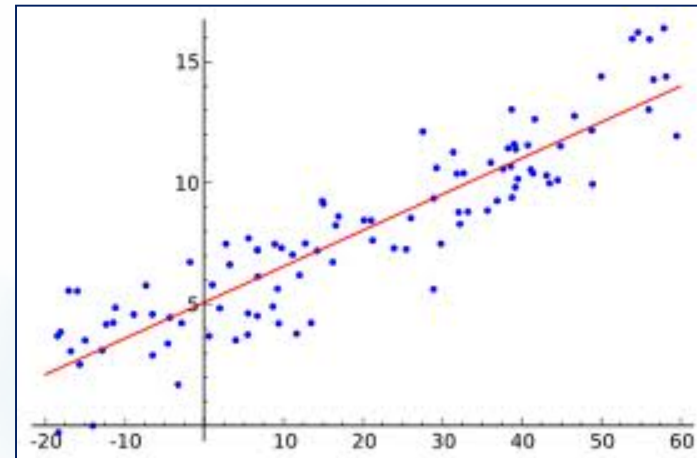
Where:

yi = value that you are trying to predict
Bi = weight or coefficient for the ith variable
Bp = weight or coefficient for the pth variable
Xi = value for the ith variable
Xp = value for the pth variable
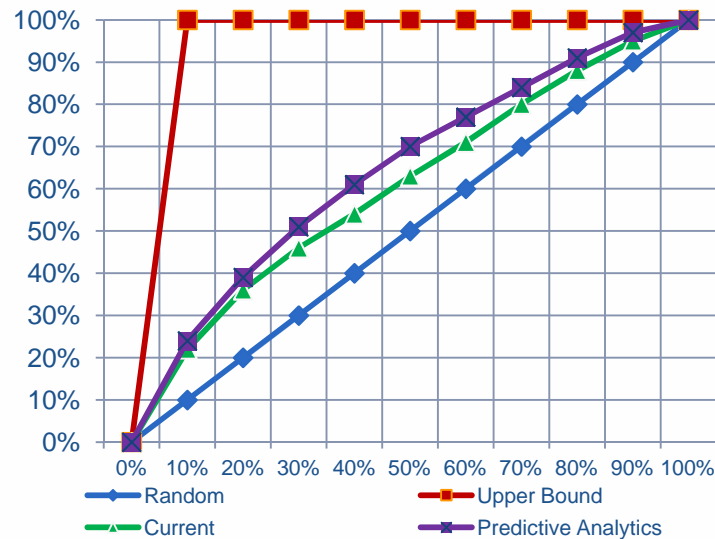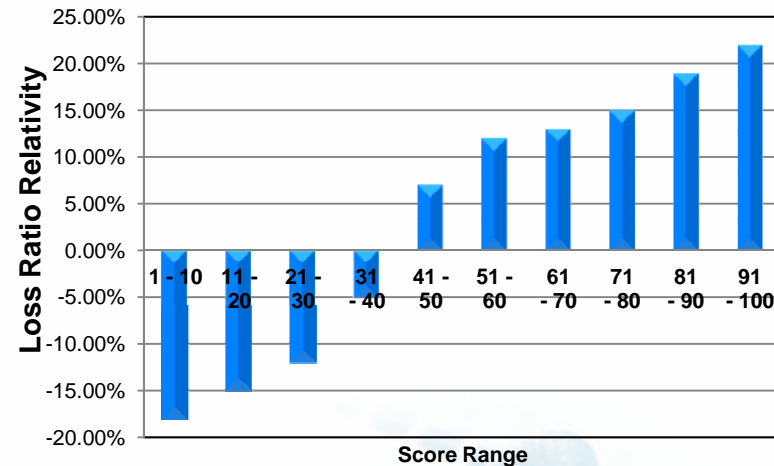Ei = the ith independently distributed normal error

Examining "Predictive Power" – Gains Charts and Lift Curves

Policyholder Predictive Loss Ratio Relativity

- In a purely random process, 10% of the effort would yield 10% of the results (i.e. – 10% of the claims examined would result in 10% of the total claim costs
- Using a non-random approach, or a rules based approach, improves over the pure random process (i.e. in 20% of the claims examined account for 37% of total claim costs).
- Predictive Analytics can go one step further and in the illustrative example above, the same 20% of the claims would represent over 40% of the total claim costs
- The difference between the percentage identified by predictive analytics for each percentage of the population over the random approach is the "Gain"

- A "Lift Curve" is used to measure the degree of segmentation or predictive power or a predictive analytics solution over an average (i.e. Loss Ratio)
- In the absence of predictive analytics, the best one could hope to achieve is to operate at an average
- With predictive analytics and in the case of the example above, predicting future loss ratio, one can segment their entire population on the basis of which risks are expected to perform better or worse than average
- For example, policyholders in the range of 1- 10 are expected to have a 16% lower loss ratio and those in the 91 – 100 are predicted to have a 20% higher loss ratio.
- The difference in relativities between the best and worst segment is the degree of segmentation power or "Lift"

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There are a variety of business applications in the P&C Industry that have been enhanced by predictive analytics

Rating and Pricing	• Rate Plans • Tiers • Company Placement
Underwriting	• Commercial Lines Credits/Debits • Specialty Lines Credits/Debits • Account Loss Ratio Models • Loss Control Triage
Claims	• Fraud • Adjuster Assignment • Claims Duration and Severity • Subrogation Potential
Distribution Channel	• New Agency Appointment • Commission Structure • Geographic Expansion
Customer	• Cross-sell/Up-sell • Retention • Life-time Value • Call Prioritization
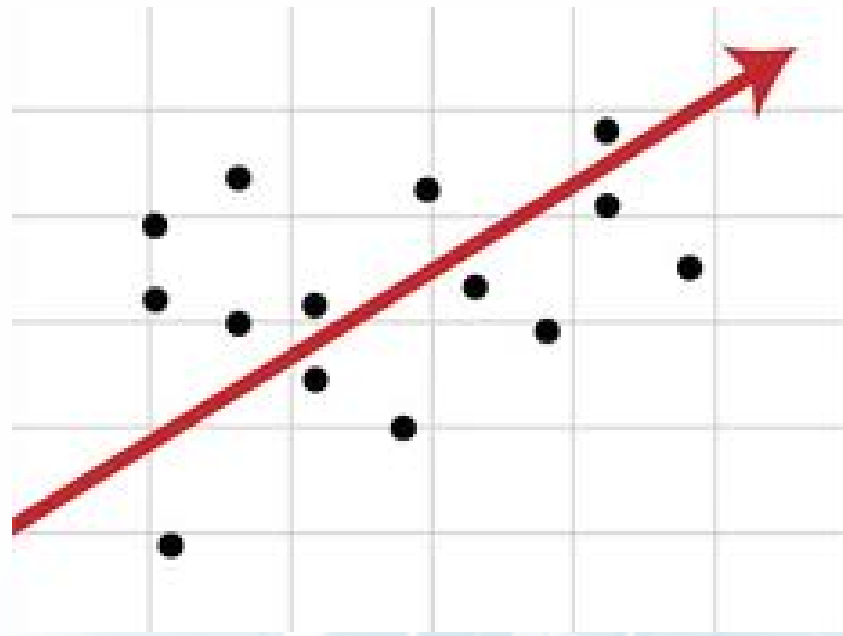
In commercial lines pricing and underwriting, predictive analytics exploits holes in traditional rating plans

Class Code	Classification Description	Base Rate
AGRICULTURE		$ 0.7913
4802	Vegetable Farms - Machine Harvest	$ 0.8117
4803	Orchards	$ 0.7242
4804	Egg and Poultry Farms	$ 1.1672
4805	Nurseries and Shellfish Farms	$ 0.7590
4806	Hand Harvesting: Berries, Nuts, Flowers	$ 0.2345
4808	Diversified Field Crops & Cereal Grains	$ 1.1315
4809	Greenhouses & Mushroom Farms	$ 0.7814
4810	Vegetable Farms - Hand Harvest	$ 0.4078
4811	Hop and Mint Farms	$ 0.8531
4812	Fish and Shellfish Hatcheries	$ 0.9163
4813	Vineyards	$ 0.4526
7301	Dairy Farms	$ 1.0401
7302	Livestock Farms and Stables	$ 2.1624
7307	Tree Farms	$ 1.0671

UW Predictive Model Lift Curve

ABC Dairy Farm – Score 22

Smithwick Dairy – Score 85
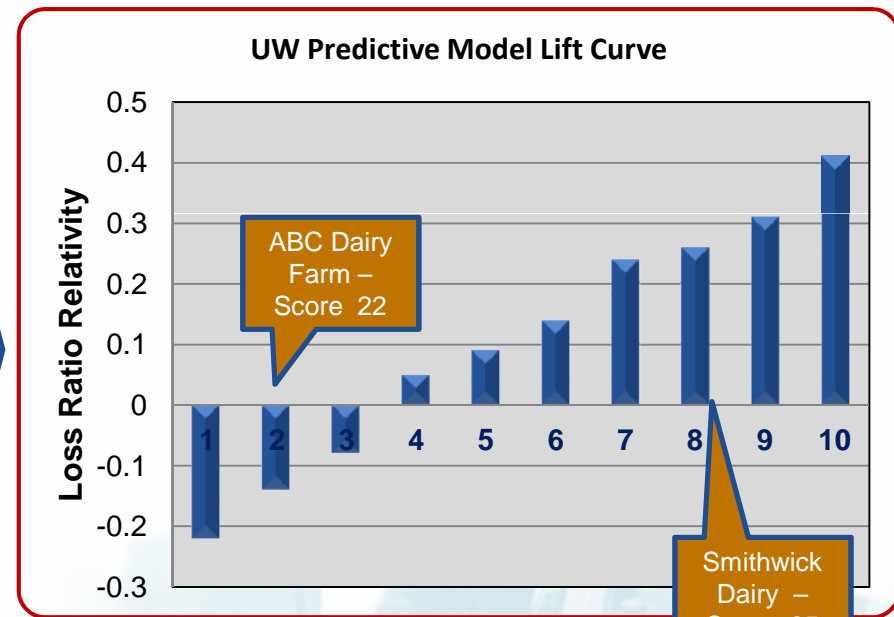
Traditional commercial lines rating is class specific. One of the benefits of predictive analytics is that it can segment within classes of business!

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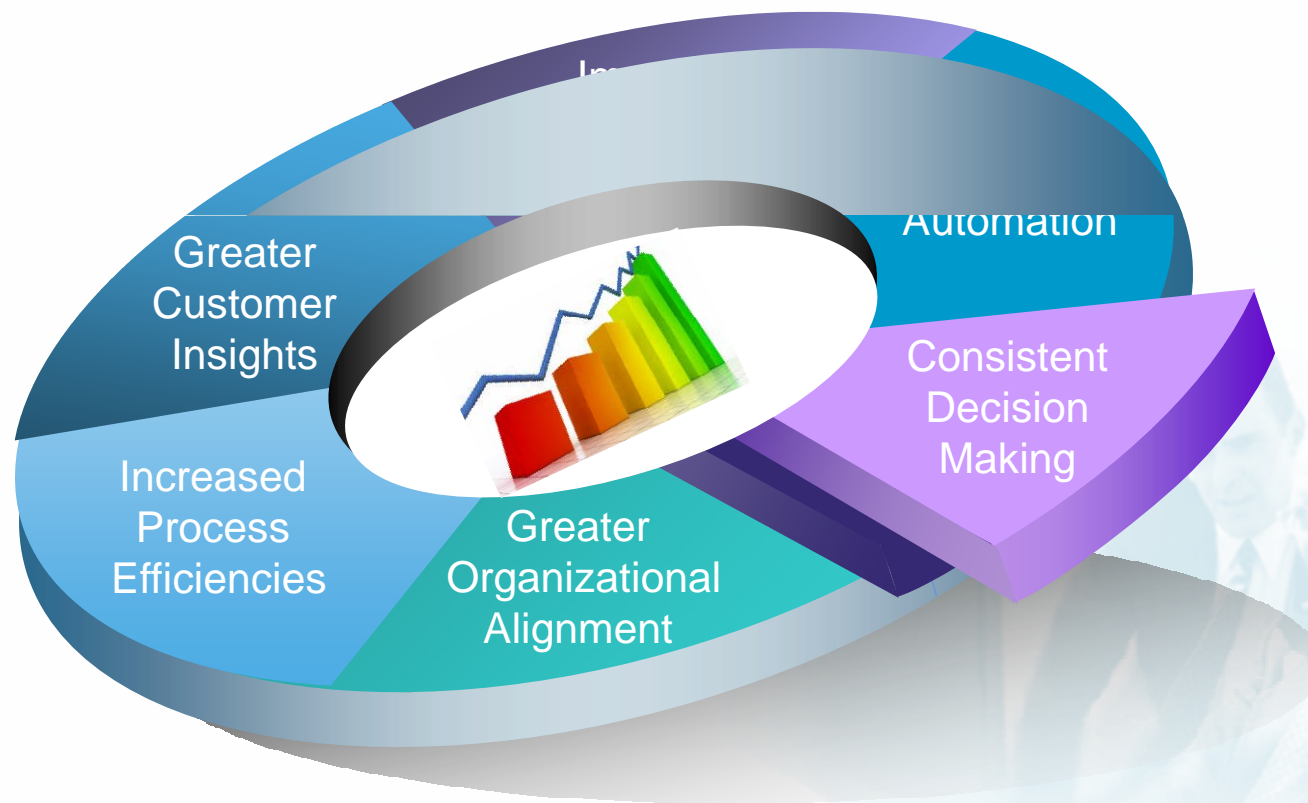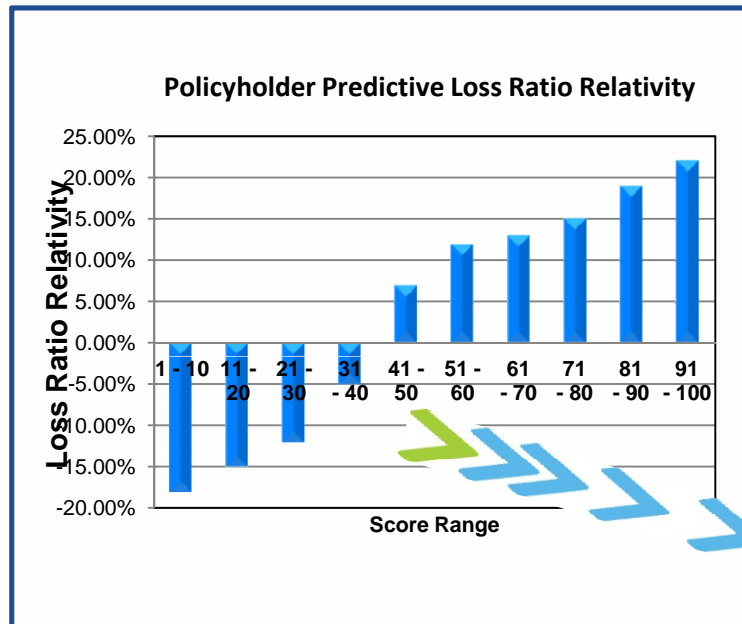**The more refined segmentation on a prospective basis from predictive analytics can be translated into significant benefits over traditional methods when applied consistently at the point of decision making**

A closer look at how benefits are realized – Underwriting Example

Policyholder Predictive Loss Ratio Relativity

Rating Factor / Insured	ABC Goods	JKL Productions	SSS Advisors	ZZZ Advertising
Business Type	Food Distribution	Media Production	Professional Services	Advertising Agency
Years in Business	8	4	35	11
Location	Northeast Florida	Southern Alabama	New York City	Southern California
Base Rate	**$14,000**	**$28,500**	**$28,500**	**$45,200**
Original IRPM	**-15%**	**+10%**	**-5%**	**+20%**
Predictive Analytics Score	**32**	**54**	**18**	**93**

Recommended Rules Based Guidance

- Based on Predictive Analytics Score, Subjective Credit should not exceed 5%
- If Subjective Credit is greater than 10% then Supervisor approval required
- If Subjective Credit is within -5 % to + 3% then minimal underwriter review is required
- Top 4 Predictive Analytics Score Risk Characteristics suggests that an initial Risk Management Survey should be conducted within 6 months of policy inception
- Food Distribution has no better than average prior loss experience but is located in an area that has above average occurrences of D&O claims

Emerging Trends in Predictive Analytics

- Today, Tomorrow and Beyond

- The Impact of Technology

Current State of the Market

Line of Business	State of the Market	Key Considerations
Personal Lines	• Majority of the industry is using credit scoring, MVR and prior claims experience • Applications including pricing, marketing, retention and claims/fraud • Analytics is being used to promote more self-service at the point of sale	• Most carriers are using the same external data so where is the differentiation • Business applications such as cross-selling/up-selling has not caught up to the analytics • Highly regulated line of business thereby limiting the data that can be used
Small Commercial	• Significant growth in the past 5 years in UW and Claims applications • Less regulation allows for greater use of internal and external data • Analytics is being used to drive straight-through processing and automated UW for certain segments	• Not all carriers have enough data to build class or state specific predictive analytics solutions • Gaining buy-in from underwriters and agents to support automated decision making • Ability to incorporate policyholder behaviors into the analytics process (loss control, premium audit, fraud)
Middle Market and Specialty	• Emerging application in the past 3 years especially in professional liability lines • Less regulation allows for greater use of internal and external data • Limited use for straight-through processing	• Risks are not as homogeneous as other lines • Typically low frequency, high severity lines which pose a modeling challenge • Size and quality of data poses technical challenges • Underwriter and agency buy-in is not as common as other lines of business

Emerging Trends in Predictive Analytics Today, Tomorrow and Beyond

Given the sophistication of technology over the decades, availability of information, and structured use – the need for analytics has proved increasingly valuable to the embedded business processes of insurance companies.

Analytics Sophistication

- Middle Market and Specialty UW Models
- Small Commercial UW Models
- Actuarial Analytics Data Mart
- Enterprise Risk Analytics
- Customer Life-time Value
- Rules Based Analytics
- Claims Analytics
- Personal Lines Credit Scoring
- Business Rules Engines
- Class or State UW Small Commercial Models
- Telematics
- Unstructured Data/ Social Media
- Fraud Analytics
- Data Warehousing
- ERM
- Rating Plans
- Relational Databases

Time

Pre-1980 1985 1990 1995 2000 2002 2004 2006 2008 2012 2014+

Legend
- Market Milestone
- Market Development
- Today's Opportunity

What the Future Holds

Insurance carriers are making significant investments in strategy, people, process and technology to not only capitalize on predictive analytics but help shape it

Strategy
- Data will be used as a strategic asset to drive organizational strategies in distribution, marketing, pricing, underwriting and claims
- Predictive Analytics will get more and more visibility among senior levels of the organization
- Organizations will leverage data and predictive analytics to create a "fact based" culture
- There will be a greater integration between predictive analytics and ERM

People
- The role of the Chief Actuary and actuarial resources will change significantly in a predictive analytics organization from analyzing "what has happened" to "determining what will happen"
- Ability to recruit and retain analytics or data resources will be a significant part of talent management
- Innovation will be a key differentiator in how organizations cultivate their analytics talent
- People will shift their mindset from "how we always did it" to "what can we do different today"

Process
- Predictive Analytics will be used to drive greater process automation, efficiency and consistency
- Performance Metrics will be in place to measure the consistency of analytics decisions
- Remote and mobile access to back-office predictive analytics will help drive greater marketing opportunities
- Organizations will take a life-time view of their customers vs. a policy-term or line of business view

Technology
- Legacy systems migrations and SOA integration will further embed predictive analytics at the point of decision making
- Faster and more robust and flexible analytics tools will create opportunities to incorporate unstructured and Big Data into traditional and new analytics applications
- Mobility and mobile technologies will result in advancing predictive analytics at the point-of-sale

Technology is having a significant impact in the way predictive analytics solutions are developed and deployed

- **Lower cost of computing and open source analytics software such as R are making the development of predictive analytics solutions more affordable than ever**

- **Advances in traditional analytics software are creating opportunities to implement new analytics techniques such as simulation, machine learning, unstructured data mining**

- **Legacy systems migration and new enterprise platforms such as Duckcreek and Guidewire are creating greater integration opportunities to drive analytics enabled decisions at the point of sale**

- **Business Rules Management Systems (BRMS) such as Blaze Advisor and Pegasystems are transforming the way analytics enabled decisions are applied consistently across the organization**

- **Business Intelligence Tools are moving from measuring what has happened to what will happen and the "health" of predictive analytics solutions**

- **Greater emphasis on automated data management rules and data processing through analytics data marts are helping organizations reduce their internal analytics development costs and increase speed to market**

A Predictive Analytics Enabled Organization

FTP or Batch External Data

FTP or Batch External Data

ETL

Transactional Systems

Actuarial Analytics Data Mart

Custom Predictive Analytics Solutions

Insurance Analytics Team

Telematics

External Data Provider

Pricing Analytics

UW Analytics

Customer Retention Analytics

Claims and Fraud Analytics

Rating Engine

UW Rules and Analytics

CRM and Member Services

Claims System

Enterprise Service Bus

Field Rep

Agent

Customer

Rating and Pricing

Underwriting

Customer Service / Marketing

Claims

Manual Premium

Rule Engine
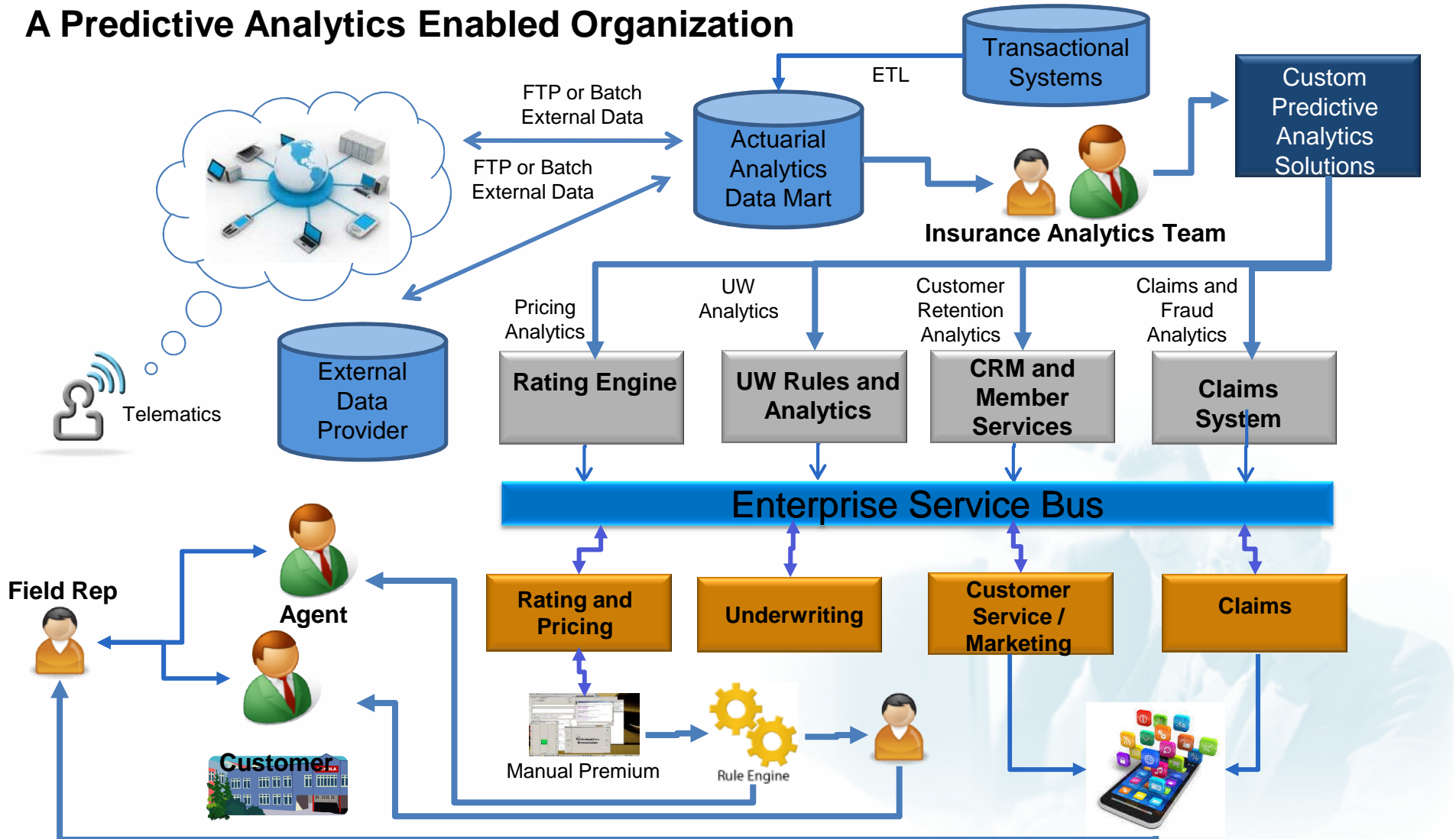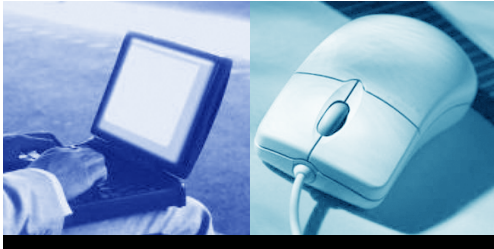
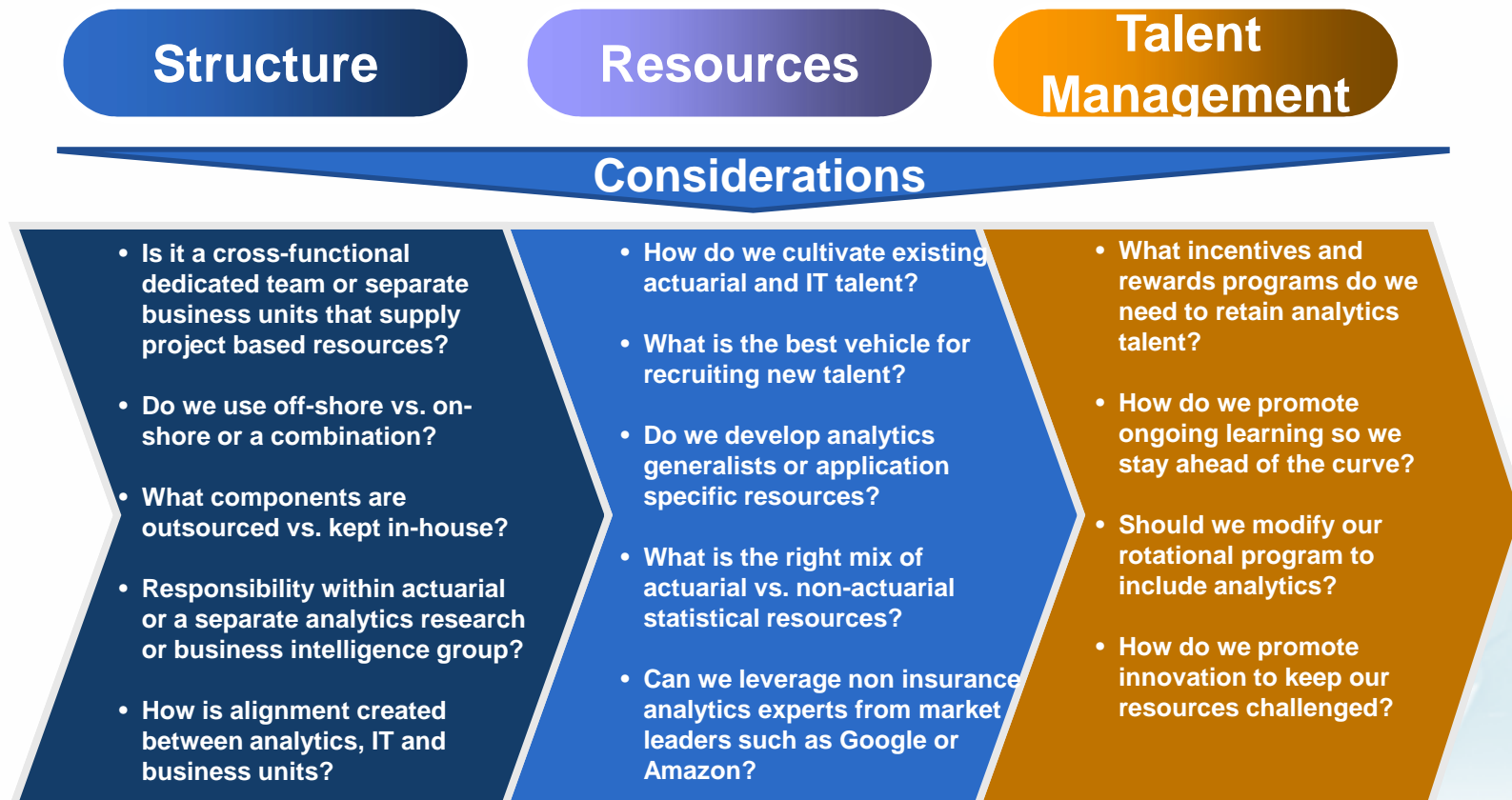# Developing Sustainable Capabilities

- Building Your High Performing Analytics Team

- Defining Your Analytics Strategy

- Executing on Your Analytics Strategy

Developing Sustainable Capabilities
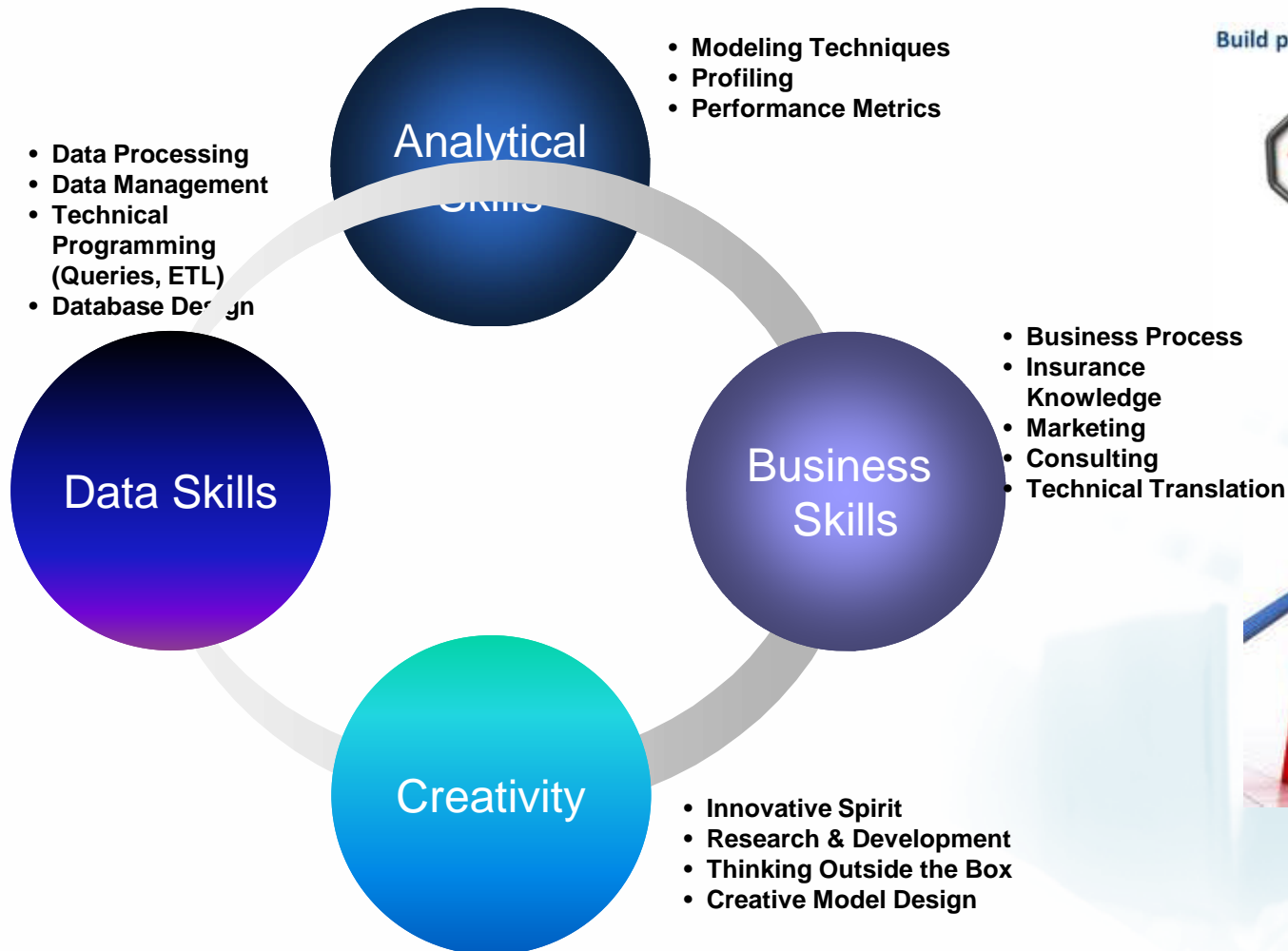## Building A High Performing Analytics Team

Predictive Analytics is a key strategic differentiator for P&C insurance carriers large and small. As a result, building a high performance internal analytics team is the foundation for sustainable analytics capabilities.

Structure | **Resources** | **Talent Management**

Considerations

Structure
- Is it a cross-functional dedicated team or separate business units that supply project based resources?
- Do we use off-shore vs. on-shore or a combination?
- What components are outsourced vs. kept in-house?
- Responsibility within actuarial or a separate analytics research or business intelligence group?
- How is alignment created between analytics, IT and business units?

Resources
- How do we cultivate existing actuarial and IT talent?
- What is the best vehicle for recruiting new talent?
- Do we develop analytics generalists or application specific resources?
- What is the right mix of actuarial vs. non-actuarial statistical resources?
- Can we leverage non insurance analytics experts from market leaders such as Google or Amazon?

Talent Management
- What incentives and rewards programs do we need to retain analytics talent?
- How do we promote ongoing learning so we stay ahead of the curve?
- Should we modify our rotational program to include analytics?
- How do we promote innovation to keep our resources challenged?

What to Look For in Leading Analytics Talent

Analytical Skills

- **Modeling Techniques**
- **Profiling**
- **Performance Metrics**

- **Data Processing**
- **Data Management**
- **Technical Programming (Queries, ETL)**
- **Database Design**

Data Skills

Business Skills

- **Business Process**
- **Insurance Knowledge**
- **Marketing**
- **Consulting**
- **Technical Translation**

Creativity

- **Innovative Spirit**
- **Research & Development**
- **Thinking Outside the Box**
- **Creative Model Design**

Build predictive analytics expertise for business use
Stand **out** from the crowd

Analytics Users

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Developing Sustainable Capabilities
Defining Your Analytics Strategy

Support Strategic Initiatives

- Leaders of the predictive analytics group have to have a seat at the table for all strategic discussions.
- Developing an answer and then looking for the problem it solves is an inefficient use of the company's resources.

Build Organizational Alignment

- Engage broad range of functions in the analytic development work.
- Go for smaller, quicker wins to gain confidence of senior management.
- A culture of fact-based decisions is critical.
- Need to be able to "sell" what the analytics can do for the company
- Implement effective change management to gain buy-in at all levels

Gain Senior Leadership Support

- There should be a clear communication line to senior levels of the organization
- Organizational Leadership plays an important role in communicating the vision of predictive analytics throughout the organization
- Senior Leadership must ensure initiatives are properly funded and priorities are clearly defined

Develop Sound Execution Plan

- Establish the leadership team and program management office that will translate the strategy into execution
- Learn from prior failures and mitigate risk
- In analytics things get "lost in translation", ensure cross-functional project team members "speak each other's language"

If you think predictive analytics is a mathematical exercise, you are missing the strategic value of tilting the business odds in your favor!
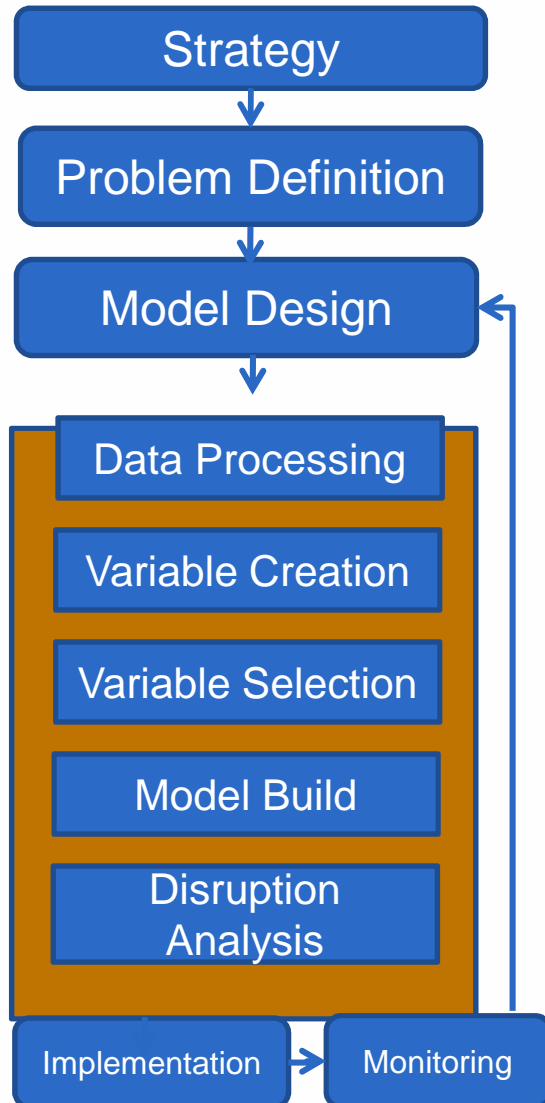
Gaining Organizational Buy-in is Critical

Where is your organization in the Predictive Analytics Commitment Curve?

Level of Acceptance

Time

Internalization
I play a critical role in an predictive analytics enabled organization

Commitment
We will leverage analytics to be better at what we do everyday

Acceptance
I like how this will make my job more efficient

Engagement
I see the benefits this will have for the organization

Understanding
I now know how this will impact my current job function

Awareness
I have a general idea of Predictive Analytics

Contact
Something is about to change

Strategy

↓

Problem Definition

↓

Model Design

↓

Data Processing

Variable Creation

Variable Selection

Model Build

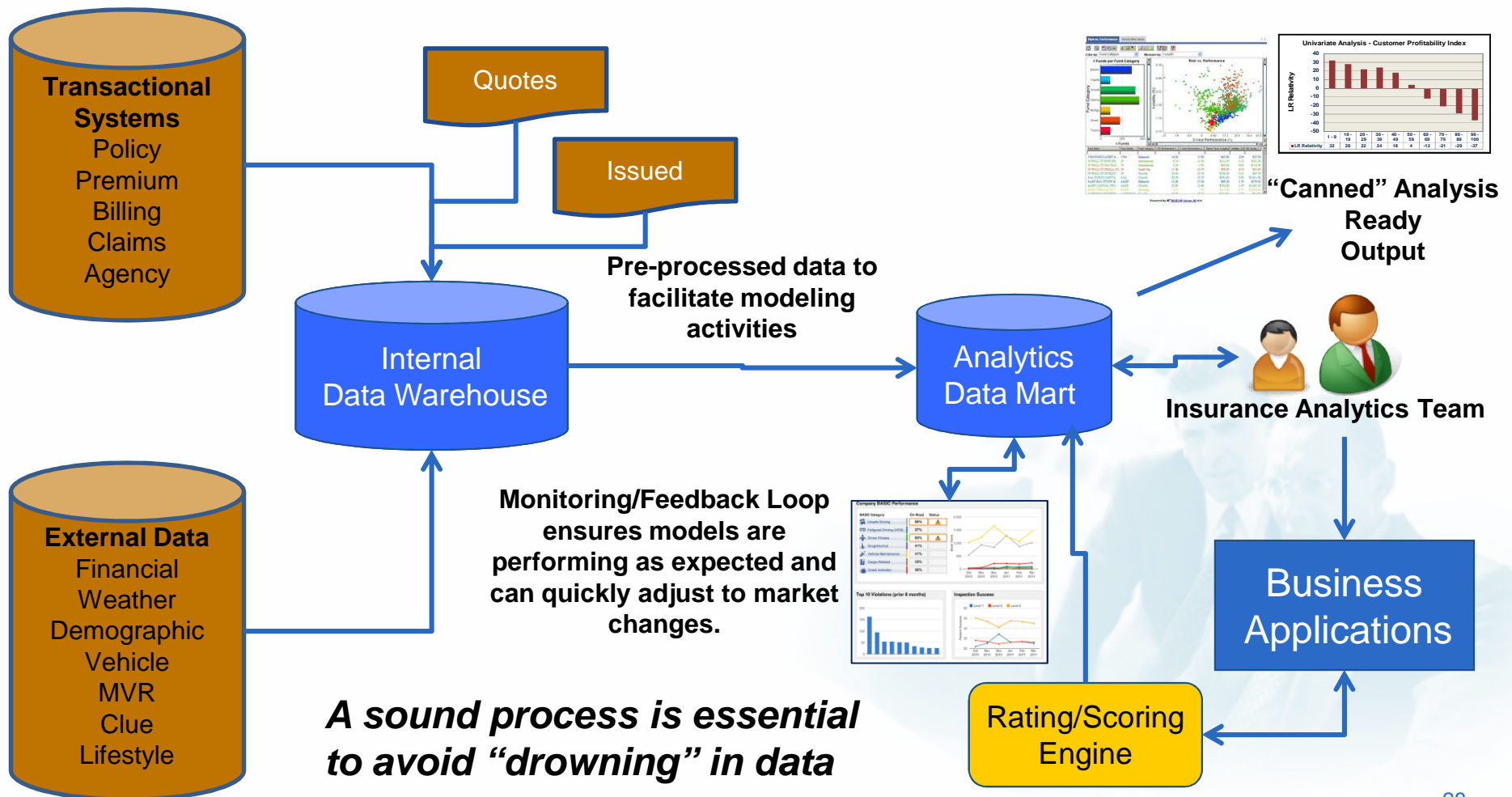**Disruption Analysis**

Implementation → **Monitoring**

- Technology plays a big role translating analytics into action.
  - Data has to be captured with the expectation of being used for analysis.
  - There has to be an easy way to link information across various sources together.
  - Predictive analytics and a robust business rules engine need to work together to ensure consistent application of analytic results.
  - Analytic solutions need to be easily scalable and have to be able to respond quickly to changing market conditions.
- Data Management, Business Intelligence, and Performance Management are critical to measure the impact/effectiveness of predictive analytics.
  - Predictive analytics solutions must be able to be deployed within the business applications (needs to be seamless to the user).
  - Results need to deployed at the point of decision (can't require anyone to go to another system to get an answer and then come back to where they were before).

A successful analytics team needs DATA – as much of it as you can get and structured the right way to speed implementation and monitor performance.

Transactional Systems
Policy
Premium
Billing
Claims
Agency

Quotes

Issued

Pre-processed data to facilitate modeling activities

Internal Data Warehouse

Analytics Data Mart

"Canned" Analysis Ready Output

Insurance Analytics Team

External Data
Financial
Weather
Demographic
Vehicle
MVR
Clue
Lifestyle

Monitoring/Feedback Loop ensures models are performing as expected and can quickly adjust to market changes.

A sound process is essential to avoid "drowning" in data

Rating/Scoring Engine

Business Applications

- How Has the Role Changed

- Some Examples

- A Closer Look

As P&C companies invest more heavily in data warehousing, new front-end systems, and other technologies to streamline processes, the actuary's role will move from a *"What happened?"* mentality to more of a *"What will happen?"* approach.

Traditional Roles (Service Provider)	New Roles (Trusted Advisor)
Operational reporting	Advanced analytics
Looking back	Looking Forward
1-way/2-way cuts	Discover/Simulate/Residual Analysis
Understand	Predict
Analyze	Optimization
Key Performance Indicators (KPI)	Key Performance Predictors (KPP)

In the end, these new advanced analytic capabilities will make actuaries even better business partners than they are today!

Traditional Roles
State/Industry Rate Indications
Use 3-5 yrs of data
Time consuming
Slow to react to changes

General profiling of business
Impacts of rate/pricing changes are only analyzed on historical data.

Class-based analysis

Class/Industry	Appetite
Shoe Stores	"We like them"
Roofers	"Don't want them"

No data driven differences in UW process once they are in the door.

New Roles
Risk-based indications
Can be done on more current data
Reacts quicker to changes in mix.
Analysis takes much less time.

Development of benchmarks
Monitor performance against expectations
Can predict mix changes based on rate/price actions.

Model-based results drive UW rules

Class/Industry	UW Score	UW Process
Shoe Stores	1-60	Automatic issue
	61-90	UW review
	91-100	Do not Submit
Roofers	1-5	Automatic issue
	6-30	UW review
	31-100	Do not Submit

Drives efficiency in UW process and efficiently filters out business with less profit potential.
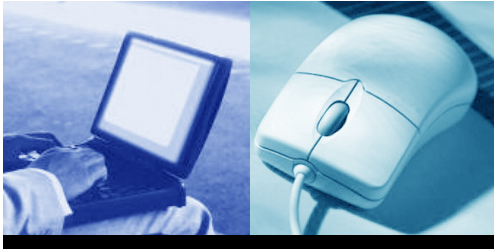
Let's assume Insurance Carrier ABC, a large national carrier of personal, small commercial and middle market lines, wants to differentiate their existing commercial lines analytics solutions by building state specific underwriting predictive analytics solutions.......

- What would the process look like?

- What are some of the key decisions and considerations the analytics team would have to make during requirements, design and development?
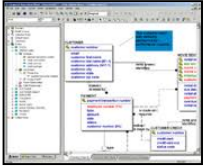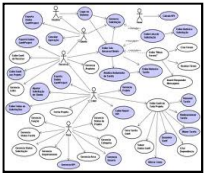
- What would be some common pitfalls to avoid?

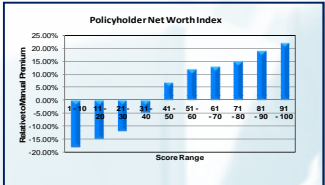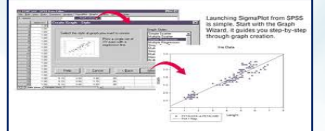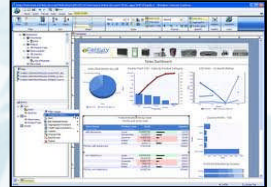| Analytics Requirements and Design	Analytics Development	Analytics Testing and Refinement	Analytics Deployment
• Define business objectives • Gather requirements • Determine external and internal data sources • Define actuarial adjustments and other analytical methodologies • Prepare analytics design including definition of Target Variable • Define business process and change management impact • Define approach for disruption analysis with Countrywide Model	• Extract historical data • Merge historical data with external data • Apply actuarial adjustments • Process data and prepare analytics analysis file • Conduct Independent Variable Analysis and select leading candidate variables based on Countrywide Model and new State specific variables • Based on the pool of leading candidate variables, conduct Multivariate Analysis	• Conduct statistical tests for each potential Multivariate Model • Select the optimal Multivariate Model • Apply the optimal Multivariate Model to the test data set and examine results • "Score" current book or policyholders with optimal Multivariate Model and measure impact • Conduct disruption analysis with Countrywide Model • Modify and adjust the optimal Multivariate Model as needed	• Develop IT implementation plan • Define and develop business rules • Define state specific rules include price tempering • Integrate model output with existing systems • "Redesign business process based on future state definition • Implement formal change management and training

Requirements and Design

Internal Data

External Data

ETL Process

Analytics Analysis File

Policyholder Net Worth Index

Independent Variable Analysis

Multivariate Analysis

Optimal Multivariate Model

Business and IT Deployment

Key Considerations and Decisions for the Analytics Team
During Requirements and Design

- What type of model are we going to build (pure premium vs. loss ratio)?

- Will we build a separate model for new and renewal business or small vs. middle market?

- Will data credibility be an issue if we build separate models?

- How much data do we need for a specific state for the model to be credible?

- How do we treat states without enough data (i.e. group them into all other, exclude them, or run the Countrywide Model, etc.) ?

- What model validation technique will we use (train/test/validate, bootstrapping, cross-validation)?

- Will we include rating factors in the State specific model?

- What will be the approach for rolling out these State specific models (i.e. New business first, renewal with price tempering, etc.)?

- How will the models be deployed (i.e. – company and tier placement, recommended IRPM, etc.)?

Key Considerations and Decisions for the Analytics Team

During Analytics Development

- Will we use all the variables in the Countrywide Model and adjust parameters for State Specific Models?

- What new predictive variables will we examine?

- Will there separate exclusion criteria and loss capping for each State?

- How will we handle parameter sign reversals between a Countrywide and State specific models?

- For territorial variables, how will we determine in-state relativities vs. Countrywide relativities?

- What will be the acceptable level of disruption between the Countrywide Model and State Specific Models for each univariate analyzed?

- What state specific considerations do we need to factor in when developing our pricing and underwriting rules?

- How will the models be deployed (i.e. – company and tier placement, recommended IRPM, etc.)?
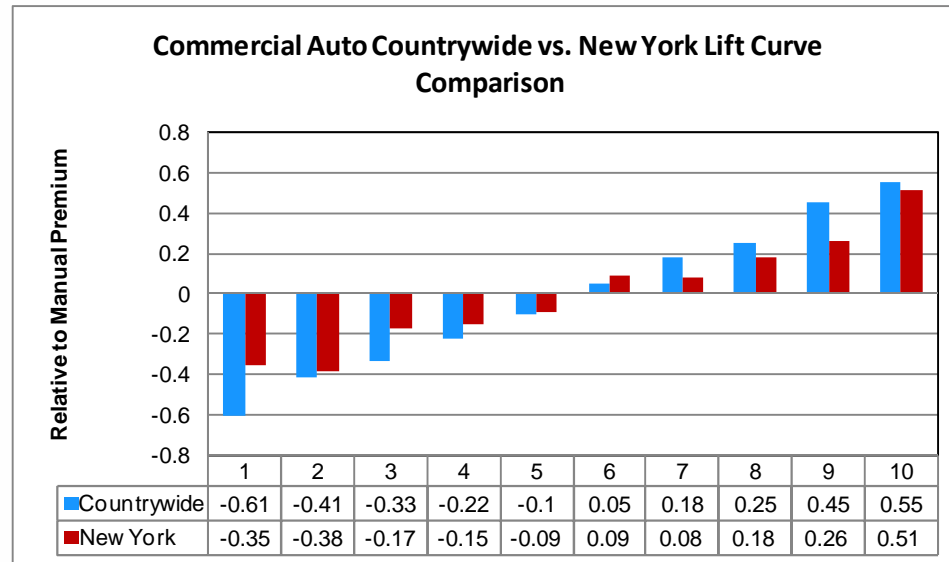
Common Pitfalls to Avoid

- Pay attention to data credibility and avoid thinning out data.
- Realize that disruption will take on a whole new meaning because of existing Countrywide Models.
- Design a flexible rules based implementation approach to support running two models potentially for a given state or running different models for different states.
- There will be overlap in variables between the Countrywide and State specific models but they should not be identical. Otherwise you could have just calibrated your Countrywide Models on individual State data.
- Rules to support price tempering will be essential to avoid market disruption.
- Territorial variables and other model design considerations such as capping large losses, etc. should be state specific.

Commercial Auto Countrywide vs. New York Lift Curve Comparison

Relative to Manual Premium

	1	2	3	4	5	6	7	8	9	10
Countrywide	-0.61	-0.41	-0.33	-0.22	-0.1	0.05	0.18	0.25	0.45	0.55
New York	-0.35	-0.38	-0.17	-0.15	-0.09	0.09	0.08	0.18	0.26	0.51

Questions?

About the Speakers

Eric Besman – eric.besman@thehartford.com

Eric is the Commercial Lines lead of the Applied Research group of the Hartford overseeing predictive analytics for Small Commercial, Middle Market, and Group Benefits. He has a B.S. in Actuarial Science from the University of Illinois - Urbana Champaign, is a fellow of the Casualty Actuarial Society and has been at the Hartford for his entire 27 year career - the last six in Applied Research.

Eric's previous roles in the group have been the lead of Commercial Data & Analytic Support and lead of Performance Analytics for both Personal and Commercial lines. Prior to his time in Applied Research Eric has spent time in Small Commercial product development, Middle Market Industry Practices, and leading the actuarial support of commercial lines of business, bond, and agriculture.

Eric also holds a patent for "System and Method for Using Interrelated Computerized Predictive Models". In his spare time he enjoys travel, golfing and biking on mostly level surfaces.

Mo Masud – mo.masud@us.pwc.com

Mo is a Managing Director with PricewaterhouseCoopers, LLP (PwC) and leads predictive analytics for PwC's Actuarial and Insurance Management Solutions (AIMS) group. He brings an invaluable blend of technology, strategy, process and statistical capabilities to help clients execute on analytics. He has over fifteen years of relevant experience serving clients in broad industries including healthcare, financial services, commercial P&C, medical malpractice and life insurance. His areas of expertise include: technical and business implementation of predictive analytics, data warehousing and business intelligence, predictive analytics enabled business strategies, enterprise risk management and risk analytics, and business rules management systems.

He is widely regarded as a proven thought leader in the field of predictive analytics for the insurance industry and has written numerous articles and has spoken at numerous industry conferences. Prior to joining PwC, Mo held a leadership position s at Deloitte Consulting in their Actuarial, Risk and Analytics practice and at Accenture in their Risk Management practice. risk management capabilities in the insurance space.

Mo credentials include a B.S. in Information Systems and an M.B.A from Rensselaer Polytechnic Institute (RPI).