Advanced Analytics

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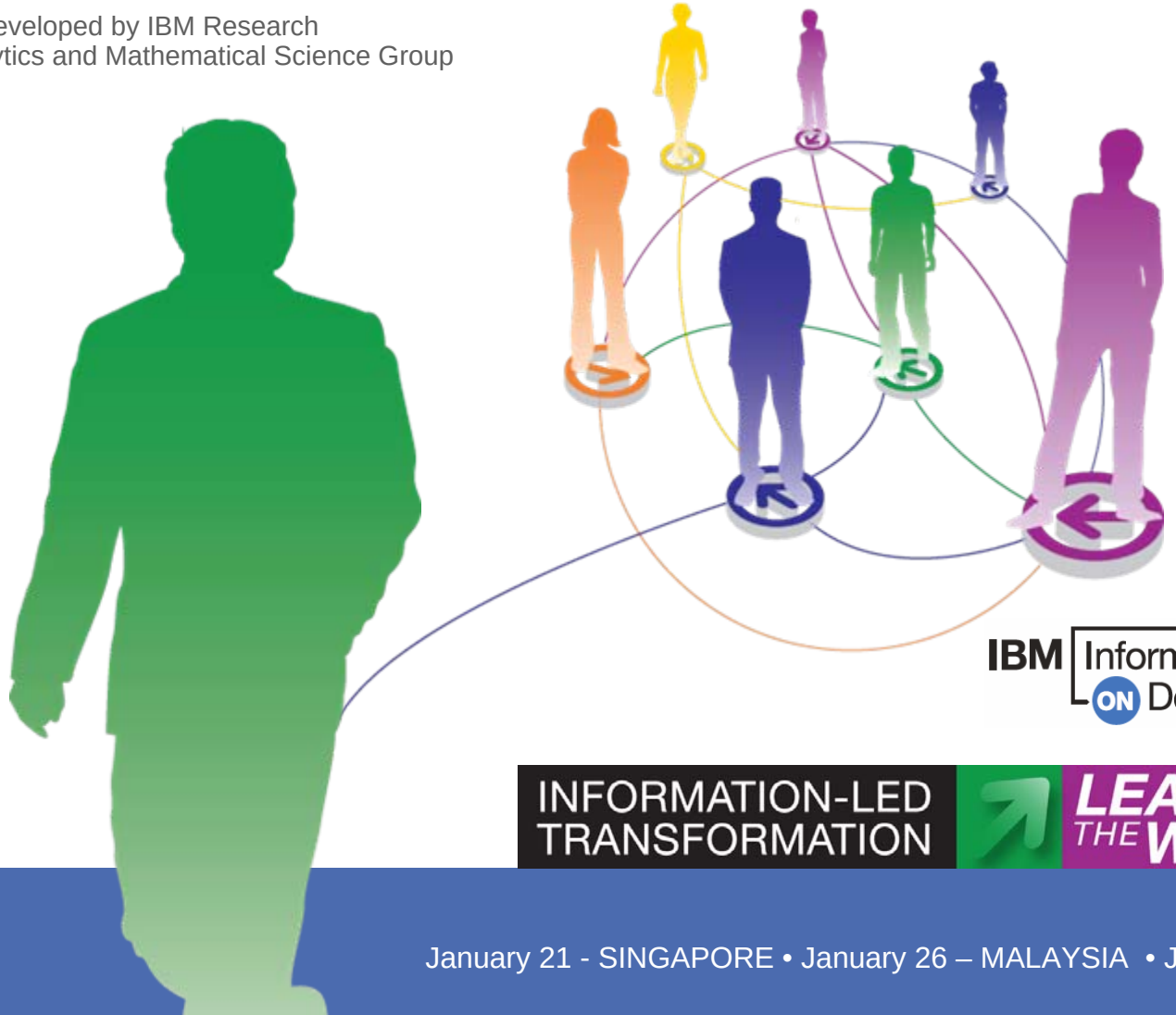
Presentation developed by IBM Research
Business Analytics and Mathematical Science Group



IBM Information On Demand 2010

INFORMATION-LED TRANSFORMATION LEAD THE WAY

January 21 - SINGAPORE • January 26 – MALAYSIA • January 28 - THAILAND

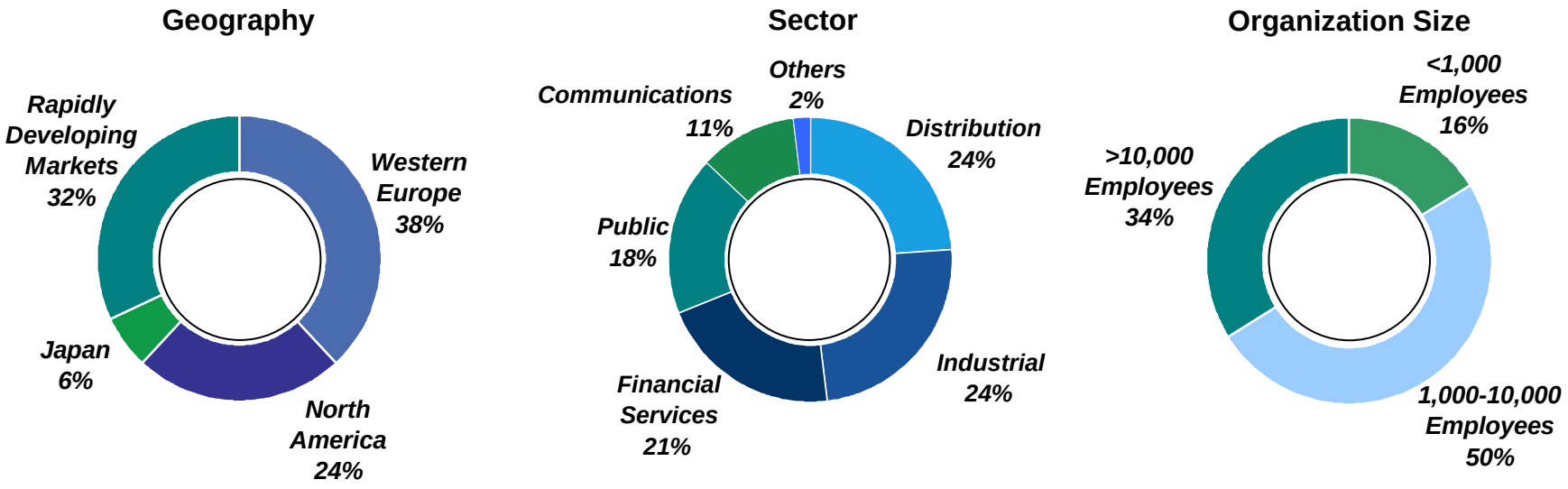
Agenda

- Introduction
- Overview of Advanced Analytics
- The Importance of Advanced Analytics Today
- IBM's Approach
  - Healthcare
  - Supply Chain
- Research Frontiers

IBM Institute for Business Value

In the largest known sample of face-to-face interviews, we spoke with over 2,500 CIOs to understand their goals and challenges

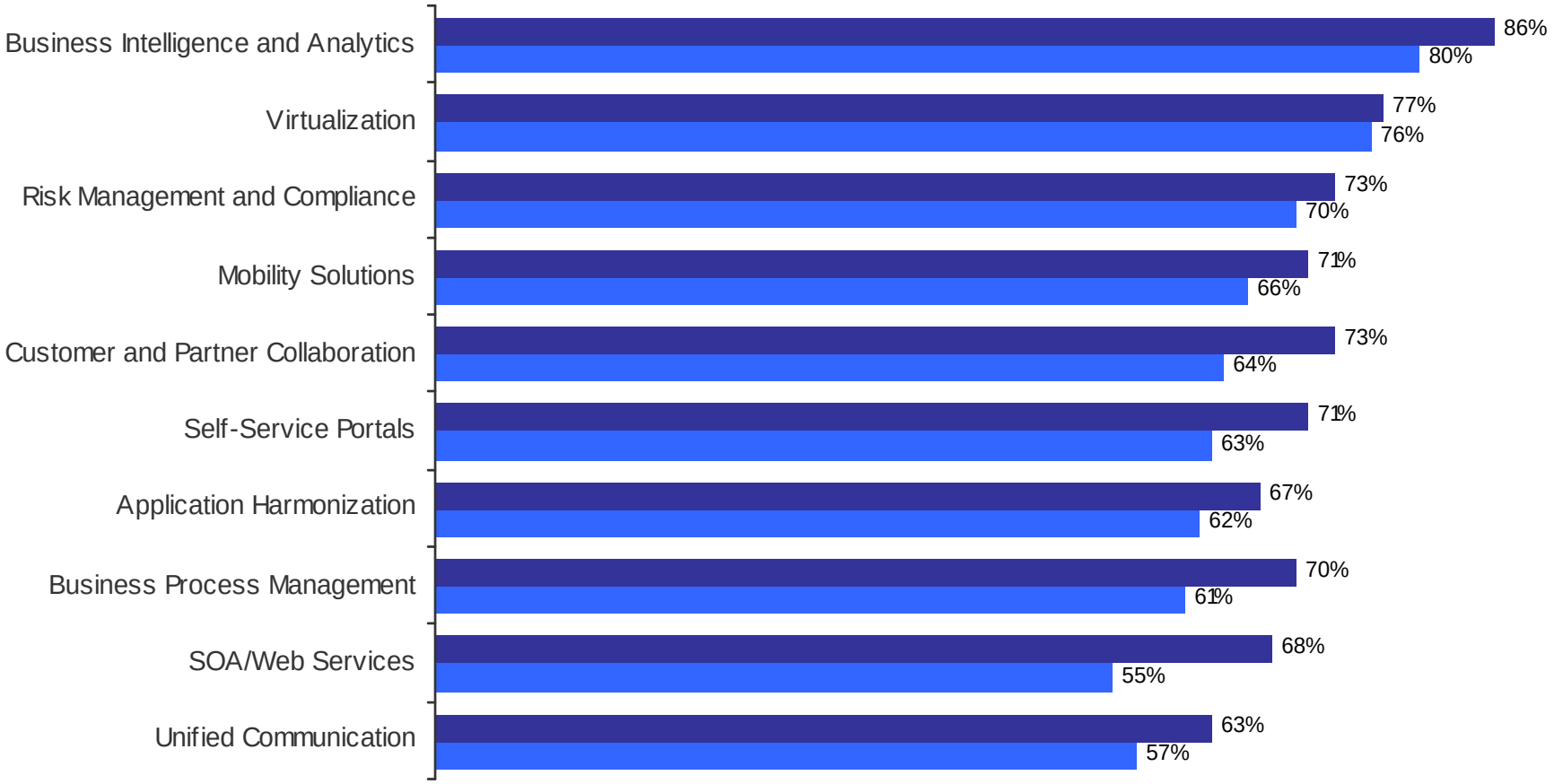
The Study represents different-sized organizations in 78 countries and 19 industries



Our analysis used 2004-2007 Profit before Tax (PBT) growth, relative to peers in their industries, to associate organizations with one of three growth levels: High, Medium or Low. For organizations where this information was not available, we used statistical correlation to assign levels, based on closest overall similarity of answers.

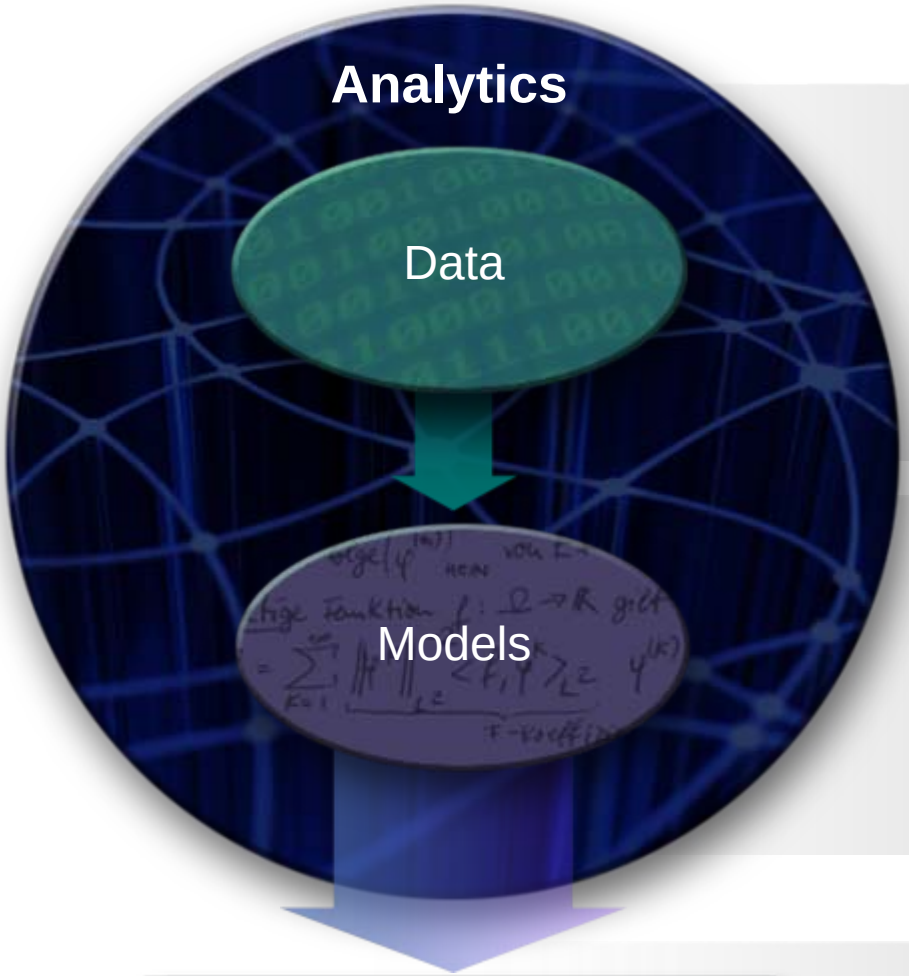
In this presentation, we primarily refer to CIOs who work in organizations with high PBT growth as “High-growth CIOs” and to those working in organizations with low PBT growth as “Low-growth CIOs.”

Ten most important visionary plan elements based on study



Advanced Analytics

is the use of data and models to provide insight to guide decisions

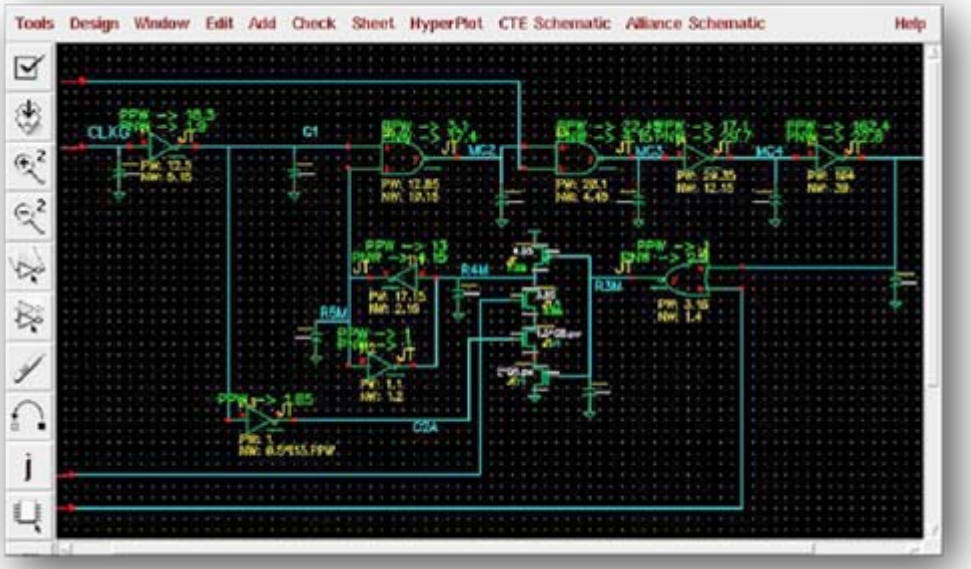


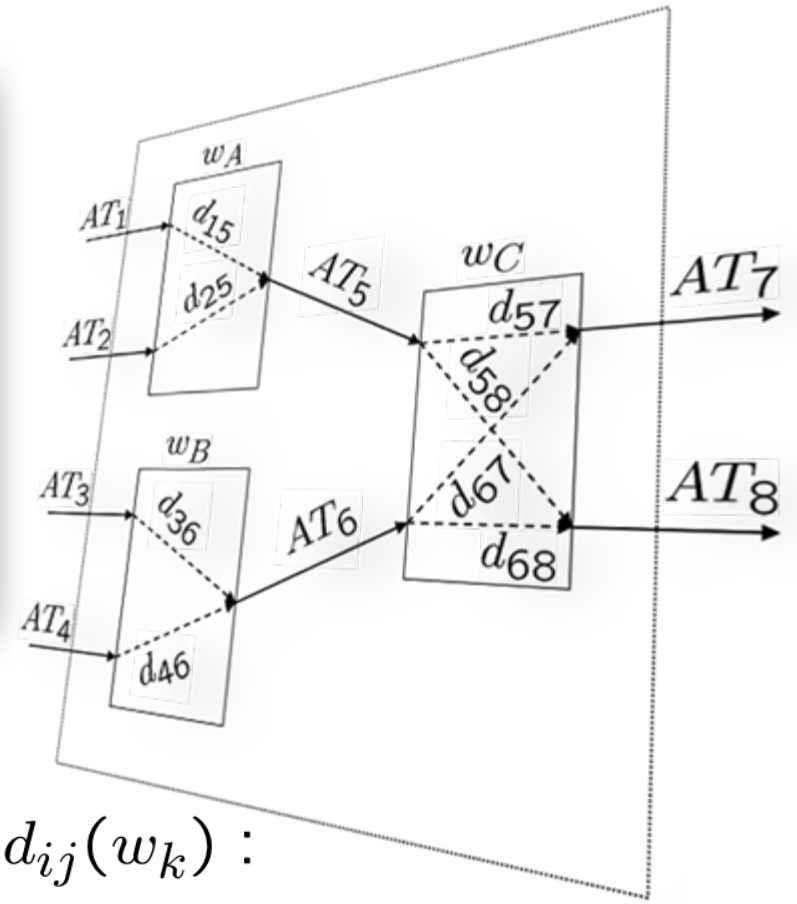
Data sources:
Business automation
Instrumentation
Sensors
Web 2.0
Expert knowledge
“real world physics”

Model:
a mathematical or algorithmic representation of reality intended to explain or predict some aspect of it

Decision executed automatically or by people

Analytic Models Have Been in Use for Decades in Engineering



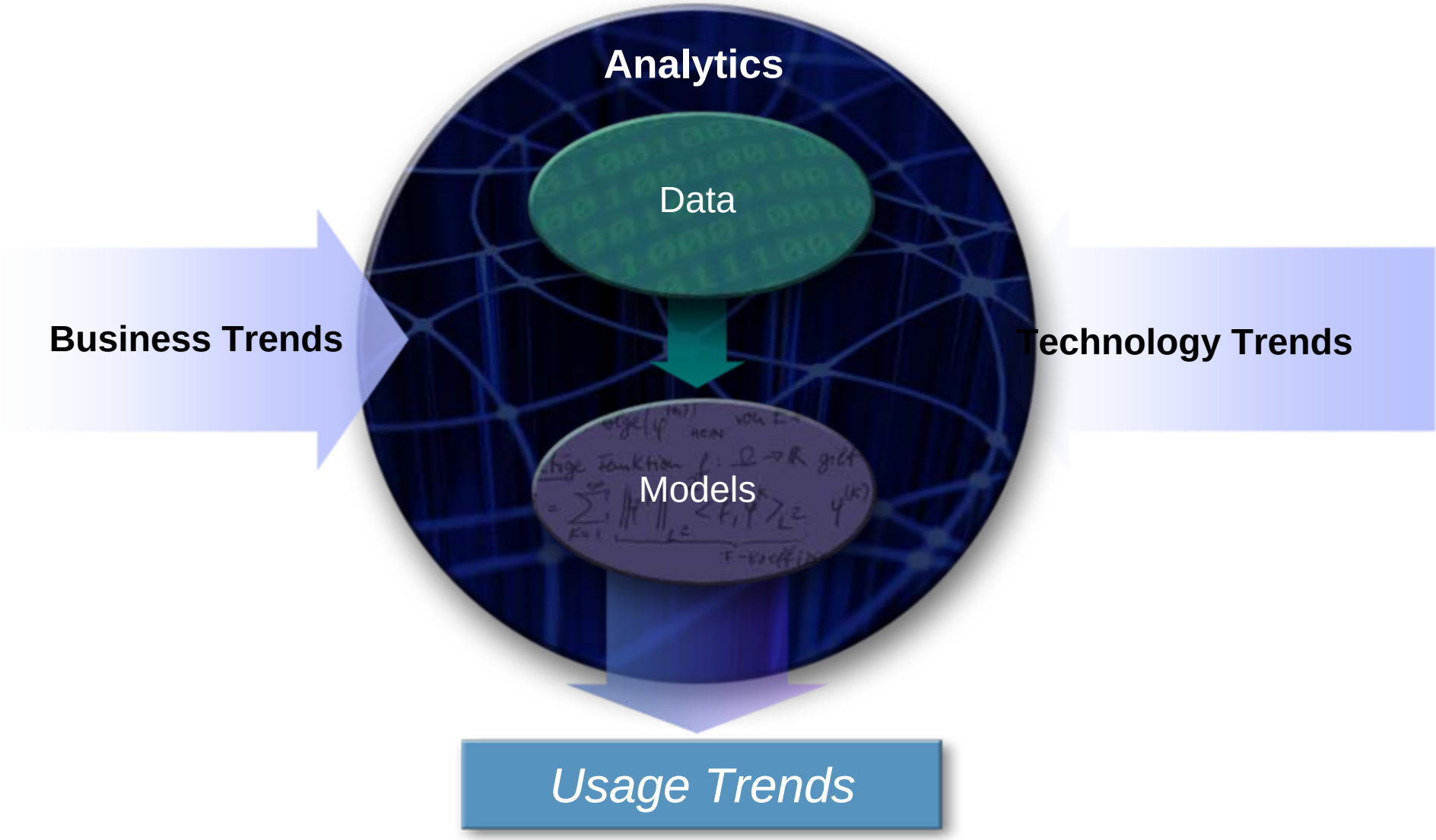


$$\min_{w_k} \quad \max\{AT_i : i \in PO\}$$

$$s.t. \quad AT_j = \max\{AT_i + d_{ij}(w_k) : j \in \text{input}(i)\}$$

$$w_k^L \leq w_k \leq w_k^U$$

Why Are Advanced Analytics Important Now?



Instances of Advanced Analytics are becoming Mainstream

- Digital Maps
- User interface
- Robust Algorithm
- Sufficient computation power

Advanced Analytics Provide Competitive Advantage

Sales Analytics for IBM increases revenue by over $1B

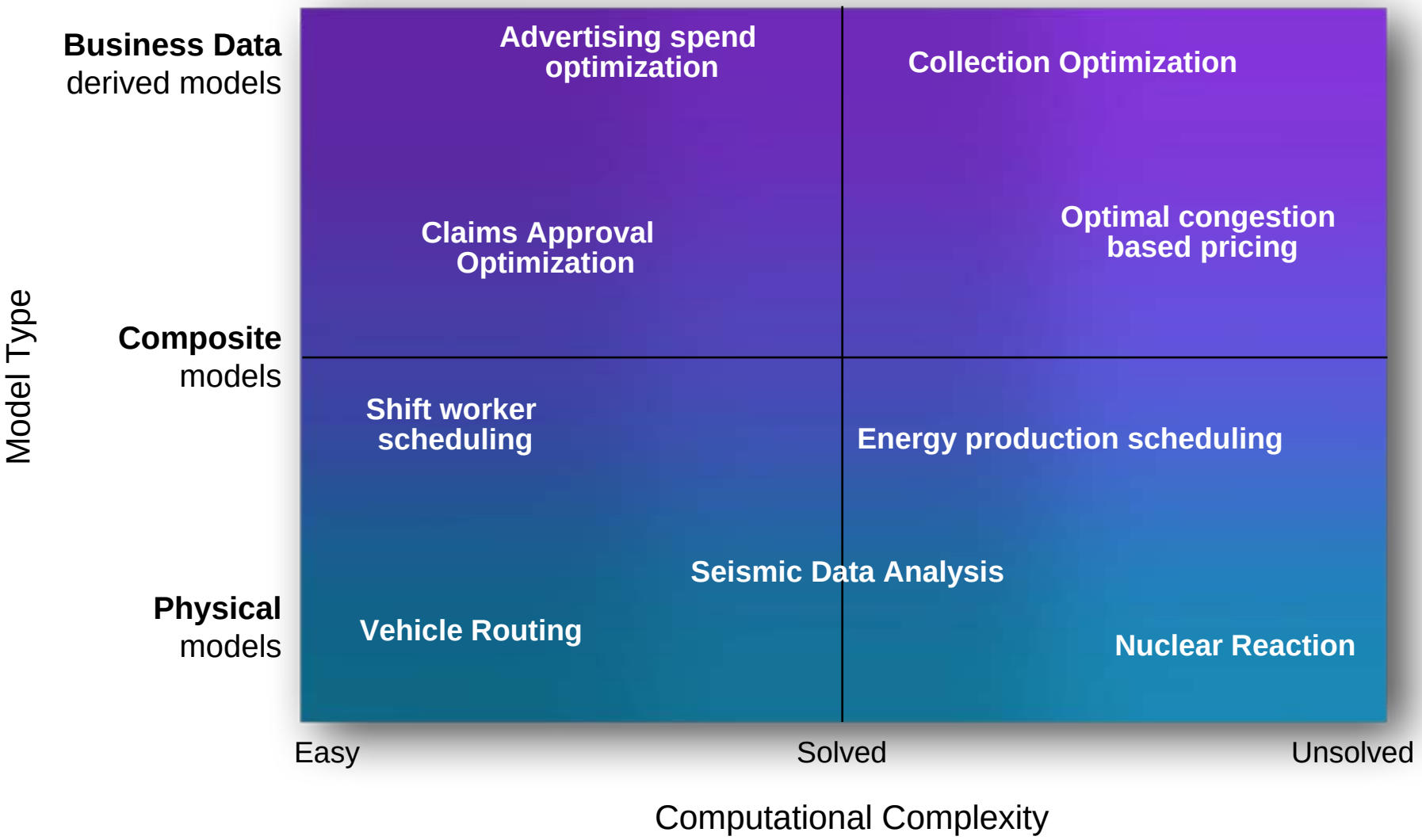
Claims analytics saved SSA over $2 billion and reduced the average approval time by 70 days

Customer Relationship Analytics for MTN reduces customer churn

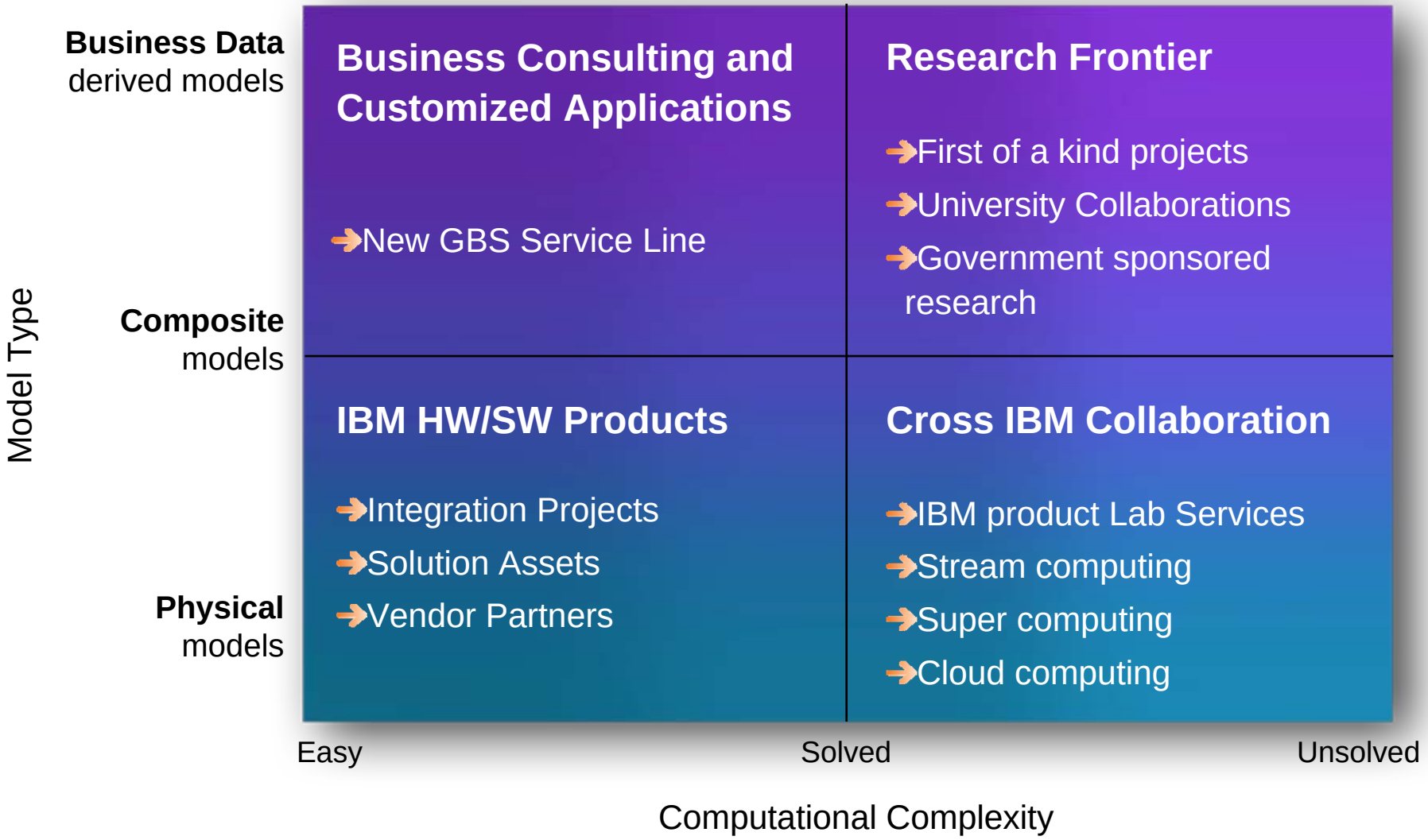
Collection Optimization will increase NY revenue by $100M over 3 years

Optimized generation saves Red Eléctrica de España €50,000 per day

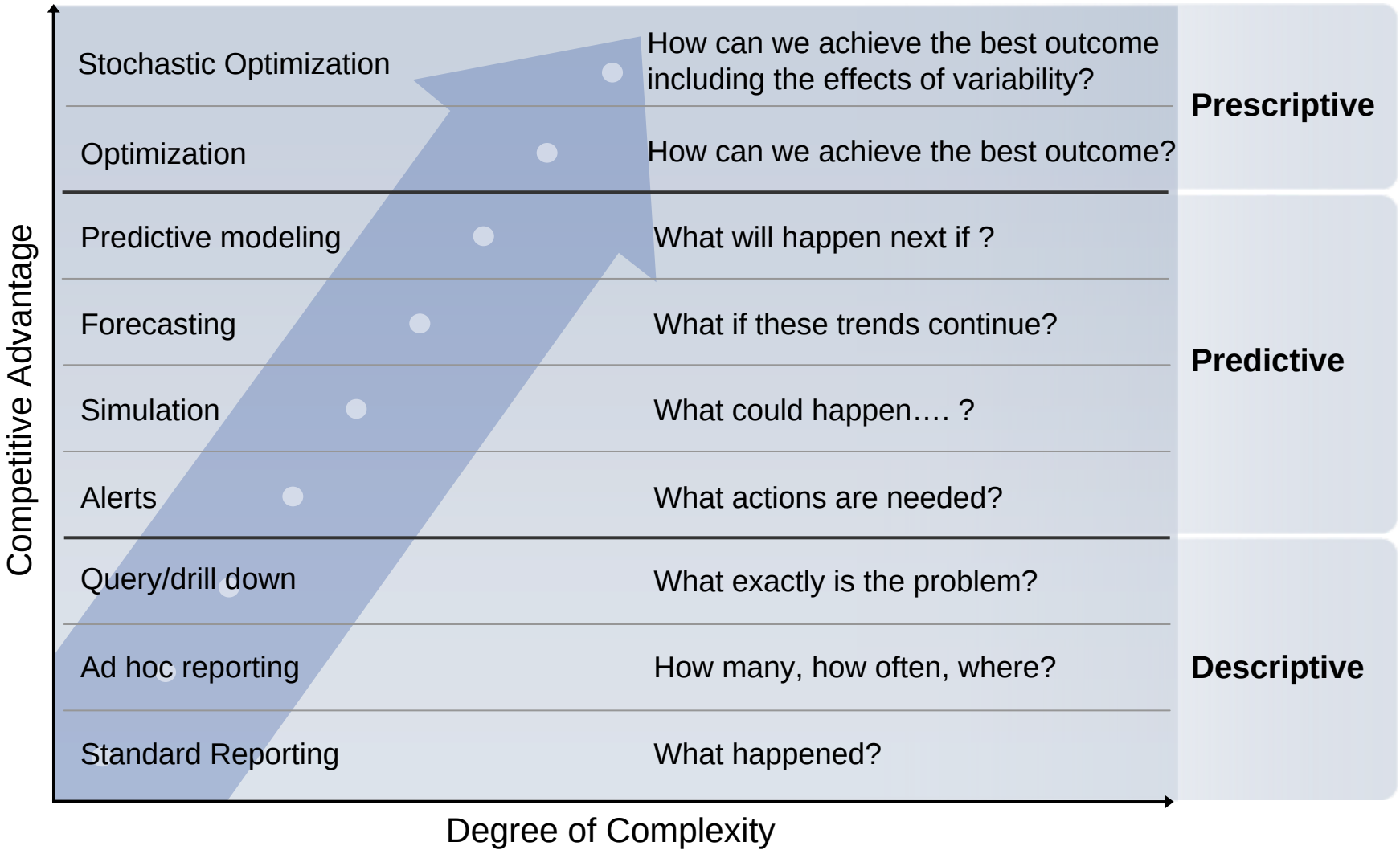
A Quick and Easy Analytics Framework



IBM Approach

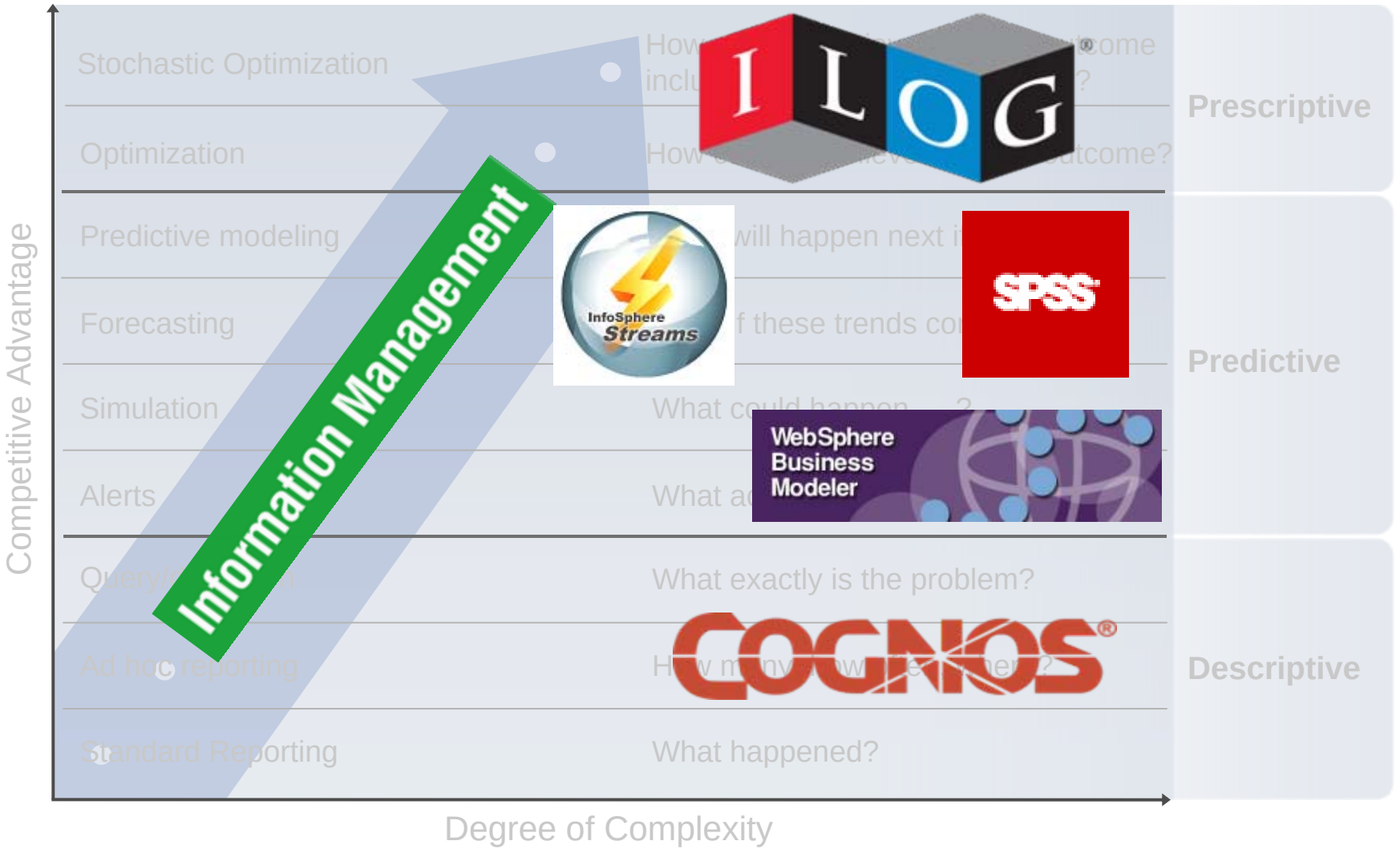


Evolution of Analytics Usage



Based on: Competing on Analytics, Davenport and Harris, 2007

Analytics Landscape at IBM



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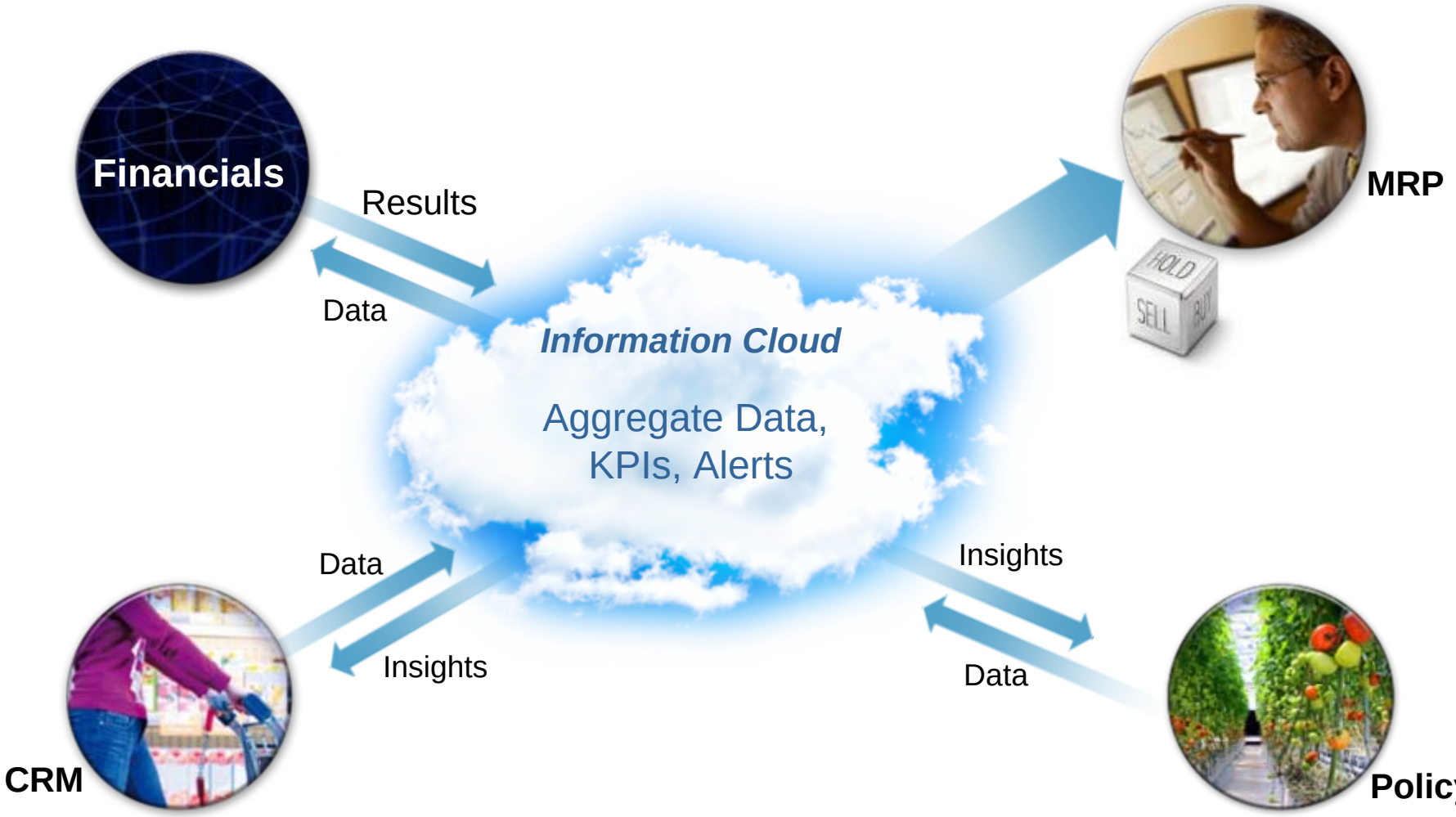
The Next Generation of Enterprise Analytics are aimed at achieving Global Optima irrespective of local maxima

Requires Cross Enterprise Data Aggregation



Healthcare Analytics: Selected Activities and Opportunities

Clinical

EuResists improves prediction of patient response to therapy to 76%

Timely alerts prevent sepsis

KAISER PERMANENTE®

Mining huge collection of treatment and diagnosis data

Opportunities:

Comparative Effectiveness Research,
Detecting drug interactions,
Prognosis Prediction

Operational

Fraud and Abuse Management reduces improper payments by 40%.

Opportunities:

Forecasting
Workforce management

Scheduling

Policy/Strategy

Public health modeling

Opportunities:

Outcome-based reimbursement
Policy analysis

New Analytics Workload Optimized Systems – InfoSphere Smart Analytic Systems

Custom Solutions

IBM Servers, Storage, Software and Services

A wide ranging portfolio for assembling a customized Analytics environment.

Analytics solutions for any client need

IBM Smart Analytics System

Optimized Analytics Solutions

Powerful and flexible system with a growing spectrum of analytics capabilities to simplify deployment, optimize performance and.. speed better business results..

Fast, Flexible, Affordable

InfoSphere Balanced Warehouse with Solid State Disk storage

Optimized 1.8TB Datamart

...

IBM Smart Analytics Optimizer

Technology Preview

Optimize existing Data systems

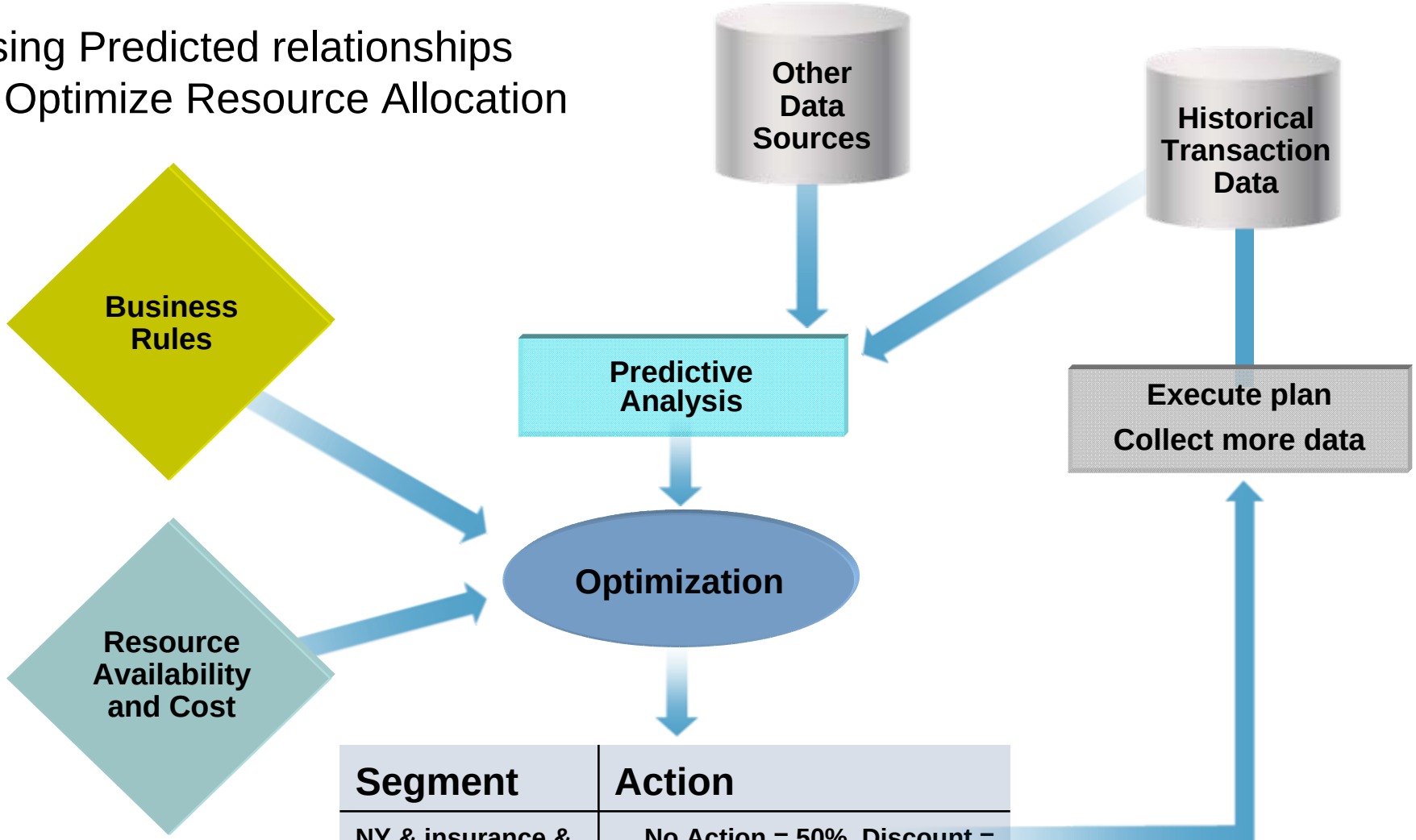
Integrates into your existing environment to optimize analytic query performance, without replicating data across the enterprise.

Technology preview on System z

Analytics workload optimized systems

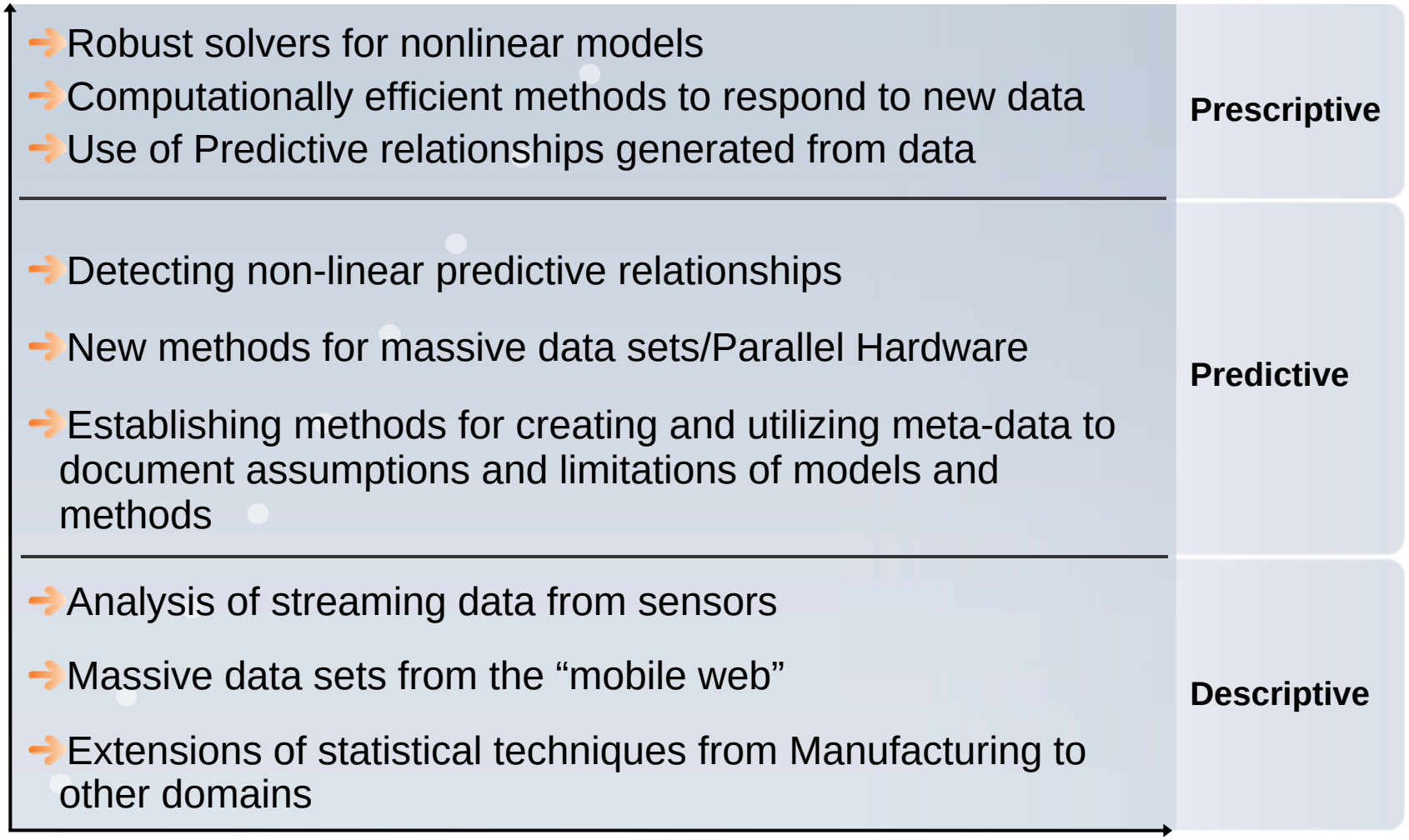
Best Practices: Analytics as 'Learning' Systems

Using Predicted relationships
to Optimize Resource Allocation

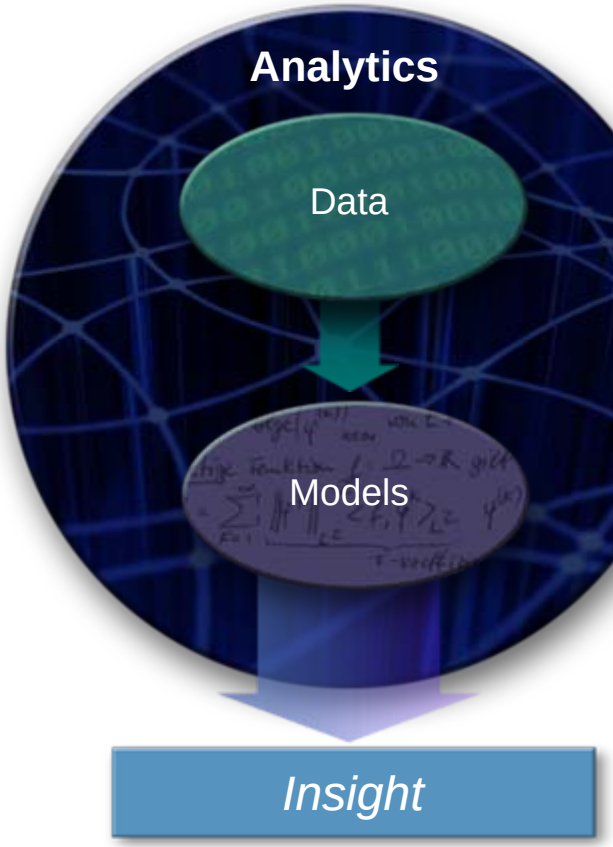


Segment	Action
NY & insurance & new	No Action = 50%, Discount = 50%
CT & finance & loyal	No Action = 80%, Discount = 20%

IBM Research Frontiers



Summary

Advanced analytics extending from the domain of science & engineering to the world of business

- Fueled by the availability of data, computational power and the need to make better choices
- IBM is positioned for leadership in the new era of data-driven business management
- IBM's advanced analytics capability is a marketplace differentiator
- Our collaboration with clients is enabling discovery in new areas
- Significant research opportunity remains