Delivering Results with Predictive Analytics

Michael Alessandro & Rob Risany, IBM

Information On Demand **2010**

The Premier Forum for Information & Analytics

Gain Insight. Optimize Results.

Agenda

- Introduction to SPSS and Predictive Analytics

- Key application areas

- Q&A

SPSS: Industry Leader in Predictive Analytics

- 40+ year heritage

- Drove the creation of the Predictive Analytics market
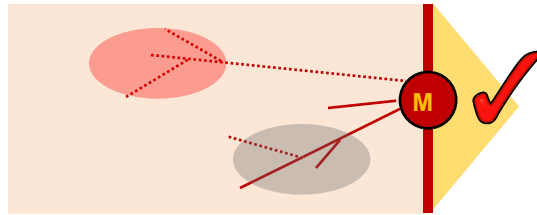
- Acquired by IBM October 2009

Enables organizations to predict future events and proactively act upon that insight to drive better business outcomes
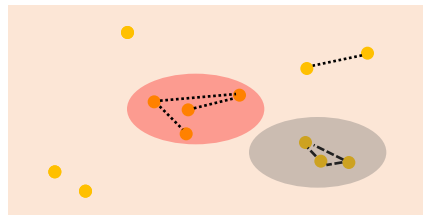
Deploying the Predictive Advantage

Predict & Act

Transformational Deployment of Predictive Models:
- Leverage current data to drive better decisions
- Make robust predictions on current and future cases
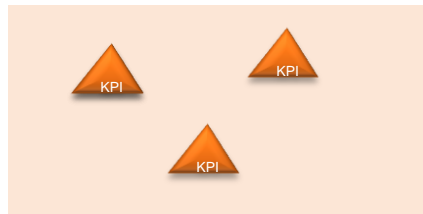- Embed predictive models into points of interaction

"NOW"

Insight Driven Predictive Analytics:
- Algorithms automatically discover significant patterns
- "Learn" from historical data – create *predictive models*
- Valuable insight into behavior improves strategic and operational decision making

"NOW"

Traditional BI and Conventional Analysis:
- KPIs and metrics provide insight
- Aggregate data up to and including current point in time
- Self guided exploration of data

Sense & Respond

"NOW"

IDC - Independent Financial Impact Studies
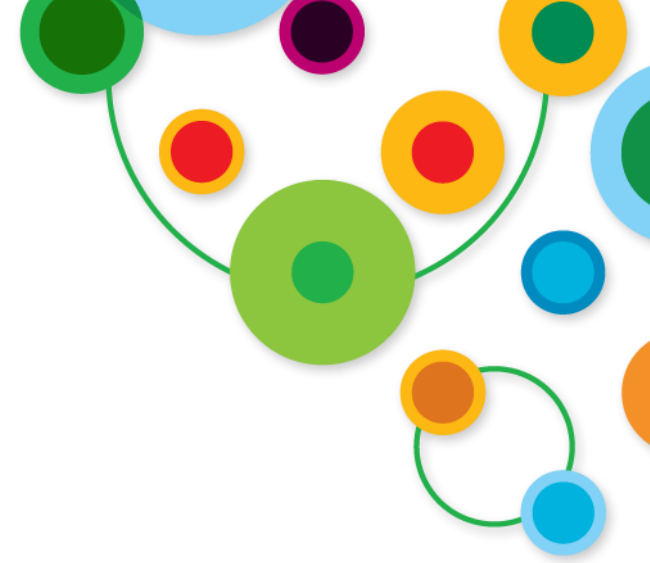

"The median ROI for the projects that incorporated predictive technologies was 145%, compared with a median ROI of 89% for those projects that did not."

Source: IDC, "Predictive Analytics and ROI: Lessons from IDC's Financial Impact Study"

Customer Analytics
Acquire, Grow & Retain

Two Sides to Customer Analytics

Attract more and better customers

Grow customer value

Retain profitable customers

Example: Customer Retention

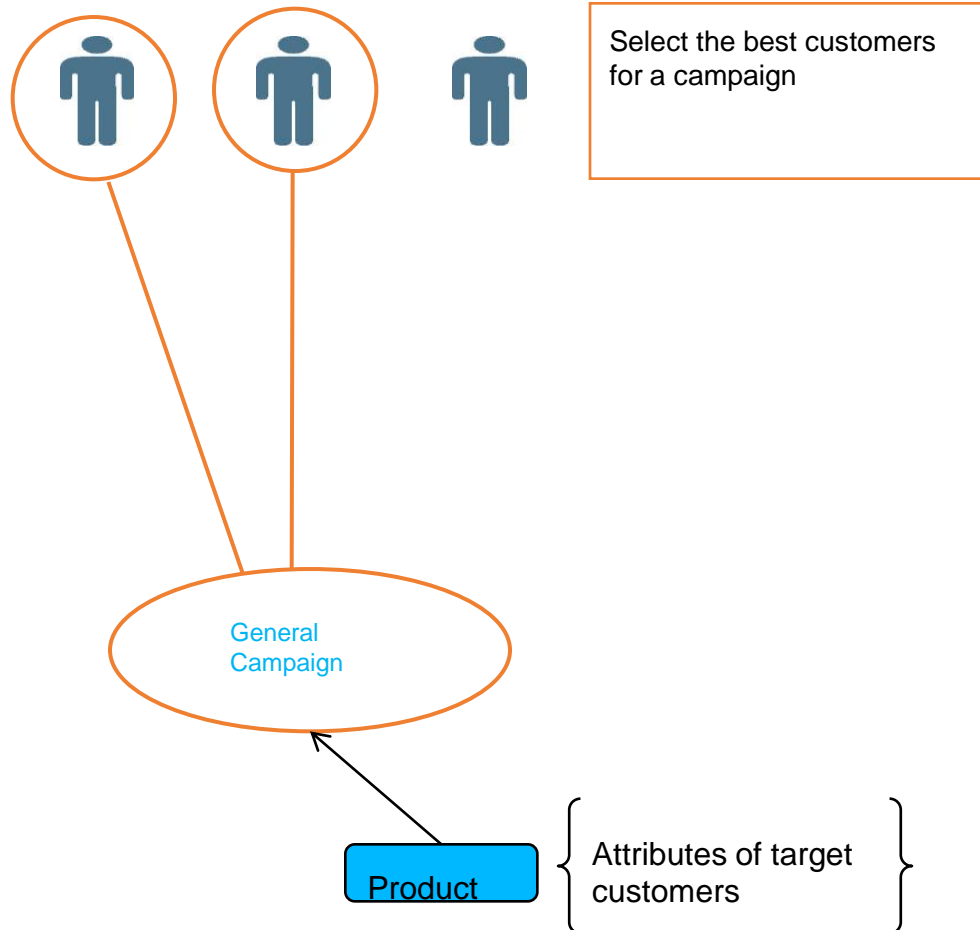**Example: Marketing & Offering Optimization**

What We've All Experienced: Mass Marketing
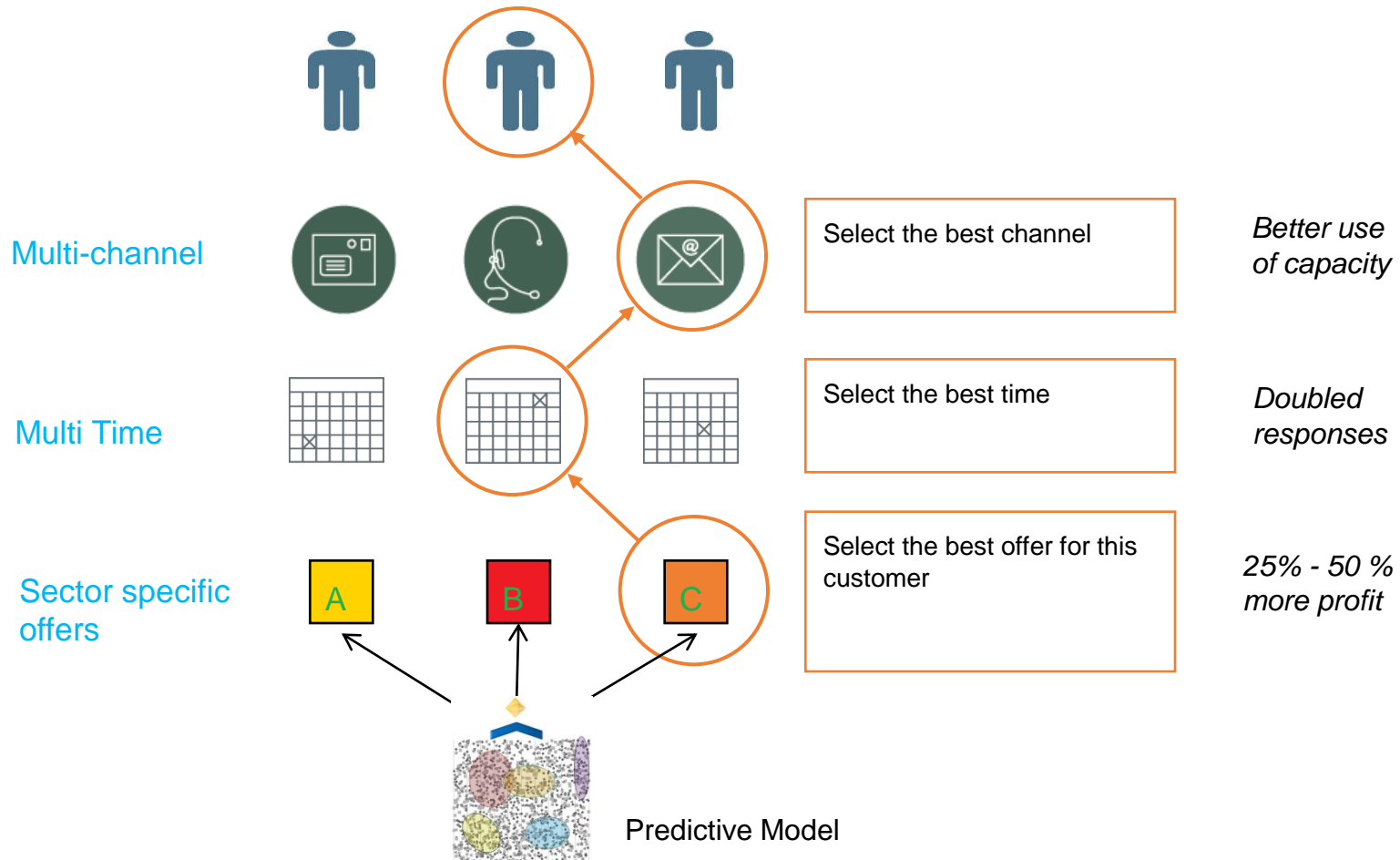
Traditional Approach
Generalize the needs faced by potential customers, **and then blanket the population** or people with those attributes

Select the best customers
for a campaign

General
Campaign

Product

Attributes of target
customers

The IBM SPSS Approach: Customer Centric Marketing

SPSS Predictive Analytics:
Predict the needs, preferences and risks of *individual* customers

Multi-channel

Select the best channel

Better use of capacity

Multi Time

Select the best time

Doubled responses

Sector specific offers

A B C

Select the best offer for this customer

25% - 50 % more profit

Predictive Model

Customer Centric Marketing
Optimize the web experience of key customers

Personalized marketing offers, presented automatically to each and every on-line customer

Recommend related products
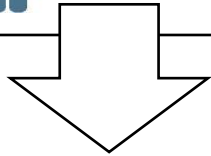
Follow-up based on purchases and experience

Customer Retention: Reactive Mode

Customers Order / Buy Goods

Customer "uses" good– some happily, some not

Dissatisfied customers defect

Extremely unhappy customers "infect" others
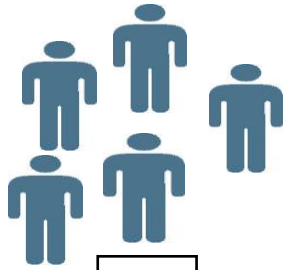
Vendor passively supplies to customers
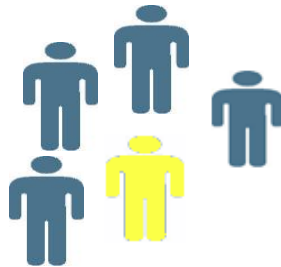
Management Reviews Sales Reports
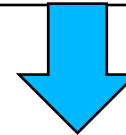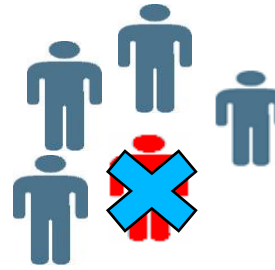
Vendor delivers / supplies to fewer customers
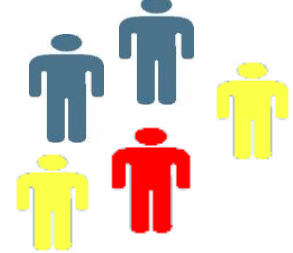
Bad numbers start to make people nervous……

The IBM SPSS Approach: Proactive Mode

Retain profitable customers

Customers selects the RIGHT product

Customer "uses" good– some happily, some not

Impressed customers tell friends
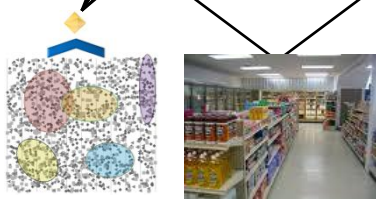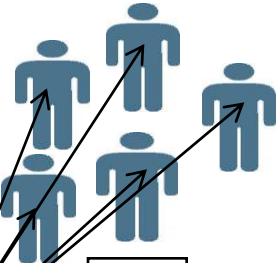
Vendor actively recommend services which are best for customer
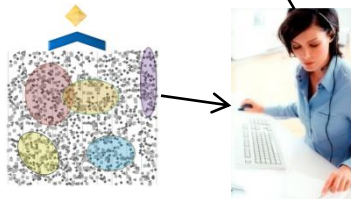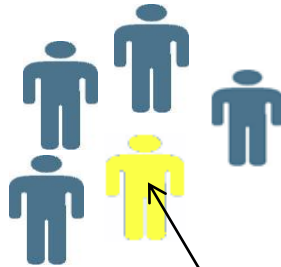
Outreach to predicted At risk customers

Company gets better at providing what customers need
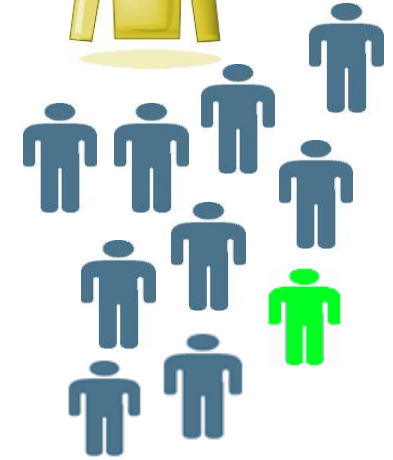
Good numbers get people promoted

Customer Analytics in Action: Major Nordic Bank Issuing 900,000 credit contracts per year

- BEFORE:

  - Issuing cost per contract: 240 EUR

  - Credit Card issuing on average in 6 working days

  - 3,500 people involved

- AFTER:

  - Decisions in 30 Seconds

  - Excluded human error and waiting time in issuing credit contracts

  - Decreased headcount involved in Credit issuing process 9 times

  - Improved employee productivity: 833%

  - Cost per credit contract issued decreased from 240€ → 32 €
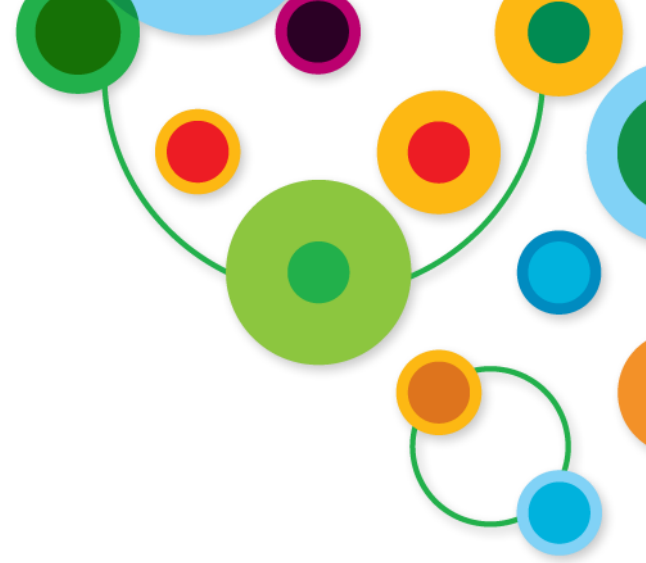
Threat Analytics
Detect, Mitigate, Prevent

Embedded predictive models in claims process to assess claims risk and identify subrogation opportunities

- *Improved detection of fraudulent claims*
- *Time to refer suspicious claims for investigation reduced from 14 days to under 24 hours*
- *Time to identify subrogation opportunities reduced from 26 days to 10 days*
- *Subrogation rate increased from 15-16% to 19-20%*
- *403% Gain in Three Months!*

Predictive Analytics used in:

- Credit Risk Management

- Fraud detection

- Anti-money laundering

- Policing/security

- Network Intrusion Detection

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Undeclared taxable goods to value of $873

Business Scenario: Border Protection

IBM

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© SPSS 2009

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Make, Model, Size, Capacities, Age, History, ...

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Predictive models

+

Risk expertise (rules)

UTAH
AOO OAA

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PASSPORT

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Border protection agency uses predictive analytics to work out which cars to inspect

Directives to Inspectors

Predictive models

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A00 0AA

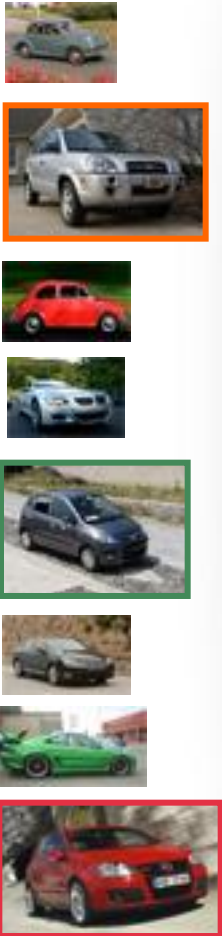**Vehicle Data**
Make, Model, Size, Capacities, Age, History, ...

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Border protection agency uses predictive analytics to work out which cars to inspect

Directives to Inspectors

Contraband 0.58
Return Crossing
Duration 7-10 days (8)
Occupants 2, related
Vehicle SUV, <2 yrs old

UTAH
A00 0AA
GREATEST SNOW ON EARTH

Predictive models

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Risk expertise (rules)

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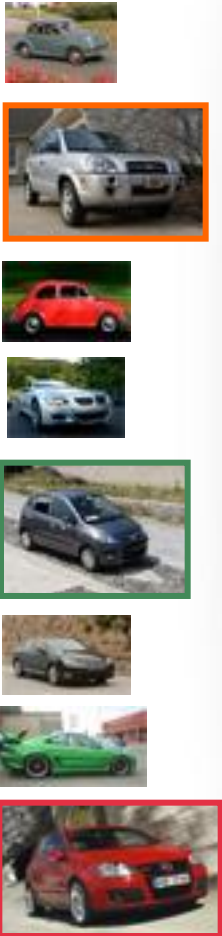
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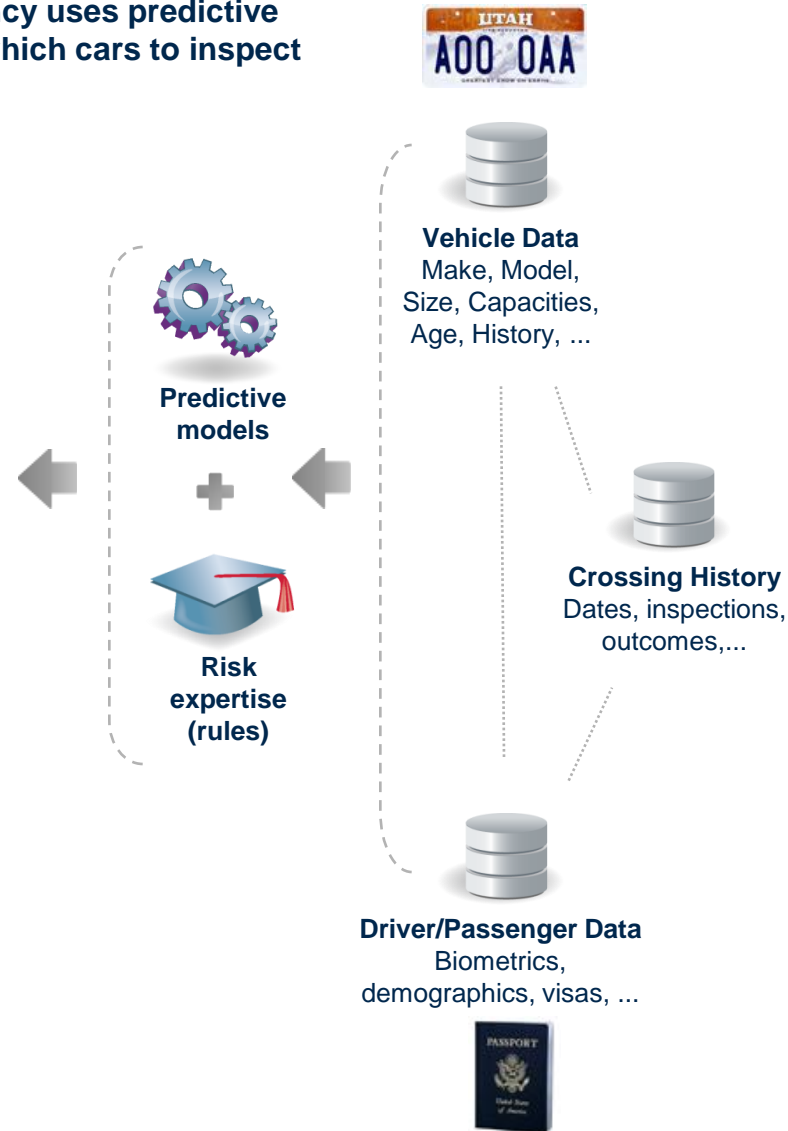➡️ *Secondary inspection*
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All risks <0.05
Family: 5, 2 adults
Return Crossing
Duration <3 days (2)
Vehicle >5 yrs old
Inspection history:
*   - 1, random, clear*

Predictive models

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Risk expertise (rules)

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PASSPORT
United States of America

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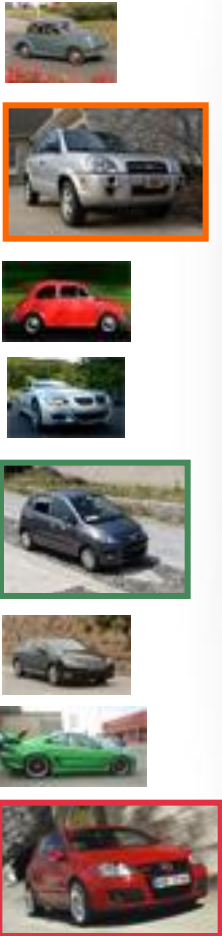
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Narcotics 0.73
Firearms 0.45 (>>CAUTION<<)
Solo driver
Return Crossing same day
Vehicle crossings history:
    - multiple drivers & checkpoints
Driver history:
    - 1 inspection, susp. Drugs, clear

Predictive models

+

Risk expertise (rules)

UTAH
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Vehicle Data
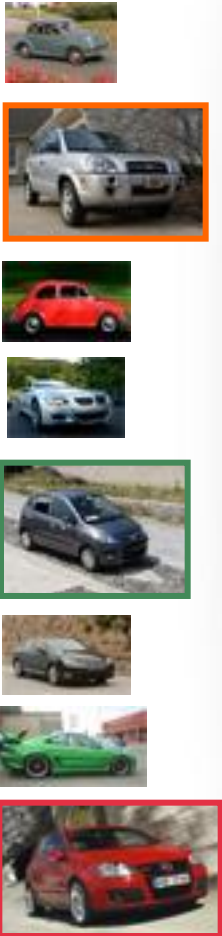Make, Model, Size, Capacities, Age, History, ...

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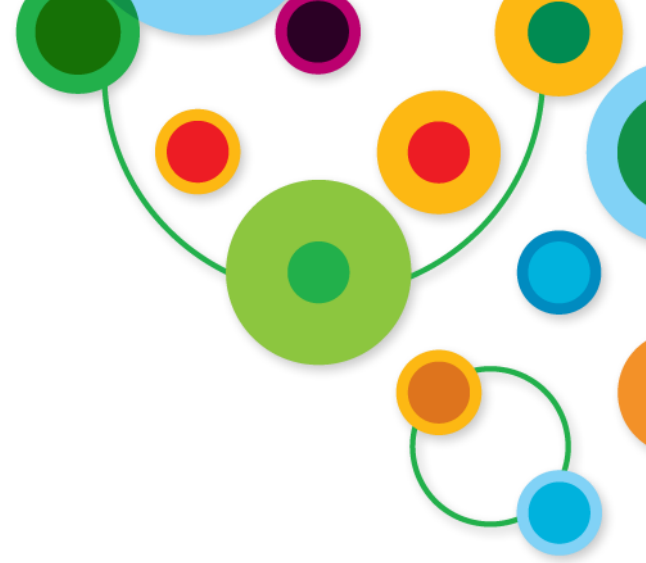Dates, inspections, outcomes,...

Reports on inspections, seizures, etc.

Driver/Passenger Data
Biometrics, demographics, visas, ...

PASSPORT

Asset Analytics
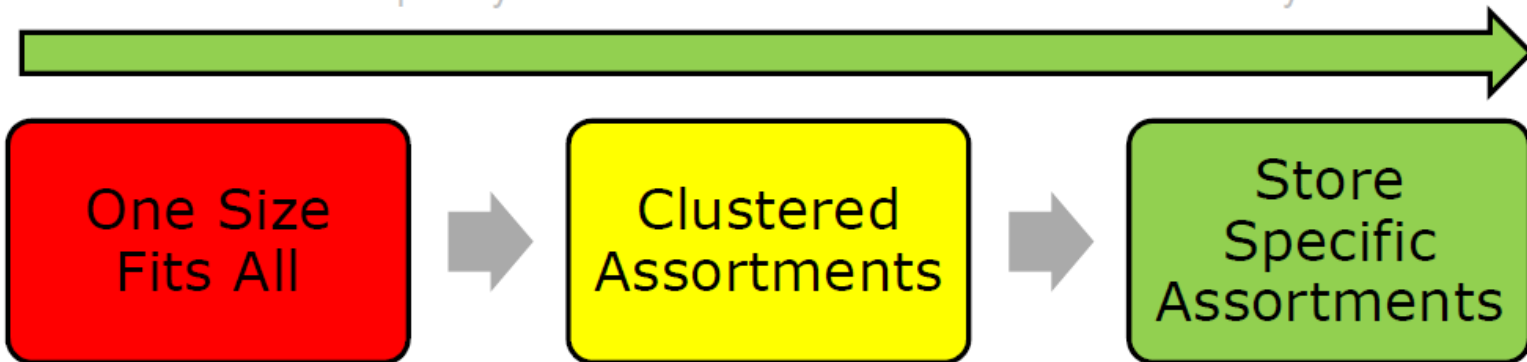## Managing, Maintaining, & Securing Assets

The Key to Meeting Customer Needs in Retail

- Have the Right Stuff…

- …at the right location…

- …………at the right time…..

- ………………..and with the right stuff together!

More Complexity ● More Effort ● Better Assortment Accuracy
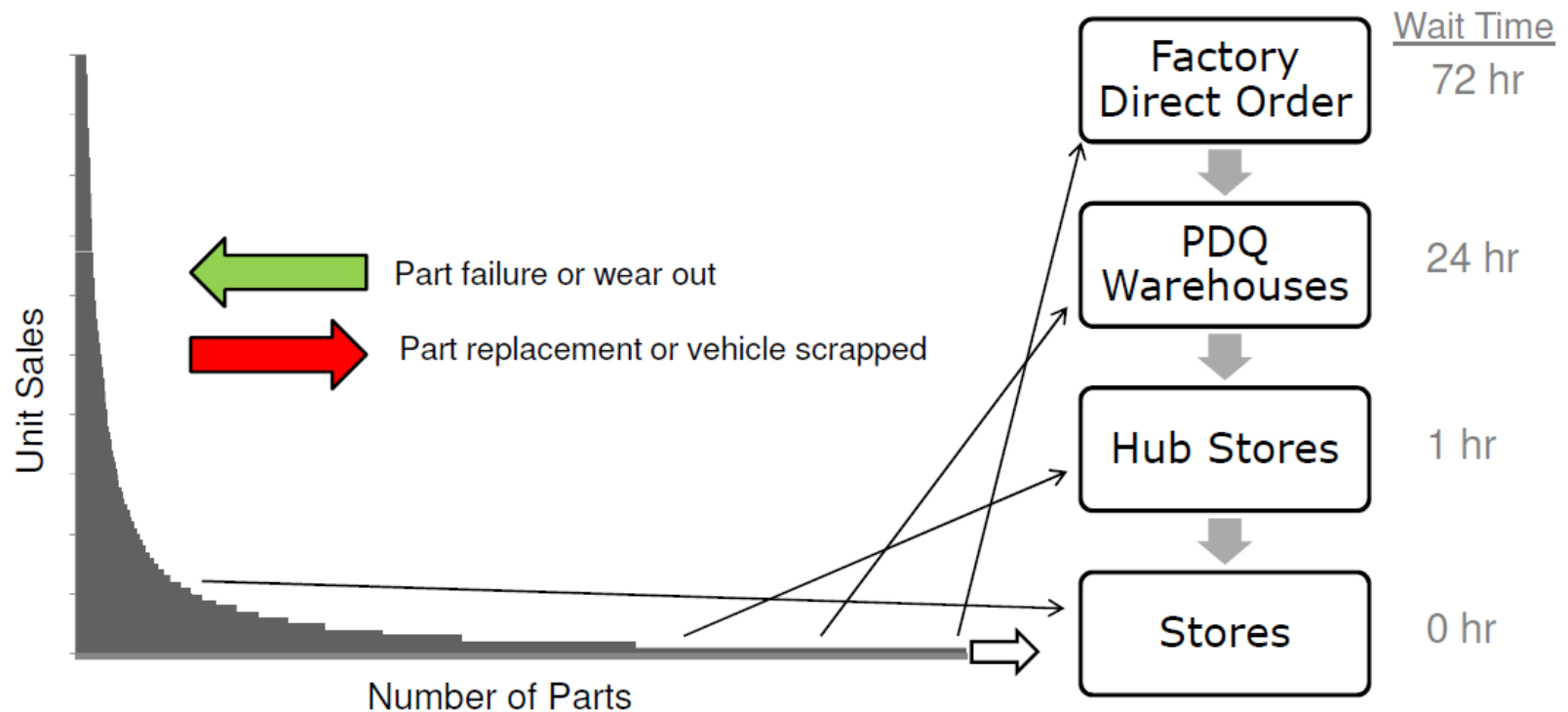
One Size Fits All → Clustered Assortments → Store Specific Assortments
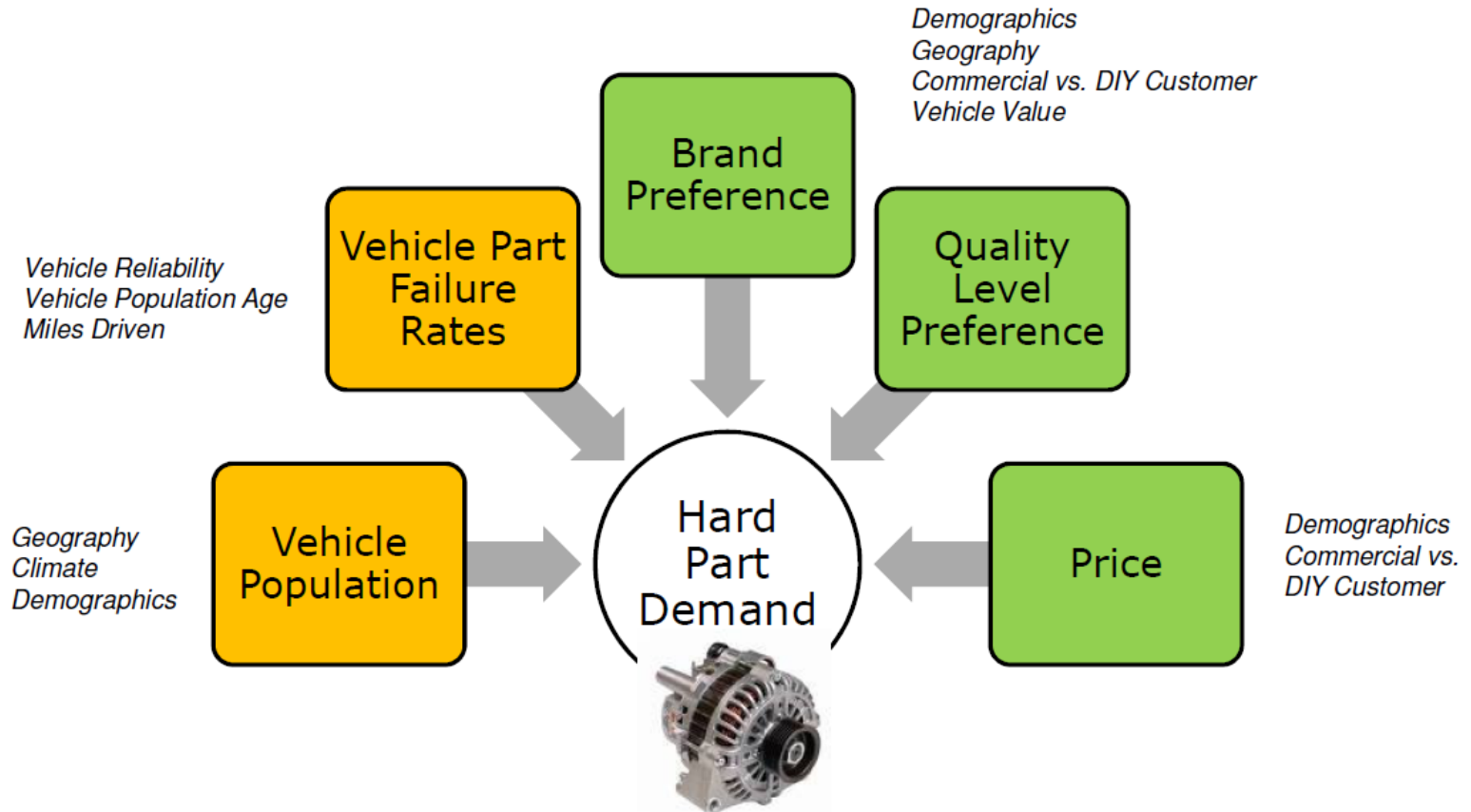
Long Tail Supply Chain Management

- About 80% of a store's unit sales come from 20% of the stocked parts
- Advance is a long tail retailer confined to a traditional brick-n-mortar store

	Wait Time
Factory Direct Order	72 hr
PDQ Warehouses	24 hr
Hub Stores	1 hr
Stores	0 hr

Part failure or wear out

Part replacement or vehicle scrapped

Unit Sales

Number of Parts

Many factors drive hard part demand

Demographics
Geography
Commercial vs. DIY Customer
Vehicle Value

Brand Preference

Vehicle Reliability
Vehicle Population Age
Miles Driven

Vehicle Part Failure Rates

Quality Level Preference

Geography
Climate
Demographics

Vehicle Population

Hard Part Demand

Price

Demographics
Commercial vs. DIY Customer

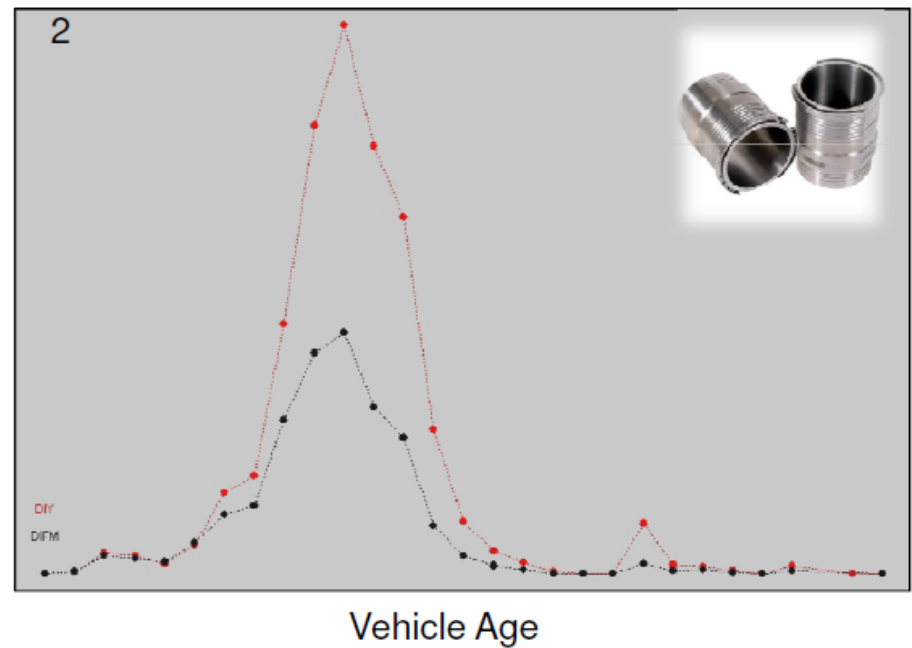# Descriptive Analysis of Vehicle Lifecycle Tells the Story

- Phase 0: Warranty repair
- Phase 1: Commercial > DIY – Increasing Sales
- Phase 2: DIY > Commercial – Decreasing Sales

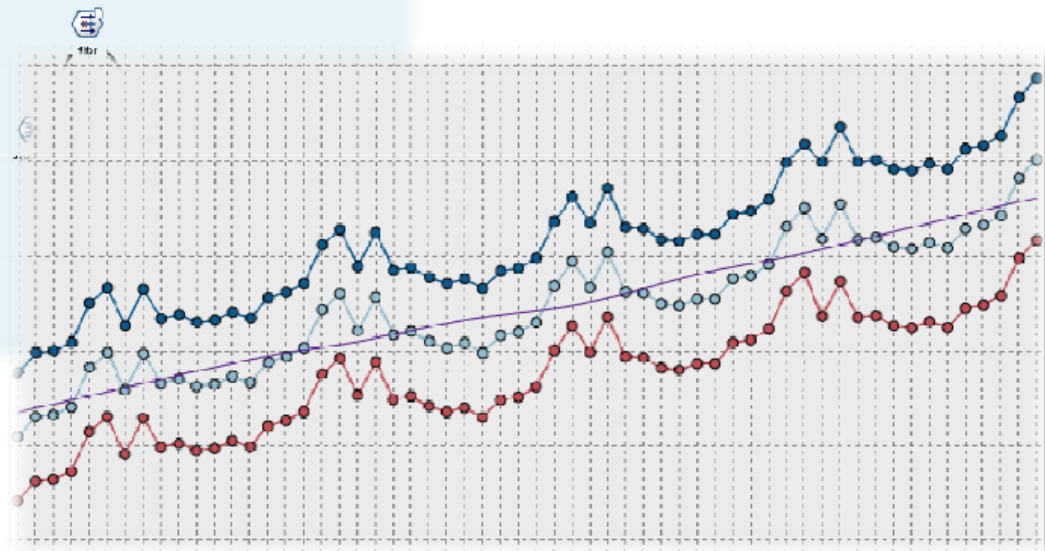Vehicle Part Failure Rates
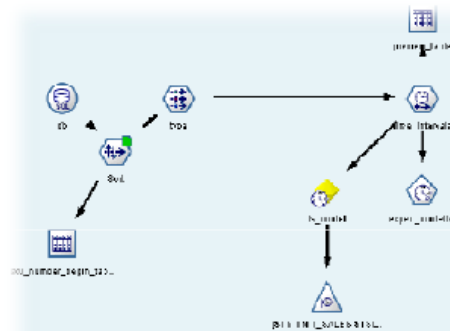

Brake Rotors
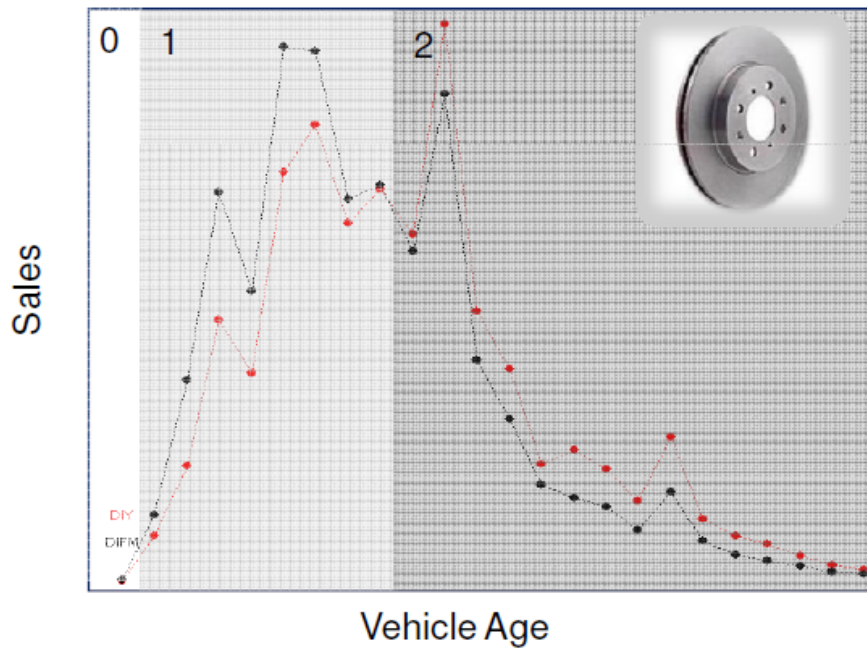
Crank Shaft Repair Sleeves

Forecasting Models Examine Each Part and Predict What's Next

- Forecasting models help determine where each part is in the repair cycle

PASW Modeler

Association Models Help Craft Ideal Product Mix

- Having all the right parts together to complete the job is key to completing the sale
- Our Parts Pros (in the stores) have tremendous parts knowledge and let the customers know which parts are required
- We mine the sales transactions (almost 1 billion) to learn these associations (and customer preferences) to ensure our assortments have the parts co-located
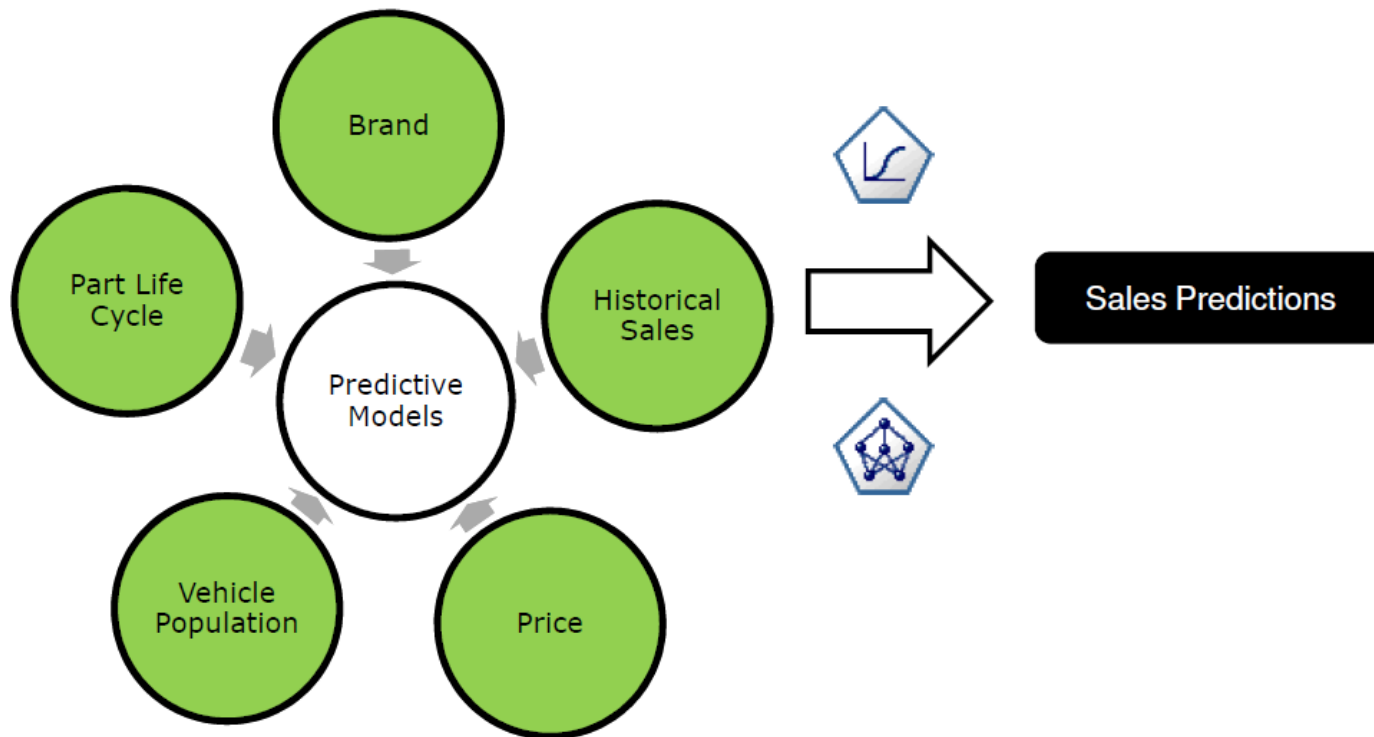
Water Pump

Timing Belt

Carma

Multiple algorithms are used to determine location specific nuances

- Logistic regression, decision trees, regression and neural network predictive models help determine which parts will sell in specific locations
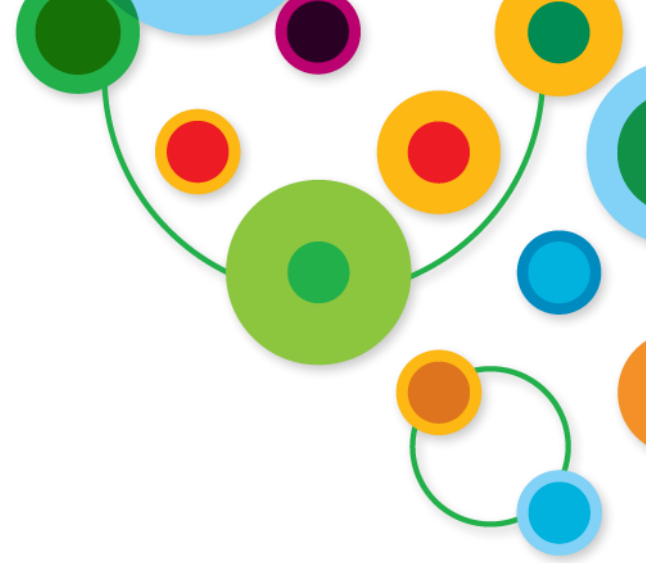
Embedded predictive analytics into real world manufacturing processes to identify part castings with a high tendency to failure

- *Increased efficiency and accuracy of quality control processes resulting in a 60% reduction in failure costs*

- *Dynamic notification to clients of upcoming failures*

Questions?