Predictive Analytics

Examples of Real Use Cases

Nicolas Plocharski, SAP
May 30, 2018
Competing in today’s marketplace

**Artificial intelligence**
“Early evidence suggests that AI can deliver real value to serious adopters and can be a powerful force for disruption. Early adopters are already creating competitive advantages, and the gap with the laggards looks set to grow.”
- McKinsey Global Institute

**Machine Learning**
“The risk of investing too late in smart machines is likely greater than the risk of investing too soon.”
- Gartner

**Data Insights-Driven Business**
“Insights-Driven Businesses Will Steal $1.2 Trillion Annually By 2020.”
- Forrester
Enterprises need to become Data-Driven

Leveraging all types of data

Applying Machine Learning across the enterprise

Automating decision making

Why now?

- Massive computing power (in-memory & distributed computing)
- Big data available for training models
- Declining hardware and software costs
- IoT/device connectivity
What makes being Data-Driven so difficult?

- **Massive Amount of Data**
  - Conversations
  - Transactions
  - Machines

- **Analytical Skill Gap**
  - Shortage of 140K to 190K deep analytical skills
  - 1.5 million managers + analysts who know how to use big data to make effective decisions will be needed

- **Belief That “It’s Too Hard”**
  - We don’t have enough Data Scientists
  - We don’t know where to begin
  - We believe that it is too complex and challenging to even get started

Source: McKinsey Global Institute
Machine Learning Automation
The fastest way to become a Data-Driven business
What is Machine Learning?

Machine Learning consist in extracting information from existing datasets describing past events to determine patterns, predict future outcomes, trends or detect anomalies.

Predict - Forecast - Classify - Cluster

The objective of SAP Predictive Solutions is to make business decision-making processes more performing and more efficient for more business value.
SAP Predictive Analytics enables Machine Learning automation

Enabling everyone to build models

Automating the end-to-end process

Ensuring the outputs are ready to be consumed by business users
SAP Predictive Analytics customers are winning

Cox Communications: Business users are creating predictive models to supercharge customer Relationships

- 14% More products per customer household
- 28% Reduction in customer churn rate
- 80% Reduction in model creation time
- 42x Greater throughput for central analysts
- 15% Reduction in driver turnover in first year

Reducing Driver Turnover and Creating a Safer Workforce by automating end to end process

- <6 Months to ROI payoff

Delivering personalized banking experiences for 5.5 million people with insights in the hands of business users

- 400% Higher hit rate for non-mortgage loans
- 250% Larger hit rate for savings products
- 200% Increased hit rate for insurance products

©2018 SAP SE or an SAP affiliate company. All rights reserved. I PUBLIC
How SAP Customers are solving business problems

**SALES + MARKETING**
- Churn Reduction
- Customer Acquisition
- Lead Scoring
- Product Recommendation
- Campaign Optimization
- Customer Segmentation
- Next Best Offer/Action

**OPERATIONS**
- Predictive Maintenance
- Load Forecasting
- Inventory/Demand Optimization
- Product Recommendation
- Quality Management
- Yield Management

**FRAUD + RISK**
- Fraud and Abuse Detection
- Claim Analysis
- Collection and Delinquency
- Credit Scoring
- Operational Risk Modeling
- Crime Threat
- Revenue and Loss Analysis

**FINANCE + HR**
- Cash Flow and Forecasting
- Budgeting Simulation
- Profitability and Margin Analysis
- Financial Risk Modeling
- Employee Retention Modeling
- Succession Planning

**25+ Industries**
- Aerospace & Defense
- Automotive
- Banking
- Chemicals
- Higher Education and Research
- High Tech
- Industrial Machinery, Components
- Insurance
- Consumer Products
- Defense & Security
- Engineering, Constructions & Operations
- Healthcare
- Life Sciences
- Media
- Mill Products
- Mining
- Oil & Gas
- Professional Services
- Public Sector
- Retail
- Sports and Entertainment
- Telecommunication
- Transportation & Logistics
- Utilities
- Wholesales Distribution
Exciting Story, but we want some real life examples
KXEN Helped Driving a Smarter Obama 2nd Campaign

✓ Needed speed to scale to huge and rapidly changing online and offline data
✓ Allowed OFA to run campaigns through email and social media sites (FB, Twitter)
✓ Optimized fundraising campaigns for higher contributions
✓ Identified “persuadable” segments of voters

“The timely and accurate insights provided by KXEN led to more effective and quicker targeting and in the end, more votes.”

- Rayid Ghani
  Chief Scientist at Obama for America
The Goal: Target Voters and Volunteers

Visits of Volunteers

TV Advertising

Fundraising emails

Social Campaign
State of Indiana: Using SAP HANA® to Combat Infant Mortality and Save Hoosier Lives

Objectives
- Use data to drive program and budget decisions and improve outcomes
- Better understand the state’s higher-than-average infant mortality
- Find new ways to analyze data to combat Indiana’s most pressing issues

Why SAP
- World-class in-memory and predictive analytics technology
- Partnership with KSM Consulting, experts in government efficiency, Big Data architecture, and predictive data science, for immediate and lasting success

Resolution
- Used the SAP HANA® platform with SAP® Predictive Analytics and SAP Lumira® software as part of the Management and Performance Hub (MPH) initiative to examine infant mortality in new ways
- Developed sophisticated algorithms to identify at-risk subpopulations and provide actionable insights for policymakers

Future plans
- Continue researching infant mortality risk to drive more positive birth outcomes and develop a mobile app to assist mothers
- Use the MPH with other state agencies to combat fraud, criminal recidivism, child abuse, and more

“SAP software and KSM Consulting have allowed us to pinpoint the problem by location and by subpopulations so we can get resources to the women who need them. We’ve brought together disparate agencies and their data in this collaborative, innovative environment to develop a targeted solution.”

Sara Marshall, Director of Business Intelligence and Analytics, State of Indiana

9+ billion
Rows of data analyzed for the infant mortality use case

15 data sets
Combined for integrated analysis

3 key findings
Identified, including the populations at greatest risk for infant morbidity, enabling targeted marketing campaigns based on these high-risk subpopulations

$13.5 million
In new budget proposed for application development and new programs to combat infant mortality
Predictive Projects at French Police

Business Objectives

**Predictive Maintenance**: with a growing-old vehicle fleet and shrinking budget, it’s crucial to avoid useless maintenance, to reduce failures and breakdowns while maximizing the use of each vehicle.

**RH Turnover**: being part of the National Gendarmerie could become tough from time to time, therefore the National Gendarmerie wanted to identify resignations’ causes to prevent them and take actions to reduce the officers’ pain points.

**Operational deployment**: by identifying criminality’s causes, officers are able to obtain mapping for different crimes’ types, depending on location, hour, etc. They also can optimize force allocation.

Current Projects

**Business Intelligence**: « Visualization of Police activity statistics »

**Predictive Analytics**: « Optimizing the allocation of vehicles to territories »

**Predictive Analytics**: « Anticipation of crime evolution »

**Predictive Analytics**: « Predictions for car thefts in the Oise province »

**Predictive Analytics**: « Forecasting the early departures for military and civilian employees »

**Innovation**: « Sentiment analysis for Gendarmerie Nationale e-reputation tracking »
Machine Learning in Banking – a long story

Bank Austria

Increased response rate of Marketing campaigns

400%

Bank of Montreal

7x increase of response rate compared to control group

Lloyds TSB

Lloyds Bank reduced modelling effort from days and weeks to hours

BARCLAYS

Increase of response rate by 160% and purchases by 35%
10 X Improvement in Modeling Productivity

Goals

• Improve modeling efficiency
• Meet modeling needs with no additional employees
• Learn if new data sources improve model performance (up to 50,000)
• Respond rapidly to market changes

Solution – SAP PA Implementation

• Allows analysts to consider tens of thousands of variables
• Reduces manual mistakes like dropping a variable too early in the process
• Allows expert analysts to focus on value-added tasks like developing new variables & segmenting customers differently
10 X Improvement in Modeling Productivity

Results

- 10X improvement in productivity without compromising model accuracy
- **End to end model creation has decreased from** 6 months to less than 1 month
- **Using traditional statistical methods it took** 10 staff days **to identify the best 10 variables.**
  - Using SAP PA it takes 1 staff day
- **Results can be used as-is or fed into further analytic efforts**

<table>
<thead>
<tr>
<th>Model kind</th>
<th>Num. variables</th>
<th>KS, traditional tools</th>
<th>KS, SAP PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>risk</td>
<td>1100</td>
<td>48</td>
<td>43</td>
</tr>
<tr>
<td>risk</td>
<td>1100</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>risk</td>
<td>1100</td>
<td>49</td>
<td>48</td>
</tr>
<tr>
<td>risk</td>
<td>1100</td>
<td>32</td>
<td>36</td>
</tr>
<tr>
<td>risk</td>
<td>1100</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>risk</td>
<td>1100</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>marketing</td>
<td>1300</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>marketing</td>
<td>1300</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>marketing</td>
<td>1300</td>
<td>35</td>
<td>40</td>
</tr>
</tbody>
</table>
POCKET CARD: Doubling Revenue from Direct Mail Campaigns with SAP Predictive Analytics

**Top objectives**
- Increase revenue by promoting cash advance services and revolving credit and by streamlining marketing calls for affiliated insurance services
- Reactivate nonactive existing cardholders and find a new customer base suitable for specific services

**Resolution**
- Adopted the SAP® InfiniteInsight® solution for predictive modeling and data analysis to gain customer insight
- Enabled data-driven customer segment targeting decisions for each campaign, rather than relying solely on marketer experience
- Enabled the analysis of enormous amounts of data such as monthly credit card statements, outstanding loans, and repayments

**Key benefits**
- Allows analysts to simulate infinite scenarios and select the optimal models for their business needs
- Enables the building of predictive models from millions of customer records and tens of millions of historical account transactions within a few hours

“The total turnover for targeted direct mail campaigns doubled, thanks to SAP InfiniteInsight.”
Kuniharu Takenaka, Manager, Sales Planning, POCKET CARD Co., Ltd.
mBank: Delivering a Personalized Banking Experience for 5.5 Million Customers with SAP Predictive Analytics

Company
mBank S.A.

Headquarters
Warsaw, Poland

Industry
Banking

Products and Services
Retail and corporate banking products and services, wealth management

Employees
6,318

Web Site
www.mbank.pl

Objectives
• Respond to customer needs as quickly as possible
• Gain insights into customer preferences to support a customer-centric banking experience across all channels
• Optimize the company’s discount program (mDeals) by providing better service to partners and more targeted offers to customers
• Improve the performance of marketing campaigns by better understanding customer behavior and anticipating future demand

Why SAP
• Ability of SAP® Predictive Analytics software to drive a close, personal connection to clients by providing a data and analytical modeling tool
• Pragmatic, user-friendly software, allowing quick user adoption and rollout
• Easy integration with the existing IT infrastructure

Resolution
• Predictive modeling based on transactional and demographic data
• Precise segmentation, advanced reporting, and execution of real-time, multichannel marketing campaigns
• Context-specific offers across all channels based on customer profiles

Benefits
• Reduce churn and grow revenue by automating campaigns and offer activation
• Increase sales efficiency and reduce the cost of sales
• Minimize the effort to train employees and identify targeted customers
• Empower mBank’s discount program by personalizing discounts for each customer based on predictive insights

Rapid
Increase in response rates to marketing campaigns
400%
Higher hit rate for nonmortgage loans
200%
Increased hit rate for insurance products
250%
Higher hit rate for savings products
With the new tools used for Maintenance data analytics …we were able to…

Create rules to **automatically identify pump repairs**. Rules are based on definition and boundaries agreed to by all Valero refineries, so the repair identification will be consistent across all the Valero refineries.

Create rules to derive **Lead Time, Time to Repair, Costs, Ratios** etc based on standard routine maintenance process.

Accuracy of those rules were **tested and validated** against one subject plant work orders and the current (Excel) bad actor report.

**Plant comparison** can be run quickly for all the values calculated above with slicing and dicing.

Perform Cluster and Weibull **predictive analysis** by mining existing reliability and maintenance data.

Reliability information can be accessed easier and be utilized more often to make **maintenance decisions**.

---

Source: Use of Predictive Maintenance & Service to analyze reliability of rotating equipment; Louis Brochu, Valero Energy Corp
Saving 8-10% on Train Maintenance Costs

40% of maintenance is currently reactive

1,3 bln €

Maintenance Costs

Solution

- Improve effectiveness of maintenance programs
- Data fusion between IT and OT data
- Remote train diagnostics
- Engineering rules and predictive models
- Dynamic planning of maintenance schedules

Business Value

- Perform ALL the required interventions, and ONLY the required interventions, at the RIGHT TIME, ensuring availability of the RIGHT RESOURCES
- Reduce unplanned downtime – Reduce maintenance costs – Increase asset utilization
- Projecting 100M Euro savings per year in maintenance operations costs when fully implemented

Run to Failure
Preventative
Predictive

BRAKES

Energy Dissipation versus Mileage

DOORS

Open/Closure Cycles & Times versus Mileage

Link to the video: https://www.youtube.com/watch?v=583aGe0xIgY
Predictive Analytics in retail business of Oil Company Bashneft

- 12 Russian regions participate in the loyalty program
- More than 750,000 loyalty cards were sold from the program start
- 96,4% loyalty program participants regularly make purchases on the Gas Stations Bashneft
- Every month 40% of sold fuel falls on the participants of the loyalty program
- The participants average check is higher by 35% than the client without a card
- Thanks to the Predictive Analytics system, customers receive relevant proposals in real time directly at the Gas station
Principle of grocery recommendations

950 goods are connected with other goods

Based on this information offers are created for every purchase

- the presence in the bill products associated with the recommended increases the likelihood of response to a recommendation

Microsegmentation the customer base

- Identification of customer groups related to similar consumer behavior (they acquire the same products)

Customer recommendations

- Identifying products that are not in the buyer’s basket, but present to buyers with a similar basket.
Predicting customer inbound calls at call centers

Company
CenterPoint Energy Inc.

Headquarters
Houston, Texas

Industry
Utilities

Products and Services
Electricity transmission and distribution, natural gas distribution, sales, and services

Employees
7,400

Revenue
US$9.2 billion

Web Site
www.centerpointenergy.com

Objectives
- Improve customer satisfaction with the call-center experience
- Reduce call-handling time of call-center agents
- Increase the opportunity to resolve issues on the first call

Why SAP
Cutting-edge predictive analytics technology supported by the SAP HANA platform

Resolution
- Implemented the SAP Business Warehouse application powered by SAP HANA in combination with the SAP Customer Relationship Management application to consolidate data sources and accelerate data access
- Used predictive analytics to determine customer issues and the appropriate routing for resolution

Benefits
- Faster data access with the consolidation of data from nine systems into a single data warehouse
- Faster predictive analytics engine using SAP HANA as a data repository
- More calls handled by the lower-cost interactive voice response (IVR) system rather than an agent, thanks to predictive analytics
- A higher percentage of late-payment and disconnect-reconnect calls being processed by the autopay system

"SAP HANA delivers the unique capabilities we need to turn our data from yesterday into our predictive insights of tomorrow. The more data we put in, the more value we get out."

Dr. Steven P. Pratt, Chief Technology Officer, CenterPoint Energy Inc.
Forecasting Model Engine (FME)

- **Financial / Regulatory Model**: Focus of this project to leverage historical work and incorporate smart meter data and other data sources to build the Forecasting Model Engine. This will be the “work horse” for all subsequent development.

- **Weather**: Targeted improvement efforts with Impact Weather and IBM Deep Thunder.

- **Customer Behavior**: Enhanced capabilities with SAP CRM and HANA. More to explore.

- **Opportunity**: Delivery of the Forecasting Model Engine will provide capabilities to exploit the core functionality. Opportunity areas: Assets, Revenues, Rate Cases, Operations, Demand Management, Hedging, Competitive Gas Sales, Customer Programs...
Forecasting Model Engine – The Scope

**Finance**
- Revenue Management
- Budget Control
- Portfolio Model

**Analytics**
- Load Profiling
- Forecasting
- Weather Normalization
- Estimate of weather impact

**Transmission & Distribution**
- Substation load Analysis
- Transformer Sizing
- Circuit Load Study
- Load Management
- Loss Studies
- UFE

**Risk Management**
- Hedging

**Marketing**
- Customer Analysis
- Class Analysis
- On/Peak Demand
- Major Account Demand
- Demographic Study
- Demand Response (kVA)
- Deemed Savings (Customer response)

**Rates/Pricing**
- 8760 (hourly) class demand
- 15 min interval class demand
- Billing Determinants
- Major Account Demand
- Class & System Peak Analysis
- Allocation Schedules
- Rates Simulation
- 4CP filings
- H Schedules

**Other**
- DSM
- Acquisition Model
- Contract Models
- Circuit Load Simulation
Big European Utilities – Procurement Analytics Project Example

**Goals:**
- **Decrease the overall spent** by better planning of the maintenance and better resources’ allocation
- **Switch** from programmed inspections to **Asset Condition Based Maintenance**
- **Decrease** the number of **emergency repairs** (today they represent 80% of invoices)
- **Suppliers’ profiling** (Descriptive Analytics)
  - Evaluate suppliers for relevancy to be part of the frame contract
  - Evaluate suppliers’ performance: respect of budget, quality, delays, capacity
- **Expected Results:**
  - **8-10% decrease of yearly spent** in this category (20-25 m€)

**Project Facts:**
- 70 spent categories
- 1\(^{st}\) phase is about one special category representing 250 m€ of yearly spent.
- 150 suppliers
- Frame Contracts signed every 4 years without any guarantee to making money, but a supplier have the price fixed and is listed as preferred supplier of The Customer
- 50% of the spent is consumed for ad hoc jobs and emergency repairs
- Tenders are mandatory for works estimated at more than 10-50 k€ (depending of the region)
- Some of suppliers used at 150% of their capacity, others at 20%.
- The Customers signs frame contacts with quite everybody as there is a shortage of suppliers.
Unlike other offerings in the market, SAP provides

**Speed**
Minutes to hours with automation vs. weeks to months

**End To End**
From 10 to 1,000’s of models and data sets

**Insights Everywhere**
Automated techniques to embed models

**SAP Integration**
SAP HANA | SAP Cloud Platform
SAP BW | Universes

**All-in-one Solution**
Prepare I Model
Deploy I Automate
SAP Predictive Analytics has great traction
Successful customer deployments. Recognized industry leadership.

Customers

Industry recognition

Forrester: Leader
“SAP draws a straight line from predictive models to business applications.”

Hurwitz: Victor
“Fast time to value and ability to support very large data sets.”

Dresner: Top vendor
“The top vendors for advanced and predictive analytics include SAP.”

Predictive and machine learning wave
Where can SAP take you?

171% Three year ROI

$2.4M Annual cost savings

60% Reduction in process costs

*Forrester Total Economic Impact of SAP Analytics, November 2016 www.sap.com/analytics-tei
Next Steps.

Learn about SAP Predictive Analytics
https://www.sap.com/community/topic/predictive-analytics.html

View SAP Predictive Analytics in action
https://www.youtube.com/playlist?list=PLufF7pZxlCBiwM1un4omn2BkP-nTCV7xG

Try it today
www.sap.com/trypredictive
Thank you.

Contact information:

Nicolas Plocharski  
Senior Director at Global Center of Excellence, SAP Leonardo & Analytics  
nplocharski@sap.com  
+33 6 6344 0891