



InData Labs

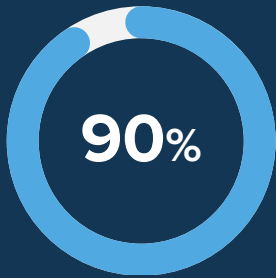
BIG DATA IN BANKING

Table of contents

What is Big Data?	3
How data science creates value in Banking	7
Best practices for Banking	14
Case studies	14
1. Fraud detection	14
2. Contact center efficiency optimization	15
3. Customer churn analysis	16
4. Risk management	17
5. Centralized marketing campaigns	18
About InData Labs	20

ABOUT BIG DATA

We create 2.5 quintillion bytes of data every day



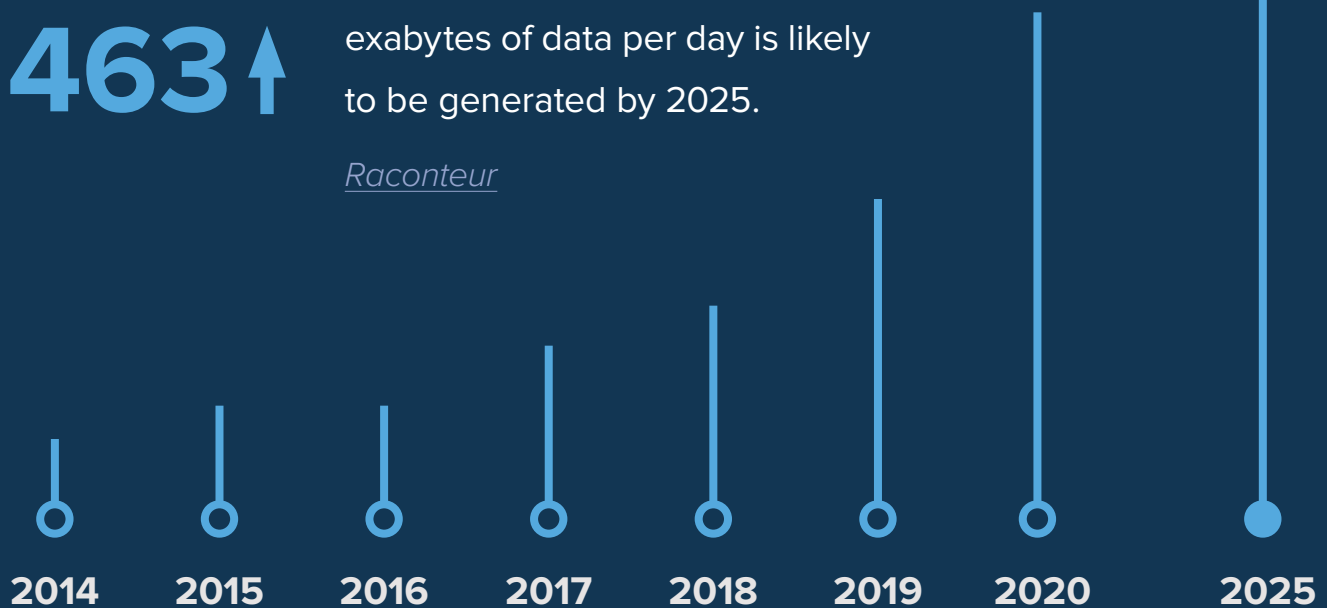
of the big data in the world today has been created in the last two years alone. This data comes from everywhere: sensors used to gather climate information, posts to social media sites, digital pictures and videos, purchase transaction records, and cell phone GPS signals to name a few. This massive, diverse, and unstructured data which is impossible to process via standard software and databases is called Big Data.

Big Data is getting bigger

463↑

exabytes of data per day is likely to be generated by 2025.

Raconteur



We create around 2.5 quintillion data bytes daily

[Domo](#)

This rate will become greater with the growing popularity of IoT (Internet of Things) devices.

Nowadays data management is becoming a critical differentiator that separates market leaders from all others. Most enterprises face Big Data, which is so large that it is impossible to process it using traditional software tools. Forward-thinking companies actively crunch their high-volume unstructured data to get a competitive advantage and find new business opportunities.

Today's high-end technologies make it possible to realize the value of Big Data. For example, retailers, financial institutions and other B2C organizations can analyze the behavioral trends and social media activity of each customer and provide personalized product offerings; they can monitor customer satisfaction with company's products and services and take prompt marketing actions having sentiment analysis in place.

Data-powered predictive maintenance tools empower proactive business strategies

that avert costly equipment downtimes and increase production capacities. According to Deloitte, this usage of Big data increases equipment uptime by up to 20% by predicting unexpected failures.

In a current data-laden world, BI reporting is another indispensable tool for modern businesses that helps companies make better decisions and take heed of all incoming insights. This field has spiked in popularity over the last few years and is expected to hit \$29.48 billion by 2022.

Oil and gas companies can take the output of sensors in their drilling equipment to make more efficient and safer drilling decisions.

Big Data is a trend across business and IT, which refers to new technologies that can analyze high-volume, diverse data from traditional and digital sources inside and outside the company. Leveraging Big Data analytics leads to more confident decision making, which means greater operational efficiencies, cost, and risk reductions.

Big Data relates to data creation, storage, retrieval, and analysis that is remarkable in terms of volume, velocity, and variety:

Volume

Massive volume of data is contributed by many sources of constantly updated data containing financial, environmental, location, and other information - transactions, social media, use of smartphones, and Internet of things. For example, Facebook produces 4 new petabytes of data every day; a Boeing 737 generates 240 terabytes of flight data during a single flight.

Variety

Data today comes in different formats: geospatial data, 3D data, audio and video, and unstructured text, including log files and social media. Managing, merging, and analyzing different varieties of data is a challenge for many organizations.

Velocity

Data is streaming in at exceptional speed and should be timely processed. Clickstreams and ad impressions capture user behavior at millions of events per second; high-frequency stock trading algorithms reflect market changes within microseconds; machine-to-machine processes exchange data between billions of devices.

What is Big data?

Three key differences between analytics and big data:



What does this all mean?

It means that globally, companies are turning to big data strategies to gain an edge over their competition. They realize that good business decisions are now data-driven, and not intuitive-like. They analyze data to better understand and reach their customers, develop new revenue streams and improve operational efficiencies.

Big data adoption grows at different rates in each vertical industry. Such markets as retail, financial services, telecommunications, and media are making considerable investments to effectively use their data to drive value.

The reason behind these verticals being the forerunners is that they have a lot of customers generating plenty of data, and a continuous need to keep customers happy so as not to lose them.

For example, the widespread use of increasingly granular customer data can enable retailers to improve the effectiveness of their marketing and merchandising. Data analytics applied to supply chains and operations will continue to reduce costs and create value and new competitive advantages for growing retailers' revenue.

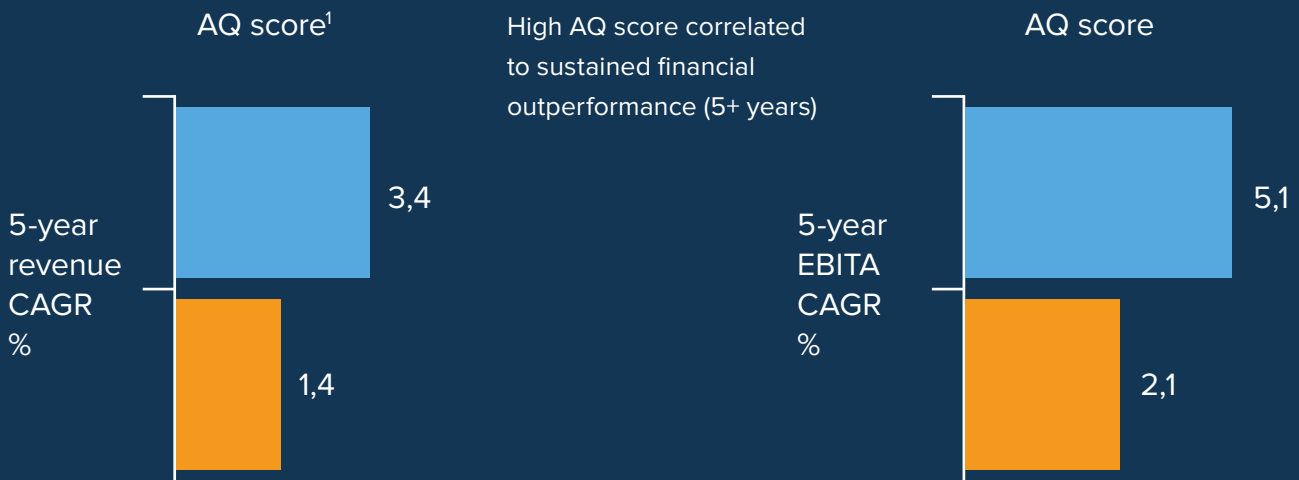
BIG DATA IN BANKING

"Analytics leaders¹ exhibit stronger financial performance than other companies."

McKinsey

Analytics maturity correlation to financial metrics

● Top quartile AQ companies ● Bottom quartile AQ companies



¹ Analytics Quotient (AQ) is a McKinsey solution developed in 2017 to standardize the measure of analytics maturity across sectors. The AQ survey has been taken by over 120 companies, across industries worldwide. Analytics leaders are defined as the top quartile of companies as determined by overall AQ score.

According to Gartner, big data in the banking industry has the highest level of opportunity due to the high volume and velocity of data available. Globally, Financial

Services and Banking is taking the lead in applying progressive big data technologies and data science techniques, followed by Telecommunications and Retail.



"Big Data Analytics in the Banking market is expected to register a CAGR of 22.97% during the period of 2021-2026."

Mordor Intelligence

There are multiple internal data sources in banks - including relational databases, XML data, Data Warehouses, enterprise applications such as ERP and CRM. Banks also have a large amount of external data about their customers

in the form of website visits, tweets, Facebook wall posts, searches, streams, videos, etc. This huge amount of data needs to be stored, processed, and analyzed to let banks solve real business problems that banks face nowadays.

Typical banking sources of big data include:



Customer bank visits



Call logs



Web interactions



Credit card histories



Social media



Transaction type



Banking volumes

Happily, advances in technology - such as processing power, data warehouse storage - as well their reliability make it easier for banks to apply them for solving high-impact business problems. Moreover, it is now data scientists who play a crucial role in applying big data tools and mathematical algorithms to each specific business problem. And there is no doubt that banks of all sizes, shapes, and forms need to incorporate data science into

their operating models.

What are bank business problems that data science can actually solve? They are multiple. Application of big data in banking varies from marketing (marketing campaigns efficiency, next best offer, personalized messages), through operational efficiency (ATM cash optimization, capacity planning) to human resources management (predictive recruitment modeling).

Application of data science in banking

Marketing

- marketing-spend optimization
- personalized messages

Product design & pricing:

- conjoint analysis for product configuration
- elasticity modeling for pricing
- predicting demand modeling

Sales & Relationship building

- next product to buy propensity model
- frontline tools
- churn-prediction-propensity model
- channel management
- multi-channel journey analysis

Operations

- capacity-planning model
- network-optimization model
- identification of service pain points and simulate trade-offs
- ATM cash optimization

Risk, servicing, collection

- customer-centric risk assessment
- fraud-prediction assessment
- early-warning system and tailored offers based on system and collector data

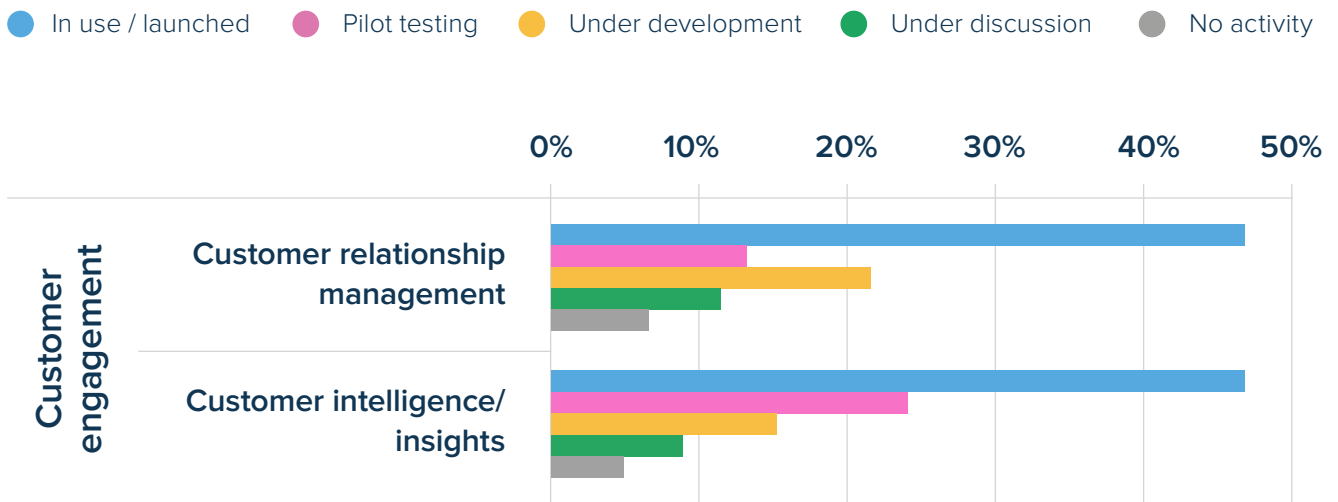
People / Performance management

- real-time executive dashboards
- action boards
- predictive recruitment mode

According to the latest EBA report, considerable use of data science is focused on achieving a customer-centric view. For example, analysis of big data can help banks better target the right product to the right

customer at the right time. By correlating the social activities of a customer with a spending pattern, banks can customize and optimize the timing of their product offerings.

Current use of Big Data Analytics for customer engagement purposes



European Banking Authority

"Banks that want to create long-term value will need to adapt business models to help customers navigate through the crisis and its aftermath."

EY 'Three focus areas to help banks reframe their future'

Also, analysis of social media helps banks predict customer churn. As the study by EY shows, **63% of customers** in the United States trust online personal networks and communities on choosing various banking products.

Moreover, 45% of customers comment on social media channels on the quality of service they received.

The ability to monitor customer sentiment gives banks early signals - and allows banks to be proactive in improving the customer experience, their engagement with the brand, thus saving costs and preventing revenue loss.

Analytics techniques can also play a significant role in fraud detection - allowing organizations to extract, analyze, and interpret business data to increase the probability of fraud and implement effective fraud detection systems.

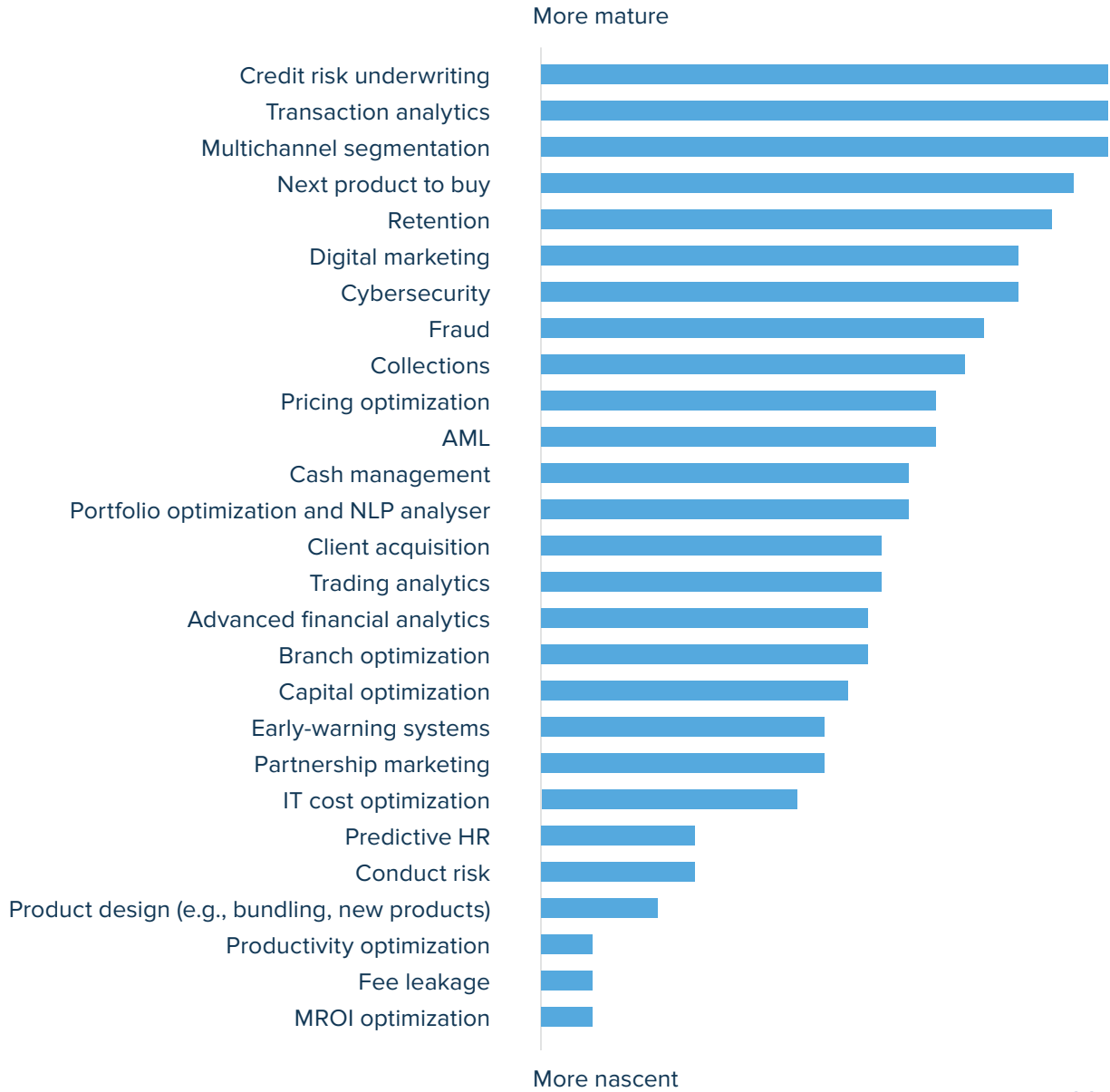
All in all, big data opens huge opportunities for banks. According to EY predictions, by 2030, banks will deepen their personal connections with customers via data analysis techniques that might seem fantastic by today's standards.

Although financial institutions have increased their awareness about data-field tools, some analytics applications are still in their nascent stage.

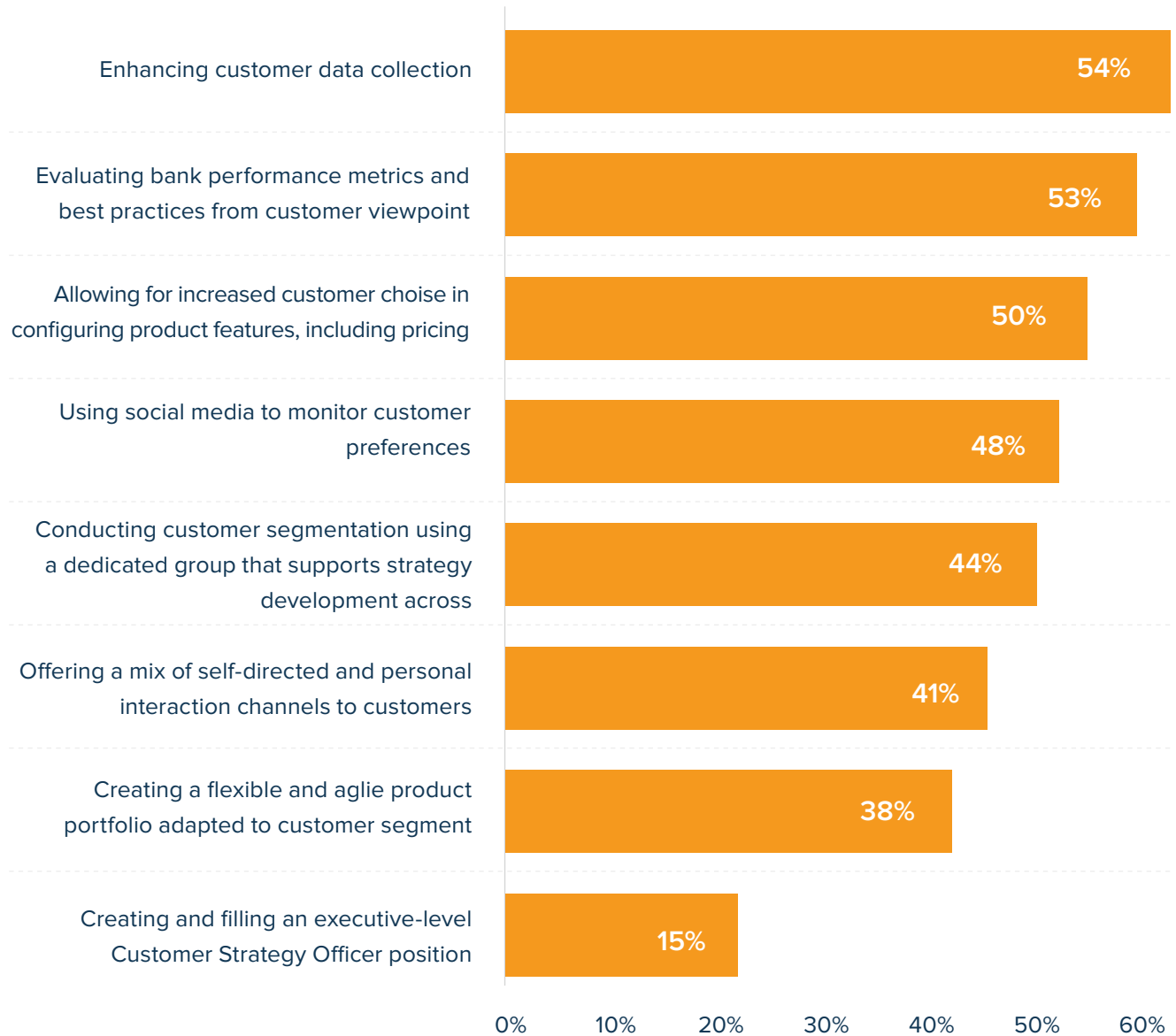
According to McKinsey, credit risk underwriting, transactional analytics, and multi-channel segmentation are the leading use cases of data analytics in banking. Other applications such as fee leakage detection and MROI optimization are to gain momentum in the coming years.

Banks are increasingly deploying more sophisticated analytics use cases in early stages, but not yet at scale.

Percent of banking responders deploying use case at scale



Areas of significant effort in coming years



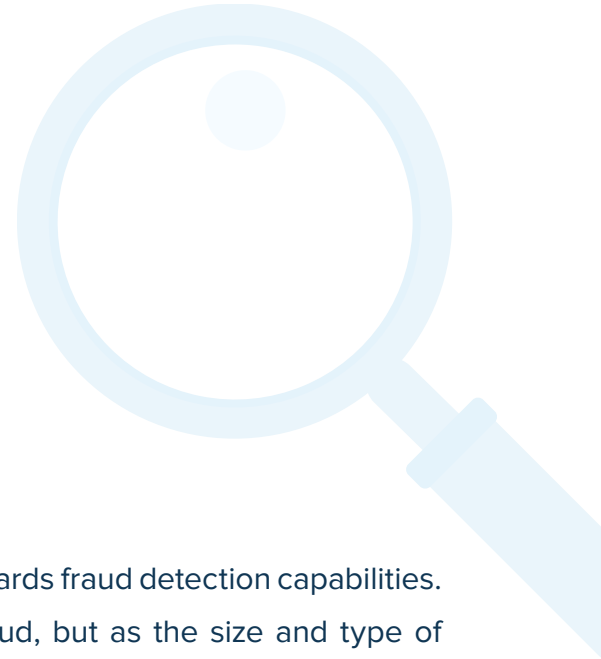
PwC Banking 2020 Survey

Therefore, in coming years, banking institutions will continue to look into the data-driven ways of customer engagement and interaction. Personalized services across channels will continue to enhance the consumer experience by demonstrating the interest of financial institutions for evolving customer needs.

BANKING. CASE STUDIES

Case study

#1 Fraud detection



BUSINESS PROBLEM

A leading Eastern European bank needed to improve its credit cards fraud detection capabilities. The existing process was detecting and preventing some fraud, but as the size and type of fraud varied and changed correspondingly, the bank required a new, more sophisticated system to provide efficient protection for the bank's customers.

SOLUTION PROVIDED

InData Labs offered to build an intelligent system that would detect fraud in real-time. The system applies the data analysis approach to create patterns on each client's behavior based on all of their previous transactions live. Then it enriches this information with third-party data (e.g. social media data, geo-location) - such as geo data taken from the bank's mobile application. Transactions that do not fit into the cardholder's profile are marked as suspicious. Cardholders' profiles are updated with every single new transaction the system uses self-learning techniques to constantly adapt to any changes in cardholders' behavior.

BENEFITS

- Fraudulent transactions are successfully distinguished from legitimate transactions
- Fraud prevented or minimized
- Decreased operating costs thanks to an automated approach

Case study

#2 Contact center efficiency optimization

BUSINESS PROBLEM

A mid-size European bank faced the problem of rapidly rising call center operating costs and declining customer satisfaction. The bank's agents often had to make multiple transfers and switches of calls, with sometimes no result for the person who was calling. It became evident that the bank needed to improve the contact center operations.

SOLUTION PROVIDED

To solve these problems, InData Labs has proposed to tackle two major issues:

- To reduce the overall volume of calls and the number of transfers
- To turn call centers into sales centers - implementing a customer-centric approach

InData Labs has developed a solution that solves both of these issues simultaneously - a system that would understand why people call to offer the best service in the shortest time possible.

The system provides call center analytics that merges real-time and historical data to anticipate customer needs ahead of time. With this system, the bank's agents can learn in advance the reason behind customer calling and solve the problem before the customer even expects it to be solved.

For example, if the client encounters that his card or online banking passcode has been blocked, the system detects it in advance. It predicts that the client will call the contact center very shortly and ask to unblock it - so in real-time the system notifies the contact center operator about the problem thus giving some time to handle it. Thus, early problem identification allows to shorten client's waiting time and enhance client's user experience in addition to providing bank systems with more time to deal with the problem in advance.

BENEFITS

- Reduced operating costs
- Improved cross-sales and up-sales success rates
- Increased customer loyalty

Case study

#3 Customer churn analysis



BUSINESS PROBLEM

A large European bank confronted a serious issue - it was losing customers in favor of a competing bank. So its management needed to answer the question - to identify the customers that were most likely to churn and offer them superb customer service in advance to keep them happy and loyal.

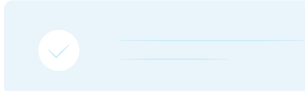
SOLUTION PROVIDED

InData Labs has developed a customer churn prevention system delivering analytics on each client on a real-time basis. In this decision-based system, mathematical algorithms and machine learning techniques are applied to massive amounts of historic data available on lost customers. Based on this data, a churn model is developed. The system identifies very accurate behavioral patterns and applies them successfully to existing customers. Each customer is given a score that measures potential attrition on the basis of as many factors as possible. Moreover, the system models every situation and gives recommendations on the next best action for the customer to prevent churn (e.g., providing competing offers such as higher rates, fewer fees, or even a gift).

For example, the bank's client used to get salary on a bank account at the certain date of each month, however these transactions stopped. The system analyzes it in real-time, assuming that the client has changed or lost the job. To avoid the client's leaving the bank to use his/her new employer's preferred bank, the bank is able to offer him adjacent banking products (e.g. savings account). To verify if the client has lost his job, the bank gives him a courtesy phone call. As a result, the customer stays loyal to the bank, being ready and happy to keep using this bank's products and services later on.

BENEFITS

- Upgraded customer service
- Increased customer loyalty
- Reduced attrition rates
- Identification of profitable customers to approach them directly



Case study

#4 Risk management



BUSINESS PROBLEM

A large Western European bank wanted to implement a new system that would apply accurate methods to determine the credit risk of an individual or a legal entity. Basically, the bank needed a tool that would analyze credit applicants and determine their risk level with a very high probability in a very short period of time.

SOLUTION PROVIDED

To help the bank, InData Labs has developed a sophisticated analytical tool that is able to predict loan defaults with a very high probability. The high probability is reached thanks to a high-end predictive model developed by InData Labs` data scientists on the basis of enriched analysis of various data sources.

In terms of historical data, the system gathers and analyzes internal sources of information in the bank, such as credit reports and applications, repayment rates of credit applicants, and any information on default and recovery for borrowers. It also analyzes data from emails, website usage, and call centers. This sophisticated analysis is then enriched with data analytics from local credit bureaus and behavioral information from social media activities and other online sources of information (blogs, Google search, etc.).

As a result, the solution can provide the credit score for each applicant almost in real-time and with very high predictability of risk.

BENEFITS

- Higher credit scoring accuracy
- Improved credit decisions
- Credit risk-controlled and managed
- Healthy credit portfolio



Case study

#5 Centralized marketing campaigns

BUSINESS PROBLEM

A European bank was losing its market share. It became evident that the bank was no longer meeting customer needs. The bank identified that the major problem was hidden in its ineffective marketing efforts.

A seasoned solution was required to solve the following burning problems:

- Ineffective marketing campaigns
- Fragmented marketing strategy across various channels
- Long evaluation of campaigns performance
- Challenges to present marketing campaigns results to senior management in real-time

SOLUTION PROVIDED

InData Labs has offered to implement a customer-centric approach within the bank with the help of a centralized marketing platform, which:

- Connects every channel of communication with customers to a centralized system
- Provides a 360-degree view of the customer and gives recommendations
- Analyzes social data and track what customers need and want in real-time
- Measures and evaluates each marketing campaign effectiveness

To reach the above objectives, the platform has been realized in two stages:

- As the first step, a data lake has been created – one big data repository that consolidates the bank's structured and unstructured data from internal and external sources such as enterprise applications, credit card payment histories, loyalty programs, web clickstreams, social interactions, locational data, etc.



- During the second phase, InData Labs has built a consumer intelligence software that applies mathematical algorithms and machine learning techniques to match all data available for one particular customer. Thus, one single enriched profile for every customer is created. This profile gives a clear vision of each consumer's preferences to buy certain types of products.

The system is also able to provide recommendations on which products to whom at what time might be offered. Now the bank's employees conduct marketing campaigns via all or selected channels and measure effectiveness shortly with easy-to-make and user-friendly visualized reports.

BENEFITS

- Substantial increase in average campaign response rate
- Centralized marketing strategy across various departments
- Quick and easy reporting to senior management

ABOUT INDATA LABS

Our team delivers high-end engineering services & intelligent data analysis to achieve increased profitability of every business through constant innovation, insightful & data-driven management. Leveraging the latest big data technologies with a highly professional & talented team of data engineers, statisticians & mathematicians, we help our clients solve high-impact business problems in Marketing, Supply Chain Management, Fraud Detection, Risk Analytics to name just a few areas. Our core industry competencies are FMCG & Retail, Finance, Supply Chain & Logistics, Sport & Wellness, Digital Health.

Big Data Strategy Consulting

- Use cases definition & prioritization
- Architecture design
- Road Map elaboration and Strategy report delivery

Engineering

- End-to-end deployment and management of Big Data platform
- Big Data integration services
- System engineering & technical support service

Data Science

- Customer analytics with our internal flagman products - MoneyGraph & Snipe Mathematical models & algorithms developed by our R&D Lab
- Predictive analytics solutions

More information about InData Labs services is available on the Web at www.indatalabs.com