Capgemini Consulting

Big Data Alchemy: How can Banks Maximize the Value of their Customer Data?

Banks Have Not Fully Exploited the Potential of Customer Data

> *60% of financial institutions in North America believe that big data analytics offers a significant competitive advantage and 90% think that successful big data initiatives will define the winners in the future.*
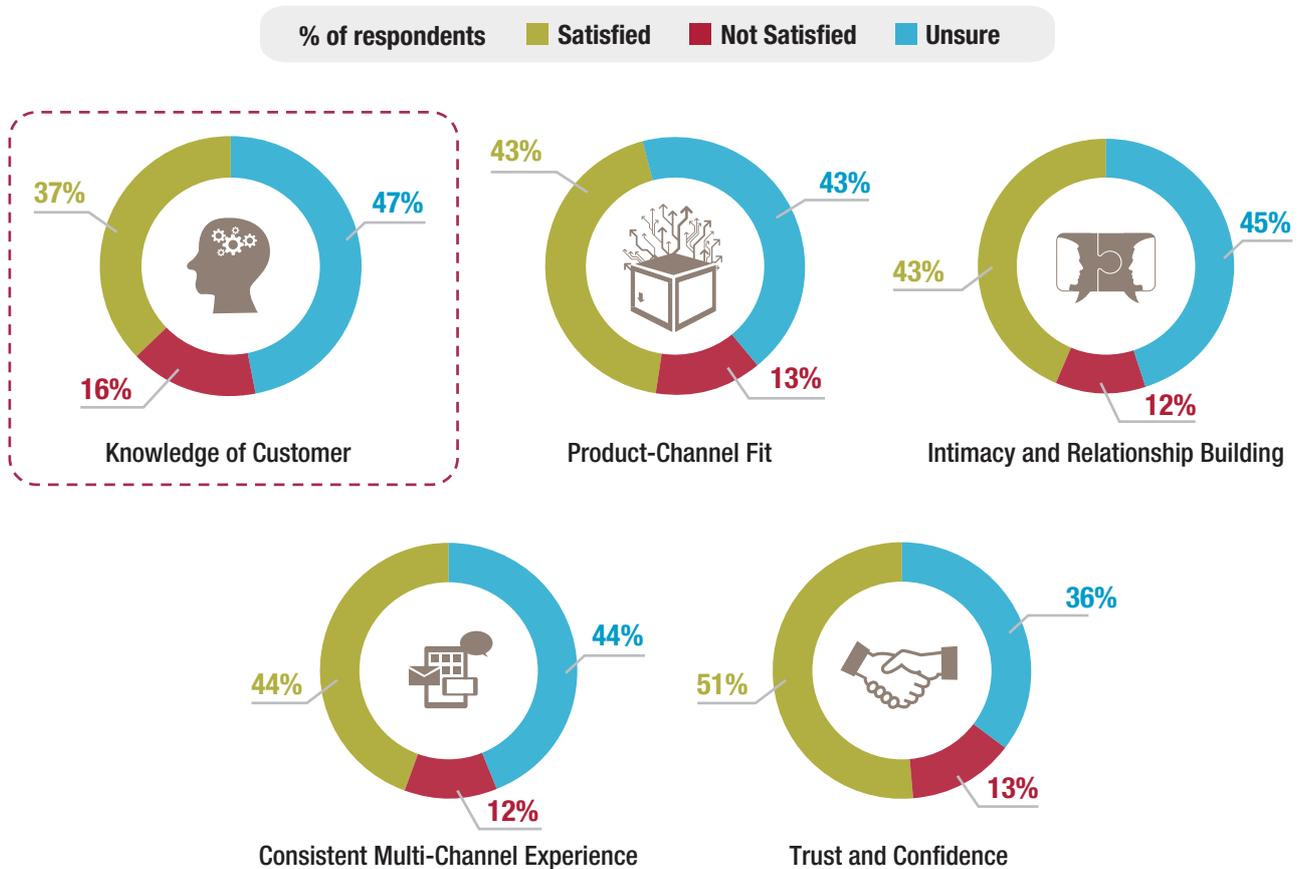
Banks are Struggling to Profit from Increasing Volumes of Data

More than 70% of banking executives worldwide say customer centricity is important to them[1]. However, achieving greater customer centricity requires a deeper understanding of customer needs. Our research indicates that only 37% of customers believe that banks understand their needs and preferences adequately (see Figure 1).

This may be surprising given the increasing volume and variety of data that banks have about their customers. The frequent use of web and mobile channels has led to a steady increase in the number of customer interactions and, as a result, increasing volume of customer data. However, banks are only using a small portion of this data to generate insights that enhance the customer experience. For instance, research indicates that less than half of banks analyze customers' external data, such as social media activities and online behavior. Further, only 29% analyze customers' share of wallet[a], one of the key measures of a bank's relationship with its customers[2].

Figure 1: Customer Satisfaction across Five Core Areas of the Customer–Bank Relationship

% of respondents   ■ Satisfied   ■ Not Satisfied   ■ Unsure

Knowledge of Customer — 37% Satisfied, 16% Not Satisfied, 47% Unsure

Product-Channel Fit — 43% Satisfied, 13% Not Satisfied, 43% Unsure

Intimacy and Relationship Building — 43% Satisfied, 12% Not Satisfied, 45% Unsure

Consistent Multi-Channel Experience — 44% Satisfied, 12% Not Satisfied, 44% Unsure

Trust and Confidence — 51% Satisfied, 13% Not Satisfied, 36% Unsure

Source: Capgemini and EFMA, Retail Banking Voice of the Customer Survey, 2013.

a) Customers' share of wallet is the percentage of financial services products customers have with a particular bank relative to all of the financial services products they hold.

> *Only 37% of banks have hands-on experience with live big data implementations, while the majority of banks are still focusing on pilots and experiments.*

It is certainly strange given that the value of big data is clear to business leaders across the financial services industry. Over 60% of financial institutions in North America, for instance, believe that big data analytics offers a significant competitive advantage. Additionally, over 90% believe that successful big data initiatives will determine the winners of the future[3]. However, knowledge of the impact of big data has not translated to on-the-ground investments. For instance, only 37% of banks have hands-on experience with live big data implementations, while the majority of banks are still focusing on pilots and experiments (see Figure 2).

In the next section, we examine some of the reasons for this gap between the clear case for action and the will to achieve it.

Figure 2: Big Data Adoption Levels in Banks

Big data maturity levels (% of respondents)
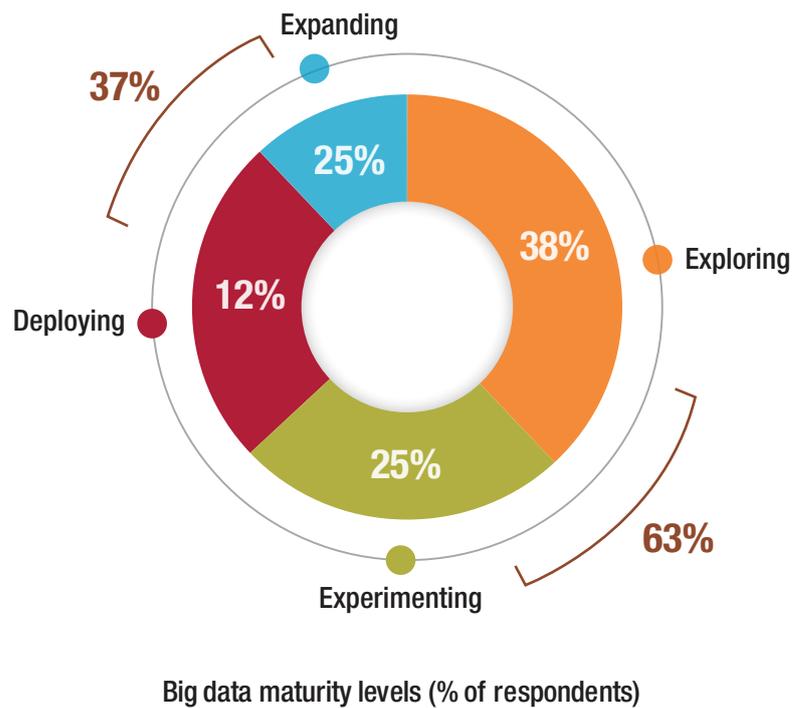
Source: Microsoft and Celent, *How Big is Big Data: Big Data Usage and Attitudes among North American Financial Services Firm, March 2013.*

Why are Banks Unable to Exploit Big Data?

Our research shows that 'organizational silos' are the biggest barrier to success in big data. Dearth of analytics talent, high cost of data management, and a lack of strategic focus on big data are also major stumbling blocks (see Figure 3). Finally, privacy concerns – which are high on many bank executives' agendas – are also a significant issue.

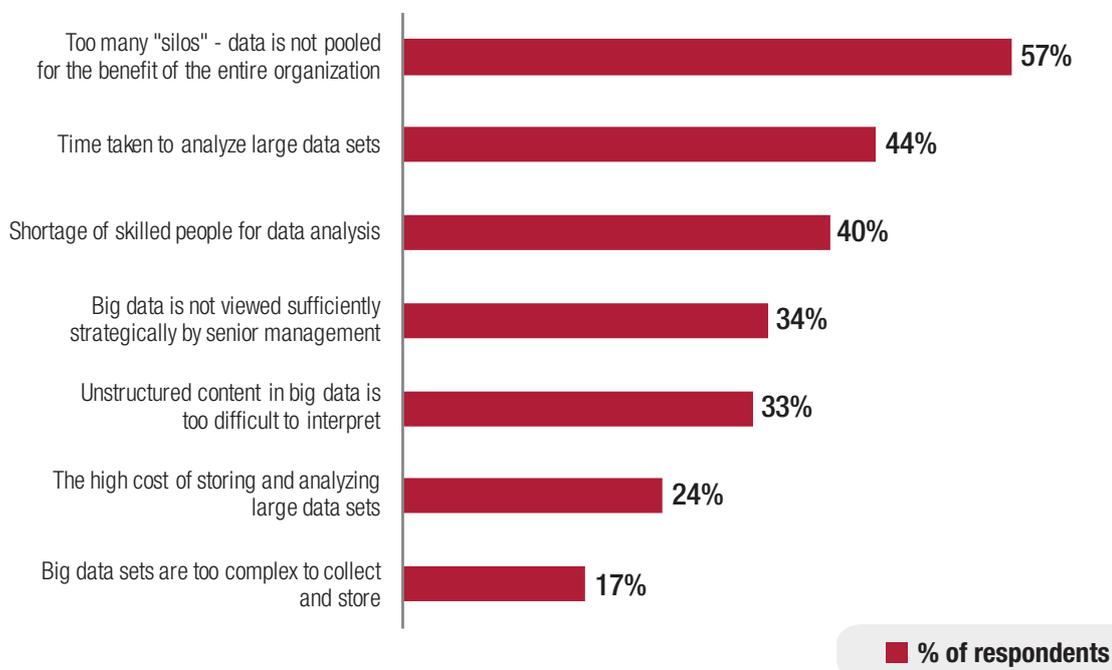## Silos of Data Block a Single Customer View

Customer data typically resides in silos across lines of business or is distributed across systems focused on specific functions such as CRM, portfolio management and loan servicing. As such, banks lack a seamless 360-degree view of the customer. Further, many banks have inflexible legacy systems that impede data integration and prevent them from generating a single view of the customer. For instance, Deutsche Bank embarked on a big data project to analyze a large amount of unstructured data, but faced difficulties in the extraction of data from legacy systems, and their integration with big data systems (see insert on Page 5).

> *Organizational silos constitute the top barrier to success in big data.*

Figure 3: Key Impediments to Big Data Success

What are your organization's three biggest impediments to using big data for effective decision-making (select up to three)?

Impediment	%
Too many "silos" - data is not pooled for the benefit of the entire organization	57%
Time taken to analyze large data sets	44%
Shortage of skilled people for data analysis	40%
Big data is not viewed sufficiently strategically by senior management	34%
Unstructured content in big data is too difficult to interpret	33%
The high cost of storing and analyzing large data sets	24%
Big data sets are too complex to collect and store	17%

■ % of respondents

Source: Capgemini and the Economist Intelligence Unit, *The Deciding Factor: Big Data and Decision-making,* 2012.

The Skills and Development Gap Needs Closing

Banks need new skill sets to benefit from big data analytics. New data management skills, including programming, mathematical, and statistical skills go beyond what is required for traditional analytics applications. For instance, 'data scientists' need to be not only well versed in understanding analytics and IT, they should also have the ability to communicate effectively with decision makers. However, this combination of skills is in short supply[4]. Three-quarters of banks do not have the right resources to gain value from big data[5]. Banks also face the challenge of training end-users of big data, who may not be data experts themselves but need to use data to enhance decision-making.

Lack of Strategic Focus: Big Data Viewed as Just Another 'IT Project'

Big data requires new technologies and processes to store, organize, and retrieve large volumes of structured and unstructured data. Traditional data management approaches followed by banks do not meet big data requirements. For instance, traditional approaches hinge on a relational data model where relationships are created inside the system and then analyzed. However, with big data, it is difficult to establish formal relationships with the variety of unstructured data that comes through. Similarly, most traditional data management projects view data from a static and/or historic perspective. However, big data analytics is largely aimed to be used in a near real-time basis. While most IT projects are driven by the twin facets of stability and scale, big data demands discovery, ability to mine existing and new data, and agility[6]. Consequently, by taking a traditional IT-based approach, organizations limit the potential of big data. In fact, an average company sees a return of just 55 cents on every dollar that it spends on big data[7].

Privacy Concerns Limit the Adoption of Customer Data Analytics

The use of customer data invariably raises privacy issues[8]. By uncovering hidden connections between seemingly unrelated pieces of data, big data analytics could potentially reveal sensitive personal information. Research indicates that 62% of bankers are cautious in their use of big data due to privacy issues[9]. Further, outsourcing of data analysis activities or distribution of customer data across departments for the generation of richer insights also amplifies security risks. For instance, a recent security breach at a leading UK-based bank exposed databases of thousands of customer files. Although this bank launched an urgent investigation, files containing highly sensitive information — such as customers' earnings, savings, mortgages, and insurance policies — ended up in the wrong hands[10]. Such incidents reinforce concerns about data privacy and discourage customers from sharing personal information in exchange for customized offers.

So how can banks effectively overcome these challenges? What are some of the key areas that they should focus on? In the next section, we discuss some starting points for banks in their big data journey.

> ❝
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> ❞

Big Data Plans at Deutsche Bank Held Back due to Legacy Infrastructure

Deutsche Bank has been working on a big data implementation since the beginning of 2012 in an attempt to analyze all of its unstructured data. However, problems have arisen while attempting to unravel the traditional systems – mainframes and databases, and trying to make big data tools work with these systems.

The bank has been collecting data from the front end (trading data), the middle (operations data) and the back-end (finance data). Petabytes of this data are stored across 46 data warehouses, where there is 90% overlap of data. It is difficult to unravel these data warehouses that have been built over the last two to three decades. The data integration challenge and the significant investments made by the bank in traditional IT infrastructure pose a key question for the bank's senior executives – what do they do now with their traditional system? They believe that big, unstructured and raw data analysis will provide important insights, mainly unknown to the bank. But they need to extract this data, streamline it and build traceability and linkages from the traditional systems, which is an expensive proposition.

Source: Computerworld UK, Deutsche Bank: Big data plans held back by legacy systems, February 2013.

How Can Banks Realize Greater Value From Customer Data?

Customer Data Analytics is a Low Priority Area for Banks

Most banks have not focused significant energy on using analytics to enhance customer experience. Our survey with the EFMA indicates that risk management has been a high-priority focus area for most banks, mainly to comply with regulatory requirements, while customer analytics has largely been neglected (see Figure 4)[11].

Customer Analytics has Proven Benefits from Acquisition to Retention Processes

Research showed that banks that apply analytics to customer data have a four-percentage point lead in market share over banks that do not. The difference in banks that use analytics to understand customer attrition is even more stark at 12-percentage points[12].

We believe banks can maximize the value of their customer data by leveraging big data analytics across the three key areas of customer retention, market share growth and increasing share of wallet (see Figure 5).

> **Banks that apply analytics to customer data have a four-percentage point lead in market share over banks that do not.**

Big Data Analytics Helps Maximize Lead Generation Potential

Big data solutions can help banks generate leads for customer acquisition more effectively. Take the case of US Bank,

Figure 4: Banks have Limited Focus and Capabilities around Customer Analytics

the fifth largest commercial bank in the US. The bank wanted to focus on multi-channel data to drive strategic decision-making and maximize lead conversions. The bank deployed an analytics solution that integrates data from online and offline channels and provides a unified view of the customer. This integrated data feeds into the bank's CRM solution, supplying the call center with more relevant leads. It also provides recommendations to the bank's web team on improving customer engagement on the bank's website. As a result, the bank's lead conversion rate has improved by over 100% and customers receive an enhanced and personalized experience. The bank also executed three major website redesigns in 18 months, using data-driven insights to refine website content and increase customer engagement[13].

Advanced Analytics Improves Credit Risk Estimation by Exploring Diverse Datasets

Assessing risks and setting the right prices are key success factors in the competitive retail banking market. Existing scoring methodologies, mainly FICO scores[b], assess credit worthiness based solely on a customer's financial history. However, in order to ensure a more comprehensive assessment, credit scores should also include additional variables such as demographic, financial, employment, and behavioral data. By using advanced predictive analytics based on these additional data points, banks can significantly enhance their credit scoring mechanisms.

b) FICO score is the most widely used credit score model in the US. It takes into account factors in a person's financial history such as payment history, credit utilization, length of credit, types of credit used, and recent searches for credit.

For instance, although 'current account' balance levels and volatility are good indicators of financial robustness and stability, transaction drill-down analysis provides in-depth insights about customers. It enables the segmentation of customers based on spending behavior. Several start-ups are also leveraging social network data to score customers based on credit quality. These include Zest Finance and Kreditech[14]. Other startups such as LendUp and Lendo even provide loan services based on social network data[15].

'Next Best Action' Analytics Models Unlock Opportunities to Drive Top Line Growth

From 'next best offer' to cross-selling and up-selling, the insights gleaned from big data analytics allows marketing professionals to make more accurate decisions. Big data analytics allows banks to target specific micro customer segments by combining various data points such as past buying behavior, demographics, sentiment analysis from social media along with CRM data. This helps improve customer engagement, experience and loyalty, ultimately leading to increased sales and profitability.

Predictive Analytics can Improve Conversion Rates by Seven Times and Top-line Growth Ten-fold

We studied the impact of using advanced, predictive analytics on marketing effectiveness for a leading European bank. The bank shifted from a model where it relied solely on internal customer data in building marketing campaigns, to one where it merged internal and external data sets and applied advanced analytics techniques to this combined data set. As a result of this shift, the bank was able to identify and qualify its target customers better. In fact, conversion rates of prospects increased by as much as seven times[16].

> ❝ *At US Bank, analytics enabled a single customer view across online and offline channels, which improved the bank's lead conversion rate by over 100%.* ❞

In another instance, a European bank built a 'propensity to save' model that predicts the probability of its customer base to invest in savings products, which in turn leads to increased cross-selling. The input to this model included data sets of 1.5 million customers with over 40 variables. The analytics team tested over 50 hypotheses through logistic regression propensity models to calculate the probability of savings for each customer. The pilot branches where this model was implemented witnessed a 10x increase in sales and a 200% growth in conversion rate over a two-month period compared to a reference group[17].

Big Data Analytics Helps Banks Limit Customer Attrition

A mid-sized European bank used data sets of over 2 million customers with over 200 variables to create a model that predicts the probability of churn for each customer. An automated scorecard with multiple logistic regression models and decision trees calculated the probability of churn for each customer. Through early identification of churn risks, an outflow of nearly €30 million per year was avoided[18].

Figure 5: How can Big Data Analytics Help Banks Maximize Value from Customer Data?
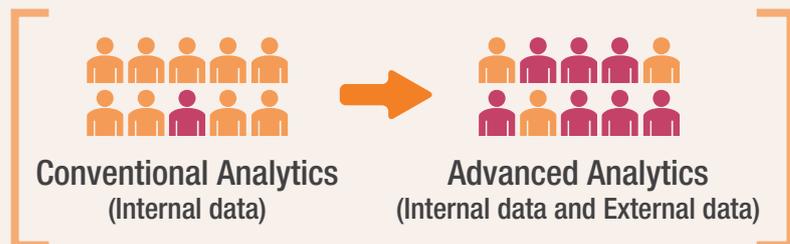

Acquire Customers

Improve Credit Risk Estimation

Maximize Lead Generation Potential

Grow Share of Wallet

Drive Efficiency of Marketing Programs

Increase Sales Through Predictive Analysis

Big Data Analytics

Retain Customers

Limit Customer Attrition

Improve Customer Satisfaction

Source: Capgemini Consulting analysis.

How Can Banks Realize Greater Value From Customer Data?

Acquire New Customers

Leading European bank

Advanced analytics increased the conversion of prospects by **7 times**

Conventional Analytics
(Internal data)

→

Advanced Analytics
(Internal data and External data)

Drive Share of Wallet

European bank

10x increase in **sales** and **200%** growth in **conversion rate** for the product in scope

The data input included **1.5 Mn** customer data across **40** variables

Limit Customer Attrition

Mid-sized bank

Analyzed over **2 million** customers across **200+** variables

→

Developed **automated scorecards** and multiple logistic **regression models** and **decision trees**

→

Early **identification** of cancellation **risks** helped

avoid an outflow of about **€30 Million**

Bank of America Leverages Big Data Analytics to Deliver Consistent Customer Experience and Detect Risks Early

Needs or Events-Based Marketing

Bank of America is focusing on big data with an emphasis on an integrated approach to customers and internal operations. The key objective of its big data efforts is understanding the customer across all channels and interactions, and presenting consistent, appealing offers to well-defined customer segments. For example, the bank utilizes transaction and propensity models to determine which of its primary relationship customers may have a credit card, or a mortgage loan that could benefit from refinancing. When the customer accesses the bank's online channel, calls a call center, or visits a branch, that information is available to the online app, or the sales associate to present the offer. The bank has launched a program called 'BankAmeriDeals', which provides cash-back offers to holders of the bank's credit and debit cards based on analyses of where they have made payments in the past.

Risk Management

The bank moved from a shared-services data modeling environment to a dedicated 'Grid Computing' platform to drive operational efficiency by early detection of high-risk accounts. The initiative is benefiting the bank in several ways, such as reducing its loan default calculation time for a mortgage book of more than 10 million loans from 96 hours to just four. The bank is also able to process ad hoc jobs at three times the speed of the previous environment.

Governance Structure

The bank modified its organizational structure in line with big data initiatives. The bank historically employed several quantitative analysts, but in order to support its big data initiatives, the bank consolidated dispersed analytics talent. The bank also set up matrix reporting lines from its analytics teams to a central analytics group as well as business units. This has improved visibility and reusability of initiatives along with providing customized services specific to a function or a business unit.

Source: International Institute for Analytics and SAS, *"Big Data in Big Companies", May 2013.*

Given that there are numerous avenues for the application of customer data analytics, where and how should banks begin? In the next and concluding section, we present a structured approach for banks to industrialize their big data efforts across the organization.

How Can Banks Scale-up to the Next Level of Customer Data Analytics?

Transformation across Culture, Capabilities and Technology is Critical for the Success of Big Data Initiatives

In order to graduate to higher levels of maturity in customer data analytics, banks will need to build the right organizational culture and back it up with the right skill sets and technological components (see Figure 6).

Drive a Shift from a 'Data as an IT-asset' to a 'Data as a Key Asset for Decision-Making' Culture

Effective big data initiatives require cultural changes within the organization and a concerted shift towards a data-driven behavior. To drive successful big data programs, banks should strive towards full executive sponsorship for analytics initiatives, develop and promote a company-wide analytics strategy, and embed analytics into core business processes. In essence, banks need to graduate towards a model where analytics is a company-wide priority and an integral element of decision-making across the organization.

Develop Analytics Talent with a Targeted Recruitment Process and Continual Training Programs

As a first step towards building expertise in customer data analytics, banks will need to establish a well-defined recruitment process to attract analytics talent. Further, disparate analytics teams should be consolidated into an Analytics Centre of Excellence (CoE) that promotes the sharing of best practices and supports skills development. Banks must also invest in continually training their analytics staff on new tools and techniques. Finally, specialized training programs should be developed for line of business personnel, to train them in the use of analytics to enhance decision-making.

Figure 6: Roadmap to Building Analytics Maturity

	Level of Maturity		
	Beginner	**Proficient**	**Expert**
Culture	Preliminary analytics strategy, but little buy-in from leadership	Analytics used to understand issues, develop data-based options across the business	Full executive sponsorship of analytics
Capabilities & Operating Model	Pockets of reporting and analysis capability Dispersed talent	Well-defined recruitment process to attract analytics talent Budget for analytics training	Analytics Centre of Excellence to promote best practices Strategic partnerships for supplementary analytics skills
Data	No defined data infrastructure Conflicting, informal and dispersed data	Data available for existing and potential customers Most data is still unstructured and internal	Internal, external and social media data is merged to build an integrated and structured dataset
Technology	Poor data governance Basic data reporting using mainly spreadsheet based tools	Use of some statistical and forecasting tools Coherent procedures for data management	Established, robust master data management framework for structured and unstructured data sets
Sample Applications of Customer Data Analytics	Mass/random targeting of customers to increase product profitability using basic product eligibility criteria	Basic profiling of customer base with customized analysis on drivers of purchase of each product individually	Analyzing customer behavior across channels to predict interest areas; developing personalized products and services

Source: Capgemini Consulting.

Establish a Strong Data Management Framework for Structured as well as Unstructured Data

The quality, accuracy, and depth of customer data determine the value of customer insights. Consequently, banks will need to establish robust data management frameworks to formalize the collection, storage and use of structured as well as unstructured data. Additionally, banks must graduate to more advanced analytics techniques such as predictive and prescriptive analytics that enable more precise modeling of customer behavior. These in turn will drive increased cross-selling opportunities, pricing optimization and targeted offerings.

Move Up the Analytics Maturity Curve with Three Sequential Controlled Steps

Big data initiatives are typically time and resource-intensive. To pave the way for a smooth implementation, we recommend a three-step approach that begins with an assessment of existing analytics capabilities (see insert on Page 12) and is followed by the launch of pilot projects, which are subsequently expanded into full-scale organization-wide programs (see Figure 7).

A capability assessment at the beginning of a big data program will provide banks with a view of analytics capability gaps that are holding them back, such as untapped data assets and key external data sets that are required to create a holistic view of the customer. With a clearer view of capability gaps, banks will be better placed to prioritize their actions and investments.

Following a capability assessment, we recommend that banks undertake their transformation journey in controlled steps, rather than in a giant leap. As such, banks should first identify and focus on a few small pilot projects, and use these as opportunities to test the efficacy of new analytics tools and techniques. For instance, Rabobank, the Netherlands-based banking and financial services company, started its big data initiative with a clear goal – to improve efficiency in business processes by analyzing customer data (see insert on Page 13). Based on the learning from a pilot project, banks can modify how they manage big data, add more complexity to use cases and subsequently rollout big data initiatives across the organization.

Figure 7: Key Steps to Effective Big Data Initiatives

Stage 1
Assess Big Data Analytics Capabilities

Stage 2
Begin with a Pilot Big Data Use Case

Stage 3
Extend Big Data Initiatives across Organization

Source: Capgemini Consulting.

Assess Your Big Data Maturity

For each answer, select the option that you most closely relate with your organization

	1	3	5
Do you have the right culture for driving big data analytics?			
Would you describe your organisation as data-driven?	No, we largely rely on intuition	We use limited analytics to develop data-based decision options for the business	Collection and analysis of data underpins our business strategy and day-to-day decision making
How important will big data be to decision-making in your organisation in the next five years?	We are not yet impacted	To a limited extent	We expect big data to be a key component of decision-making going forward
How do your business and IT teams operate?	Both teams operate separately, with the business team giving guidelines and IT implementing	Business and IT teams come together, but only for key projects driven from the top	We have joint steering committees where business and IT teams work together as one team
Does your organization have the capabilities for benefiting from big data?			
What is your investment level in analytics capabilities?	We largely use adhoc tools based on individual experience with data analysis	We have analytics teams in different business units who largely work independently	We have a centralized analytics team that constantly invests in skill upgradation and works with smaller capability groups across the company
How do you develop big data analytics capabilities?	We rely solely on in-house trainings	We rely on a mix of in-house and external trainings from third-party institutions such as universities	We have multiple partnerships with specialist analytics firms that help in building long-terms capabilities in-house
Do you have the right data that big data analytics demands?			
How structured are your datasets?	We don't have a defined data policy	We have data availability, but in silos, and most data is limited to existing and some potential customers	We rely on structured internal data sets, and combine them with external data sets. We then integrate them with social media to create a merged and integrated dataset that gives us a single view of the customer
How do you deal with growing data volume?	We haven't developed a defined policy on handling growing datasets	For those datasets that we have been tracking, we rely on historical growth volumes, while factoring in additional volume from external datasets	We have well-defined systems and policies to cope with the explosion in datasets that we are already seeing
Do you have the technology to ensure the success of big data Analytics?			
What tools do you use for big data analytics?	We don't use tools specific to big data. We use traditional tools that we have used for analytics in the past	We use some big data tools based on the dataset, but haven't standardized on their usage across the organization	We have a full suite of integrated technology driven tools that enables us to do both predictive and prescriptive analytics on customer data
How do you manage your data sets?	Most teams within the company manage data in their own formats	We have some data management guidelines, but they are not fully implemented yet	We have established, robust master data management framework for structured and unstructured data sets
Overall Score (0 - 45)			
Big Data Maturity	**Overall Score** **<9: Beginner, 10-30: Proficient, >30: Expert**		

Rabobank Embarked on a Big Data Journey by Adopting a 'Start Small and Add More Complexity Step-by-Step' Strategy

Rabobank named big data as one of the 10 most important trends in their 2013 yearly report and started developing a strategy around it. They created a list of 67 possible big data use cases, divided them into four categories – fix organizational bottlenecks, improve efficiency in business processes, create new business opportunities and develop new business models. For each of these categories they measured IT impact, time required for implementation, and business value proposition. The bank moved ahead with big data applications for the improvement of business processes due to their low IT impact and the possibility of a positive ROI.

Rabobank started with a few proof-of-concepts using only internal data. Later, the bank extended the scope of its big data program to include web data (click behavior), social network data, public data from government sources and macro-trend data. The bank built small clusters using open-source technology to test and analyze unstructured data sets, which kept costs low and offered the scalability to expand. A dedicated multidisciplinary team was setup to implement big data use cases. The team experimented with small and short implementation cycles.

One of the use cases at Rabobank involved analyzing criminal activities at ATMs. Rabobank found that the proximity of highways, and the season and weather conditions increased the risk of criminal activities. The bank also used big data tools to analyze customer data to find the best locations for ATMs. Based on its initial success with big data analytics, Rabobank is now focusing on addressing more pressing big data issues around privacy concerns and data ownership.

Source: BigData-Startups.com, *With Proof of Concepts, Rabobank Learned Valuable Big Data Lessons*, 2013.

Implementation challenges remain the biggest hurdles towards the effective use of customer data analytics by banks. While pilots deliver quick and measurable results, banks need to concurrently lay the foundations to effectively scale-up big data initiatives. The key lies in adopting a comprehensive approach, where pilots are backed by a well-defined data strategy and data governance model. The first step towards such an approach lies in altering traditional mindsets. Big data initiatives must be perceived differently from traditional IT programs. They must extend beyond the boundaries of the IT department and be embraced across functions as the core foundation for decision-making. Only then will banks be able to make the best use of their vast and growing repositories of customer data.

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Customer Value Analytics

Capgemini Consulting's Customer value analytics solution identifies levers of profit improvement and growth across online and offline channels for clients, leveraging customer behavioural and preference patterns. The solution is sector-specific, and has specific modules developed for the Banking, Automotive & Insurance industries. The solution spans the entire customer journey, providing clients multiple opportunities to drive their top line through increased acquisition, an expanding share of wallet, demand forecasting and reduction of customer attrition. Several pre-built components like ready to use analytical platforms, proof of concept and data diagnostic methodologies, pre-fabricated models and use cases allow for quick deployment in project delivery.

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