



Perficient®

Big Data Planning Guide for Financial Services



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Consulting Sources



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Abstract

This industry white paper provides information to financial institutions concerning ways to leverage and achieve a better understanding of how unmanaged and social data can be combined with managed internal data to drive new insights into customer behaviors.

Perficient white papers and research studies are based on actual collaboration and information sharing among senior IT professionals and industry experts at Perficient, and provide real-world insight and best practices on key topics facing financial services and banking professionals today.

Introduction

Big Data is not new to the financial services industry, but the evolution of Big Data use cases is changing quickly as more technologies and new banking capabilities are explored. Research shows unstructured data will account for more than 90 percent of the digital world. Along with the traditional structured sources companies are used to managing, data presents a big opportunity for financial institutions to transform information into customer-driven and growth-driven intelligence. The sheer volume and velocity of data in banking is making it very hard for the industry to ignore as a challenge.

The financial services industry's initiatives around Big Data are still in the infancy stages of development. As a result, banks must be able to do the following to be successful:

1. Recognize and address customer data issues
2. Overcome Big Data challenges
3. Understand the practical payoffs of Big Data
4. Identify low-risk strategies for enterprise adoption
5. Define meaningful uses of data for the enterprise
6. Turn data into insight to better understand their business, customers and market

The explosion of mobile device usage, the adoption of social media, along with the growth of multi-channel marketing in the corporate world has had a profound impact on the financial services industry. As experts predict the top strategic issues for 2013, banking CIOs will need to be leaders instead of followers as they strive to bring the enterprise together to focus more on transformational, data-driven solutions in a digitally enabled world.

What is Big Data?

When talking about Big Data, it is important to properly identify what it means to an enterprise, preferably with a broad definition such as Gartner's¹: "Big Data refers to high-volume, high-velocity, and high-variety of information assets that demand cost-effective, innovative forms of information processing for enhanced insight, decision making and process automation."

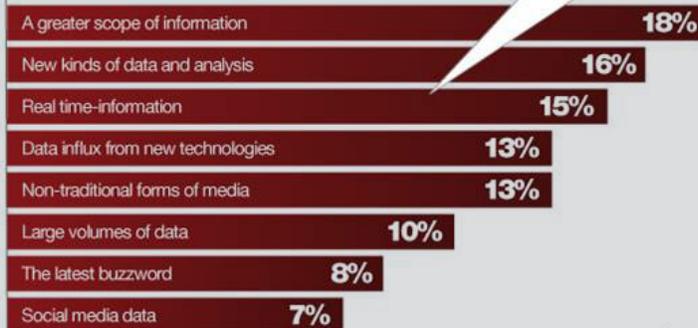
Often times, businesses do not distinguish Big Data from traditional data, with distinct analytics tools and management approaches. However, there are three elements required for a data set to qualify as Big Data.

Volume – Data is generated everywhere and is growing at unprecedented rates. Twitter generates 8 terabytes of data daily and millions of financial transactions are processed daily by banks which can be used to analyze consumer behavior. Big Data easily amasses terabytes – even petabytes – of information. 30 terabytes is a good point to start thinking about Big Data.

Velocity – The speed at which banks analyze data is critical. In the case of fraud detection, leveraging technology for continuous fraud protection and real-time analysis is paramount in order to maximize the data's value. Big Data (with latencies measured in milliseconds) changes fast and must be analyzed quickly.

Variety – Big Data is any type of data and must include structured, unstructured and/or semi-structured data such as clickstreams, log files, emails, customer service calls, rich media, social media, etc.

What do business executives think "big data" is?



Source: IBM

"Big Data is a very nebulous topic to a lot of people. There are capabilities of Big Data that people just don't think about yet. A number of gaps still exist as organizations explore the use of Big Data tools, especially around data visualization, in addition to fully grasping the concepts of how to make Big Data "actionable" for the business."

– Mike Panzarella, Director Industry Solutions for Perficient

Many financial institutions are still limited in data analysis despite an increasing number of internal and external or partner data sources. It is within these unstructured data sources that Big Data provides new insights and the biggest value for multi-channel services needed to gain a competitive advantage.

Top Data Sources in Financial Services

The convergence of social, mobile, cloud and expanding growth in data, coupled with advancements in technology, have allowed for the analysis of new data sources that financial institutions can utilize to gain a 360-degree view of their customers' terrestrial, digital and mobile behaviors. As companies explore the potential use cases of Big Data for their business, leveraging existing data sources will be imperative. The most common and easiest data sources used for Big Data initiatives in financial services, include:

- Financial transactions
- Social media streams
- Clickstreams (activity-generated data/web logs)
- Internal unstructured data
- Application log files
- In-stream monitoring
- Location-based data
- Digital/rich media

Below is a diagram (Figure 1) that supports the 360-degree view of a customer that can be created when financial institutions use enriched data delivered by analytics tools for enhanced executive decision making.

Delivering Value Across the Enterprise

The financial services market is a hot market for Big Data. There are so many use case patterns and banking trendsetters in this space that CIOs are already working through some of these information management challenges today. The easiest way to get started with delivering value is to talk to your peers, understand the key business challenges, and align these problems with your corporate goals and strategies. By taking a holistic approach to setting a Big Data strategy that involves many of the organizations' key stakeholders, financial institutions can better leverage and gain value from relevant information across the enterprise. (Figure 2, p.5)



Figure 1:
The Enhanced Customer View

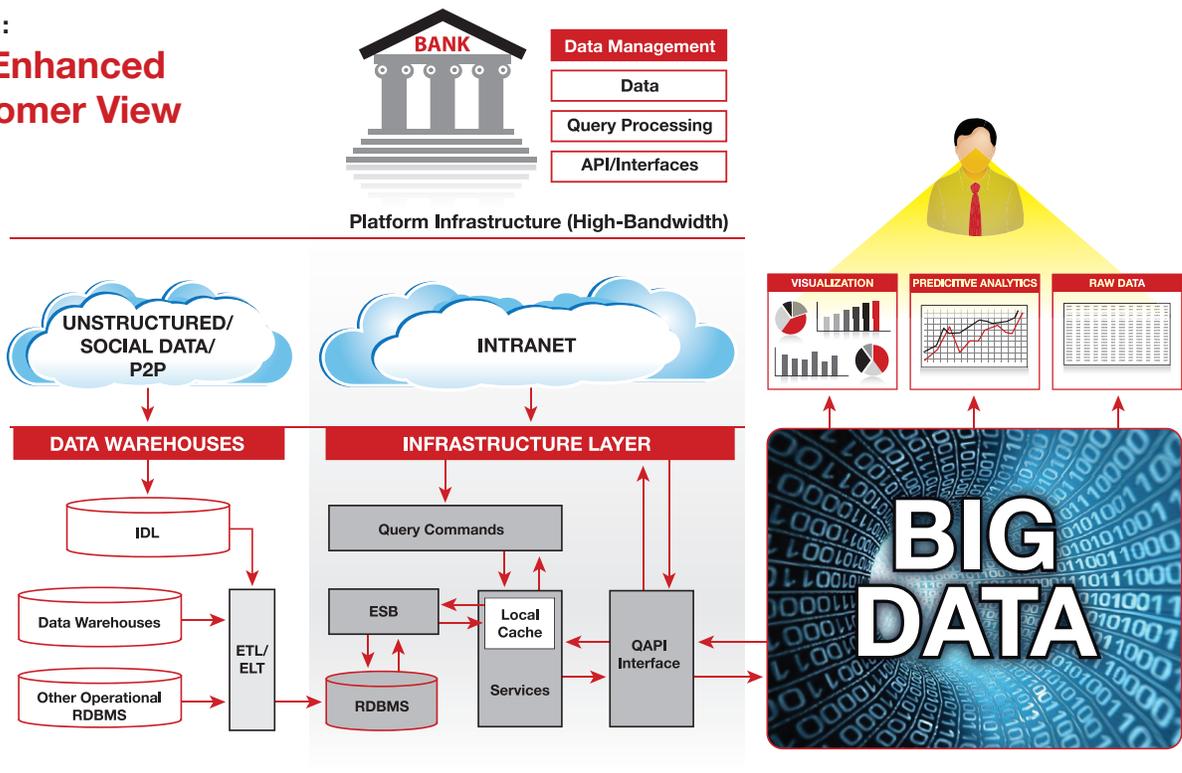


Figure 2: Prominent Roles for Big Data Success

Role	Responsibility	Insight
CFO	<ul style="list-style-type: none"> CFOs have a balancing act managing strategic insight and decision support with back office transactions as financial institutions define and manage the value of Big Data 	<ul style="list-style-type: none"> Gather a holistic picture of profitability and how the financial institution can improve performance
COO	<ul style="list-style-type: none"> COOs have a key strategic, forward-thinking role to drive change within the financial institution 	<ul style="list-style-type: none"> Ability to identify emerging trends and deliver business transformation on a larger scale
CRO	<ul style="list-style-type: none"> Risk officers develop leadership strategies for Big Data governance and will require dialogue with CIO and IT to make these strategies successful 	<ul style="list-style-type: none"> Collaborative risk management and proactive mitigation of risk events Manage regulatory reporting for Basel III
CMO	<ul style="list-style-type: none"> Chief marketers play a key role alongside the CIO; they are a key member of a Big Data advisory board for developing business use cases, tracking, measuring and communicating performance 	<ul style="list-style-type: none"> Better execute marketing strategies driving business growth (sentiment, customer experience, segmentation strategies, customer behaviors)
CTO	<ul style="list-style-type: none"> A CTO/CIO has the central role responsible for overseeing the architecture, processes, skills, and leadership necessary to obtain value from Big Data; strategic role advising on the future of technology direction and alignment to business objectives; primary leader for implementing strategies and delivering insights across the enterprise 	<ul style="list-style-type: none"> Enabler for providing value to the business Reduces ad-hoc analysis, scaling and capacity planning for IT department

Determining the Value of Big Data

Untapped data sources are a banking goldmine for information innovation to drive new revenue, improve customer loyalty and retention, and increase efficiencies for a competitive advantage. Big Data can deliver smarter outcomes across an enterprise. However, confusion and skepticism surrounds Big Data and the need for practical, focused applications in financial services. Justifying the investment is hard without a good business case.

With the help of strategy assessments and Big Data roadmaps, financial institutions can tie their current and future business requirements to easily identify their overall data needs within their landscape. As part of this process of identifying the use case, here are just a few (of many) internal questions to ask:

What can't we do today that Big Data could help us do?

What are the quick, low-hanging opportunities for Big Data?

What skills, technologies and information management investments can we leverage?

The bottom line is this: the key to successful Big Data requires focus on a compelling business opportunity as defined by a use case. Since Big Data can provide business value in a number of areas, it is important for financial institutions to hone in on outcomes that provide the greatest return on investment based on top business objectives for the organization.

The last “V”, and most important dimension of Big Data, is Value. Perficient’s goal is to help you navigate this 3-D data challenge so you can focus on the 4th dimension.

Data combined with advanced analytics can help banks:

- Gain market intelligence for a competitive advantage
- Understand customer behavior and buying patterns
- Help reduce customer churn
- Run more targeted or location-based offers and campaigns
- Effectively implement loyalty and rewards programs
- Improve customer service
- Develop new revenue streams and service channels
- Measure customer sentiment
- Ensure compliance and manage risk

Near-term Opportunities for Banks

Big Data and analytics can be used to improve business performance in numerous ways. Financial institutions have a history of using advanced analytics to mine large amounts of data. The use of existing, underutilized data can provide immediate low-cost Big Data opportunities. (Figure 3, p.6)

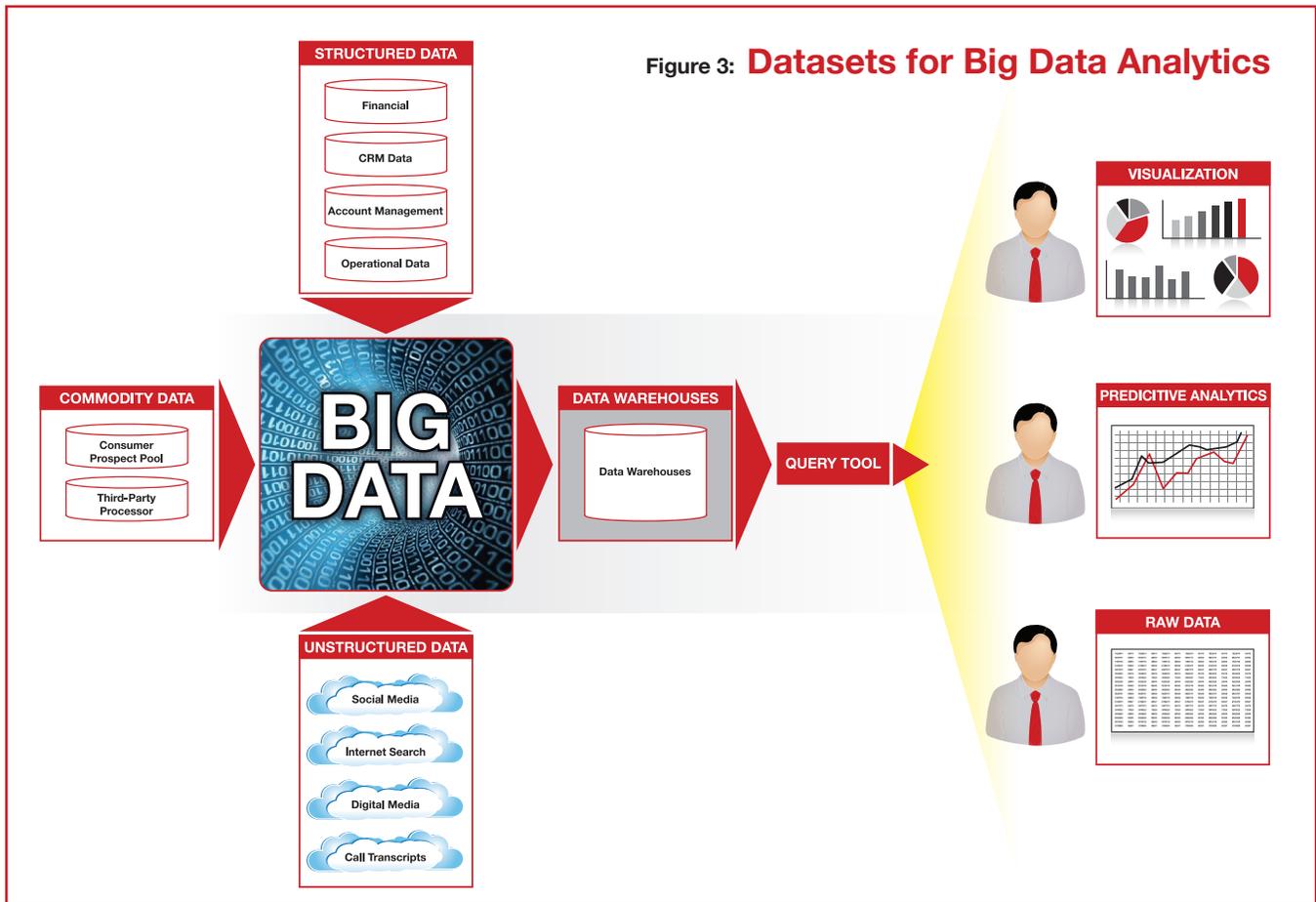


Figure 3: Datasets for Big Data Analytics

There are four key business areas within the financial services industry that present low-risk opportunities for tangible performance improvement using Big Data. (Figure 4, p.7)

1. Optimize enterprise risk management, reporting & fraud detection patterns.

Much of the Big Data use to date in financial services has been around risk management and fraud detection. Traditional fraud detection systems that have been in place only use approximately 20% of available data. By moving data away from traditional relational databases and using Big Data analytics, banks can quickly respond and react to fraudulent activities in near-time. As banking and payments have moved onto mobile and online channels, the opportunities for fraud have expanded. The cost of fighting fraud has made it challenging for smaller banks to compete and hold onto the transaction and consumer preference data which provides the fuel for information innovation. Ultimately, timely intervention for banks helps build customer loyalty and retention. Big Data helps banks more efficiently manage the risk landscape and work towards optimizing enterprise risk management practices.

2. Keep up with the digitization of consumer behavior.

Similar to the opportunity for marketing and solicitation with Big Data, banks can learn from customer behaviors in this digital era of “engagement banking”. Banks need to understand the “trendsetter” customer behaviors that are likely to become main stream and how they can interact with customers within these channels. Over the next 3-5 years, mobile will continue to impact consumer behaviors and may likely become the primary method for banking amongst many. This year we will see the first mobile-only banks go live with products for a different kind of customer experience. Payment innovations will also continue to impact the flow of cash in the economy forcing traditional banks to deploy new capabilities. All of these interactions and parallels to the retail industry support the need and evolution of Big Data for retail bank marketers.

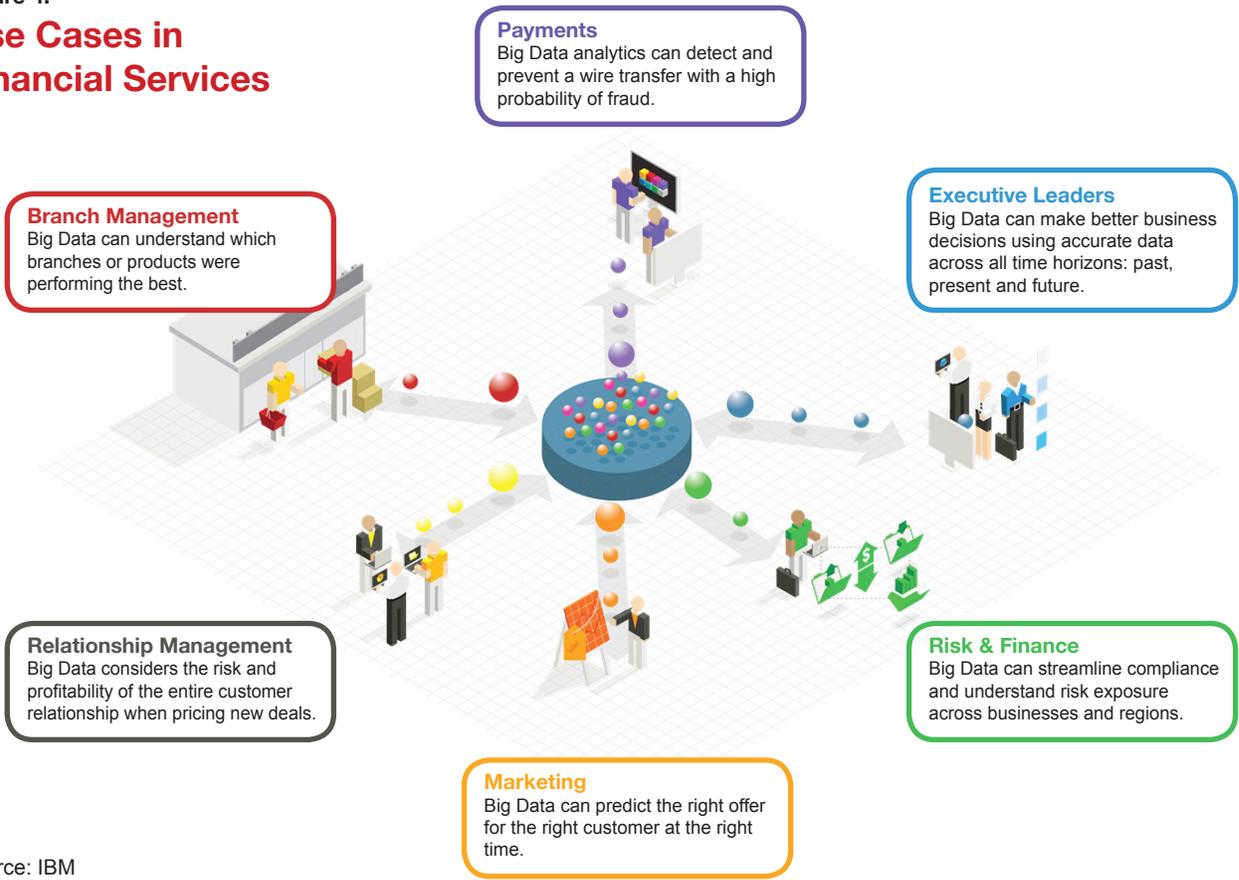
The technology shift and digital disruption in the financial services industry are changing the way consumers will do banking. Banks need to keep pace with these preferred channels and customer interactions as transactional activity moves digitally. Banks must begin to be proactive as opposed to reactive to customer

“For some banks, building a fraud detection ecosystem that leverages a Big Data platform alongside existing traditional processes may be best. This allows them to leverage their existing ERP and CRM systems and other data silos, along with a product like IBM’s InfoSphere BigInsights and InfoSphere Streams for building a data repository and processing on the fly to do mashups, build applications, and create fraud analytics models all from the same system.”

— Neetu Shaw, EIS Principal for Perficient

Figure 4:

Use Cases in Financial Services



Source: IBM

needs. As financial institutions mature their marketing analytics strategies, Big Data will help banks interact and communicate with customers in the manner they prefer in real time.

3. Benefit from intelligent forecasting.²

As with many businesses, financial institutions are often asked to pull out their crystal ball and predict the future. For example, banks could benefit from insights around future product sales, profits, and even return on investments. So how can financial institutions use Big Data to develop better forecasting?

To accomplish this, companies can benefit from intelligent forecasting, which is a part of and essentially business intelligence. Specifically, intelligent forecasting is a business analytics strategy that allows companies to obtain real time information from operational systems and send forecasting data back through the pipeline to corporate decision makers. This forecasted data provides a “dashboard” view that can be used for further analysis. This analysis is important for making business decisions around resource allocation, managing forecast risk, accelerated marketing, and efficient management of sales teams, pipeline and forecast data.

This ability to do “nowcasting” paints a clearer and more accurate picture to turn fuzzy forecasts into actionable data. Sales analytics could easily be a use case or test project for Big Data in financial services.

4. Expand customer profiling, target marketing and cross-selling.

One primary focus area for improving performance using Big Data in financial services involves generating customer insights or voice of customer (VOC) information. VOC data and customer sentiment enables segmentation strategies based on demographics, transactions, behaviors and social profiles. Embracing a Big Data strategy allows financial marketers to make smart decisions to transform the marketing function for their organization.

Using Big Data analytics, customer groups can be segmented and compared with regard to their ability to drive value. When attempting to acquire new customers, a company must identify prospects that will generate positive customer lifetime values that exceed acquisition costs. Likewise, maintaining relationships with current customers translates into identifying those customers whose predicted future value is higher than the investment necessary to maintain that relationship.

5. Quality assurance and customer service.

How can customer service centers take advantage of call center recordings? In real time, these recorded calls can be used to prevent, stop or change customer interactions at the call center level. To date there are not any closed-loop feedback

mechanisms to take advantage of all the customer service quality assurance recordings financial institutions implement to improve customer loyalty and retention. There are technologies out there that can do voice XML that can be turned into Big Data solutions – a big opportunity and hole in the industry right now.

Big Data Challenges

Since Big Data is in its infancy in financial services there are a number of perceived roadblocks to implementing it. Most banks understand the complexities and struggles of managing large amounts of data. However, as unstructured data is introduced the challenge grows as Big Data often requires unique storage, processing and management approaches. The limited understanding among senior business stakeholders and scope of Big Data initiatives does present a number of challenges for CIOs. CIOs who can successfully navigate these challenges, communicate the value, and lead results-driven Big Data projects can not only help banks take an enormous leap in analytical capabilities, but also drive profitability and business growth.

From a technology standpoint, many of the smaller banks and credit unions are constrained by limited data modeling aspects of conventional data warehousing technologies and are not able to create a dynamic environment that can look at cyclical data patterns. Another challenge for smaller organizations is the inability to build an effective and elastic repository of data that allows you to build models, fine-tune and enable effective performance.

Similar to previous hyped technology trends like cloud computing, gamification, and many others, Big Data will either take years to progress or it may evolve and mature quickly, leading to rapid adoption. One of the biggest challenges right now for the industry is understanding how Big Data can deliver on its promise of increased revenue and provide a competitive advantage for financial institutions bringing new products and services to the marketplace.

Organizations can hurdle the disillusionment phase and deliver on the promise of Big Data by addressing these five roadblocks:

1. **The ‘Aha’ Moment** – The job of technology providers and consulting companies is not done yet. Vendors and service providers must continue to provide more thought leadership, granular data modeling and specific templates to generate that “aha” moment for organizations, and provide a better model and visualization of how technology can solve a business problem in a more meaningful way. Until then, many financial institutions may continue to scratch their heads when it comes to Big Data.
2. **Budget Constraints/Cost Overruns** – Data analytics have traditionally been lengthy technology projects. Part of the misconception of Big Data projects is around the technology’s total cost of ownership. Developing a true cost-benefit model

“You can look at data ‘at rest’ to identify a pattern to identify a template, but you need the data ‘in motion’ to actually catch it in real time. A lot of times organizations don’t have a streaming Big Data solution or haven’t thought about how that needs to be facilitated, so they don’t get the full value of the Big Data set that they have. With a product like IBM Streams, you can actually apply the models as the action happens.”

— Mike Panzarella, Director Industry Solutions for Perficient

may be difficult when significant upfront development costs with tools like Hadoop are common. New analytical platforms for Big Data analytics are making setting up a platform – and seeing a return on investment – more achievable than ever before.

3. **Knowledge Gaps** – Lack of business and IT know-how present numerous challenges for banks looking to implement Big Data strategies. IT strategies and business processes for Big Data are very different. Gaps in data storage and processing strategies, plus lack of CIO know-how or direction will cause banks to falter. Banking technology professionals may also still lack knowledge of Big Data management tools. Technical and end-user training may also prohibit banks from adopting Big Data.
4. **Cost Overruns** – The amount of data managed by financial institutions has grown dramatically and it will continue to do so as companies begin to look at “dark” data sources and look for new insights. Along with the cost implications of increasing data storage demands, a vast majority of banks’ traditional data governance and data management practices aren’t capable of supporting Big Data requirements and can lead to costly and delayed data analytics projects.
5. **Business Alignment** – Banking CEOs and key stakeholders have very focused business objectives. Often times these business objectives aren’t in alignment with Big Data ideas making this a top roadblock for financial services organizations.

Implementation Challenges

For the most part, a majority of Big Data projects stall or are abandoned during implementation at the integration point. While this

is a white paper topic in and of itself, here are some basic questions to guide your Big Data implementation:

1. **How will you collect and capture data?**
2. **Where will your data reside?**
3. **How will you alert end users and route the data?**
4. **What tools will you use to make that data available?**
5. **How will you ensure performance?**
6. **How important is data backup?**

Big Data Architecture Decisions – There are a lot of questions to ask when investing in Big Data, one of the biggest being infrastructure decisions. Adding Big Data to your IT department’s growing list of responsibilities requires adequate network management. Not to mention, the technology landscape continues to evolve making it hard for banks to plan for the future.

Proprietary Models – Proprietary technology models for Big Data capabilities traditionally require a significant capital expense for software and hardware resulting in a higher total cost of ownership. Often times the requirements and risks of managing open-source components, the network infrastructure layer, multiple servers, custom code, and numerous copies of data become unfeasible and uneconomical.

Big Data Appliances – A Big Data appliance model is an effective way to implement capabilities at a lower cost of ownership by reducing storage and server requirements. Appliances help banks connect the dots between activities across consumer banking channels to offer better promotions and target key customers.

Cloud Services – Pulling in large data sets to analyze is very expensive over time. Using cloud services, banks can look for signals in social media, commodity and structured data sources.

When signals are found in external data sources, banks can pull only valuable pieces of data into the enterprise data warehouse.

Ensuring Big Data Success

Through a combination of best practices, technology tools, proven architectures and efficient project team structures financial services companies can achieve success with Big Data. Here are some tips to get your organization on the right path:

Tip #1 – Doing Nothing is Not an Option

There is consensus in the industry and amongst top CIOs that they will all have to embark on this journey with Big Data – it's just a matter of understanding how they do that. As with any other emerging technology, it is wise for businesses to tread lightly when starting Big Data projects, but doing nothing is the last thing a bank should do. Doing so will make it hard to compete regardless of size. Companies in general are already streamlining business intelligence. Forward-thinking financial institutions need a CIO who is a visionary, strategist, operational thinker and understands the business's goal to reach the 'enlightenment' with Big Data.

Tip #2 – “Don't Boil the Ocean”

Banks need to prioritize their technology investments with Big Data use cases that provide the best opportunity for the business and show value. Take baby steps with Big Data but be prepared for the future with deployment of enterprise scalability, flexibility and data governance best practices that will support the project as data volumes continue to grow.

Tip #3 – Develop A Roadmap

In order to not “boil the ocean”, banks should look to their strategic IT partners and service providers to guide them on what technologies are the ones that will help the most. IT consulting companies can provide a technology-agnostic view for organizations with the development of a Big Data strategy, roadmap and implementation plan that encompasses their existing investment in conventional data warehousing technologies to take things to the next level with a Big Data ecosystem.



Doug Laney, Gartner Big Data Analyst

Tip #4 – Find Value from Within

Leveraging information in a bank's data warehouse or data mart for a competitive advantage should be a common practice. Banks need to centralize structured data sources – retail information (bill pay,

ACH), mortgage data (originations), consumer credit information (fraud, card management), auto finance, treasury services, capital markets, and loyalty behaviors – to make Big Data successful.

Tip #5 – Be a Leader in the Social Revolution

Look for data in available new sources. Beyond the traditional structured data sources, banks can easily expand their analytics capabilities by analyzing, in real-time, unstructured data generated from social interactions (Facebook and Twitter), web conversations, click streams and other similar sources that measure sentiment, enable segmentation and deliver targeted offers in real time to a bank's customers.

Tip #6 – Enable a Competency Center

Banks need to build a team of people who promote collaboration, open communication and alignment of business and technology. Banking CIOs need to provide support and guidance for using Big Data with regards to standards, methodologies and data governance. Big Data will require shared learning and training across roles to develop internal data scientist talent to support initiatives. CIOs should also establish defined roles for vendors and service providers to support Big Data projects.

Tip #7 – Change Management is Critical

Ensuring that standardized methods and procedures are used for efficient and prompt handling of all changes to IT infrastructure helps minimize the impact, facilitates prompt handling of all changes, and maintains balance for an organization. With change management, financial institutions can align people and processes with Big Data initiatives to achieve the business vision.

Tip #8 – Manage Risk

Staffing Big Data projects with trained data analysts and integration experts, in addition to support from a service provider, will help accelerate speed to market and limit organizational risk with Big Data.

Big Data Trends in Banking

1. Big Data Governance

As financial institutions begin to recognize the value of their data and how it enables an enterprise strategy, IT departments are undertaking a paradigm shift in how data is managed as an enterprise asset. Unfortunately, they are struggling with how to implement this change. There are operational processes, analytical processes, multiple lines of business, a multitude of technologies, competing agendas, and limited budgets. Implementing strong data governance is integral to delivering reliable and usable business information, enabling the execution of business goals, and seeing information as a corporate asset.

Sunil Soares, information governance expert and author, coined the term “Big Data Governance”³ (Figure 5, p.11) to describe “the convergence of these two technology trends to formulate policy

and processes to optimize, secure and leverage Big Data as an enterprise asset by aligning the objectives of multiple functions". With the increase in volume, variety, and velocity of information as a by-product of Big Data, Big Data Governance will become increasingly important. For banking CIOs, demonstrating the business value for information governance helps to dispel technology and resource investment worries.

2. Big Data in the Cloud

We know that organizations are embracing cloud computing for its ease in deployment, reduced infrastructure and maintenance, scalability and lower cost of ownership. Information overload has been affecting the financial industry for years. It puts a strain on IT departments to manage and store the vast amount of data making Big Data a great proponent and driver for cloud adoption in banking.

In banking, cloud computing can provide the processing and Big Data support needed for predictive analytics. According to a recent Aberdeen study, predictive analytics is the top Big Data trend currently used or planned in financial services.

With online, sharable resources, the sky's the limit with Big Data. Explosive data growth alongside the capabilities of these two technology trends make for a powerful combination that will

continue to be explored. Industry research by Gartner confirms that almost one-third of organizations surveyed already use or plan to use cloud services to augment their business intelligence capabilities. In the cloud, banks can manage fraud detection and focus on client acquisition and retention, along with cross-selling of a bank's products and services.

Cloud-based solutions tout simple interfaces thus minimizing data integration costs and efforts. The cloud also provides flexibility for selecting which data sources to run in a cloud deployment. The diagram below helps illustrate the complexity of managing data sources and the benefits of the cloud for streamlining Big Data deployments. (Figure 6, p.12)

3. The Convergence of Social Media and Analytics

Just as banks are keeping up with technology innovation by offering mobile and online banking services, customers are demanding new ways to stay connected with their banks. Social media allows banks to communicate with their customers, and subsequently allows customers to compare, evaluate and openly discuss their banks' offerings. The key to social media interactions is that it leaves data behind which can be leveraged. This is where Big Data comes in for customer sentiment. Big Data applies new ways of thinking about the capture, storage and processing of large amounts of information. Also, in terms of marketing, social media

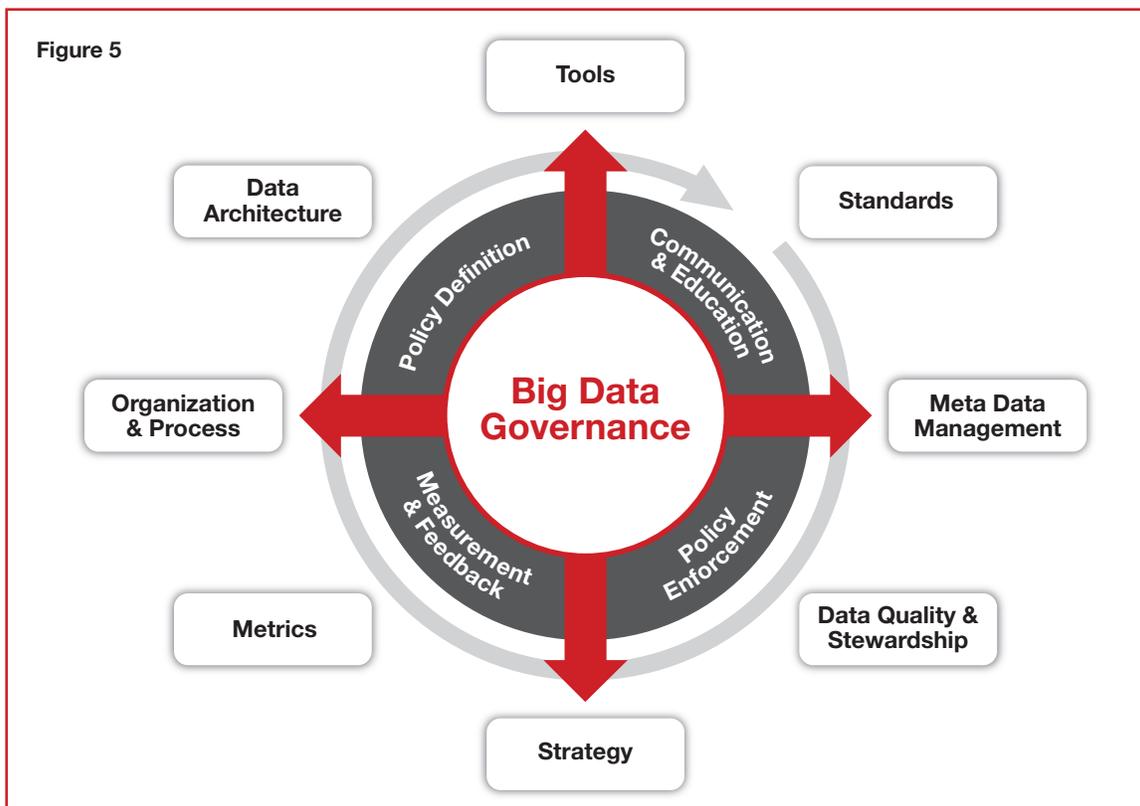
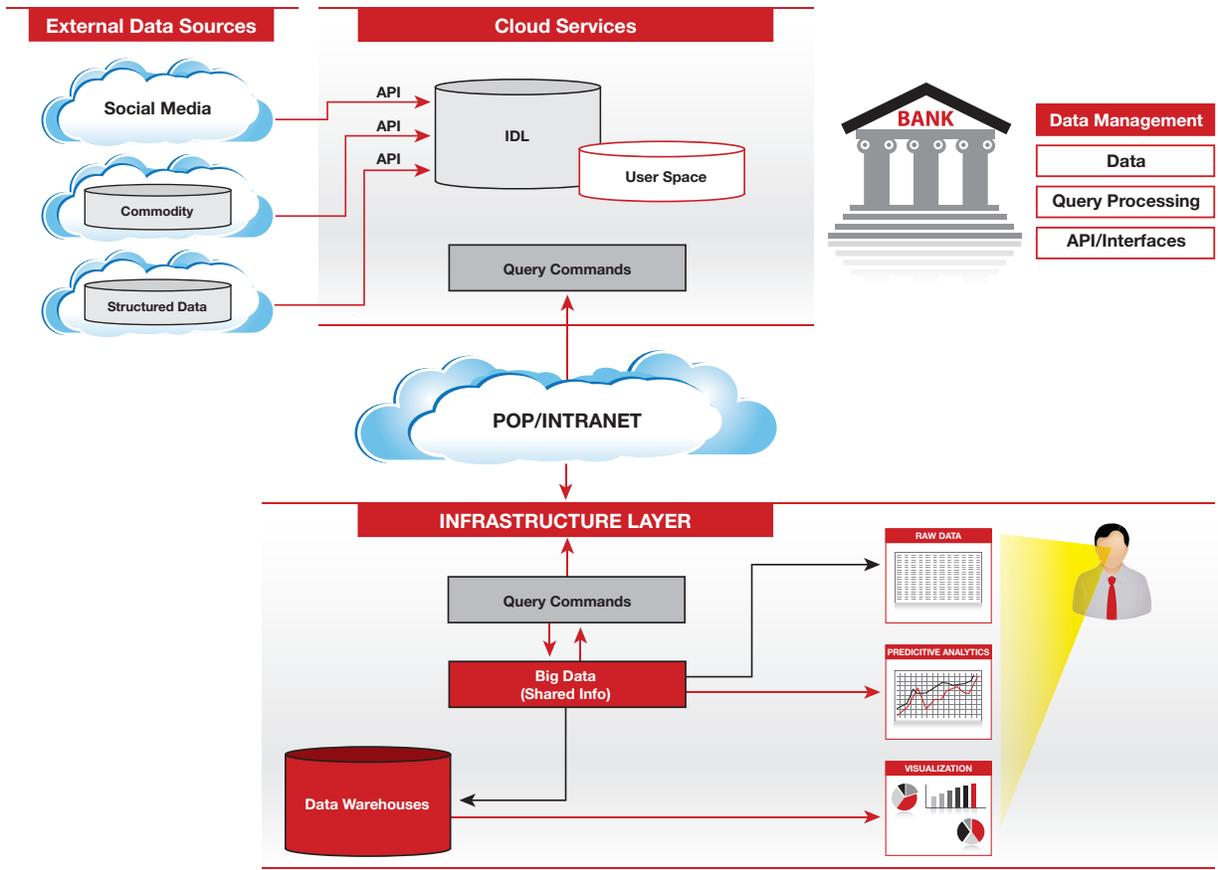


Figure 6: **Leveraging the Cloud**



analytics measures how sentiment is impacting the effectiveness of marketing campaigns. To accomplish this, banks will turn to social media and text analytics to connect the dots with Big Data. Text analytics turns comments on social media or the web into structured data that can be analyzed. This data can uncover hidden trends and relationships needed to develop segmentation strategies.

The Big Data Technology Landscape

The Big Data landscape is one of the fastest-growing technology sectors. According to a newly released IDC forecast⁴, research says “worldwide Big Data technology and services market will grow to reach \$23.8 billion in 2016.” This constantly changing ecosystem makes it challenging for organizations to keep track of all the key players and top solutions in the space.

Perficient has compiled a list of Big Data vendors, many of which are our partners, to assist your organization with the process of

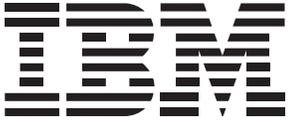
evaluating and making an informed technology decision about the Big Data solution provider right for your business.

Conclusion

The industry is starting to see examples of how the nation’s largest banks are using Big Data⁵. JPMorgan Chase has combined credit card information and transactional data with other pieces of information, and applied analytic capabilities to develop insights into consumer trends. Bank of America is using Big Data analytics to understand customer churn patterns and sentiment towards products like their cash management portal. Citi’s commercial customers’ transactional data is being aggregated to identify new trade patterns. Wells Fargo has invested heavily in enterprise information management (EIM), technology integration and consolidation, to put them in a position to see a return on investment from Big Data as they advance.

With all of these Big Data use cases IT spending, siloed banking operations, and marketing limitation prove to be a common challenge at banks. As financial institutions focus on digital marketing and innovation the need for aggregated customer information is apparent. Regardless of size, financial institutions should be focusing on

developing a strategic roadmap that encompasses the Big Data ecosystem along with other innovative technologies to capitalize on the opportunities at hand to: make better business decisions, enable growth, improve productivity and differentiate them in a highly competitive, technology-centric banking landscape.

Solution Provider	Acquisition and Organization	Data Analytics
	IBM Smart Analytics System InfoSphere Information Server IBM InfoSphere MDM Netezza Data Warehouse Appliance InfoSphere Warehouse Smart Analytics System	InfoSphere Streams InfoSphere BigInsights InfoSphere Data Explorer InfoSphere Decision Management IBM BigSheets Cognos Suite Teradata Vivisimo
	Oracle NoSQL Database Oracle Database Oracle Data Warehouse Oracle Big Data Appliance Oracle Data Integrator Oracle Big Data Connectors Oracle Exadata	Oracle Advanced Analytics Oracle Exalytics
	Microsoft SQL Server 2012 Azure HDInsight	SQL Server Analysis Services SQL Server Predictive Analytics SQL Server Power View PowerPivot StreamInsight
<p>Other Leading Vendors</p>	Apache Hadoop MapReduce SAP HANA SAP Sybase Cloudera CDH EMC2 Greenplum HD Informatica Hortonworks Datastax (Cassandra) MicroStrategy MongoDB Neo4j Splunk	TIBCO Spotfire Microstrategy EMC2 Greenplum SAS Analytics Suite SAS Enterprise Miner Karmasphere 2.0 Tableau R

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