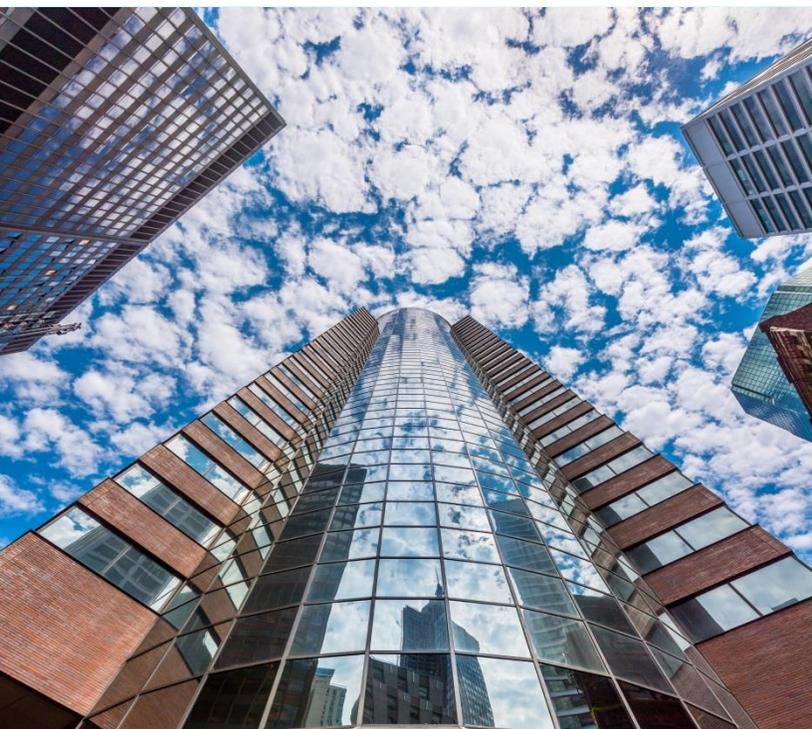


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Innovating Financial Services in the Big Data Era

Stratecast Analysis by
Jeff Cotrupe



Big Data and Analytics (BDA)

Innovating Financial Services in the Big Data Era

This paper is a must-read for decision makers in the financial services industry, generally at the director level and above, and is focused on delivering insights and value to these four meta-sectors that broadly define the financial services space: banking, capital markets, insurance, and wealth management.

Introduction

IBM researcher Hans Peter Luhn defined business intelligence (BI) in 1958 as, “*The ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal.*” The first known companies to actively use data in their businesses were communications service providers (CSPs), with their purpose-built, closed-loop operations support systems in the 1960s. Financial services companies also were early to the game, first using data in the 1970s to assess the feasibility of loans and other financial transactions, and creating actuarial tables to assess insurability.

Fast forward to today and many financial services organizations are now beginning to think of themselves, in whole or part, not merely as capable users of data but as technology companies. This evolving mindset is probably a good idea—especially since new technologies such as Bitcoin are beginning to provide consumers with alternatives to potentially replace banks altogether.¹ These forces, which are just now beginning to build momentum in global financial markets, would mirror what, ironically, has been happening for some time to those other early data adopters, the CSPs: consumers are increasingly using free-or-nearly-so over-the-top (OTT) services,² from Netflix to Facebook Messenger and beyond, instead of traditional (chargeable) CSP services.

Disruptive market forces are far from the only challenges that financial institutions face. While many are beginning to do a creditable job of managing big data, the pace of business now demands that they do it faster than ever before—while meeting the ongoing challenge of reducing costs without sacrificing customer experience. Financial institutions in the Americas, EMEA, APAC, and all world regions must equip teams across the enterprise to make smarter, faster decisions based on the freshest, most complete and accurate data. In short, financial institutions must help people see and understand their data—and beyond that, to act on it, and to measure the impacts of their actions.

This white paper discusses the challenges financial services companies face; where spending is occurring today and where it needs to be focused going forward; the benefits that can accrue when financial services companies apply actionable analytics to solve problems and capture areas of opportunity; and brief case study snapshots of best practices in this industry.

Replacing “The Invisible Hand” with the Tangible Impact of Fintech

Financial institutions used to rely on The Invisible Hand of the Market, their own accumulated knowledge, and a bit of banker’s intuition to make decisions. Decisions were shaped by tribal knowledge, legacy processes, and, more often than any would openly admit, guesswork. Today, the proliferation of Internet and mobile technologies has driven the development of fintech, which originally came to life in the back offices of banks and trading firms but now encompasses a broad range of innovations impacting most aspects of financial services. Ongoing developments in fintech

¹ Quartz, *I’m ditching traditional banks in favor of bitcoin—and you can, too*, available [here](#)

² Those who provide voice, video, and other data services over the Internet

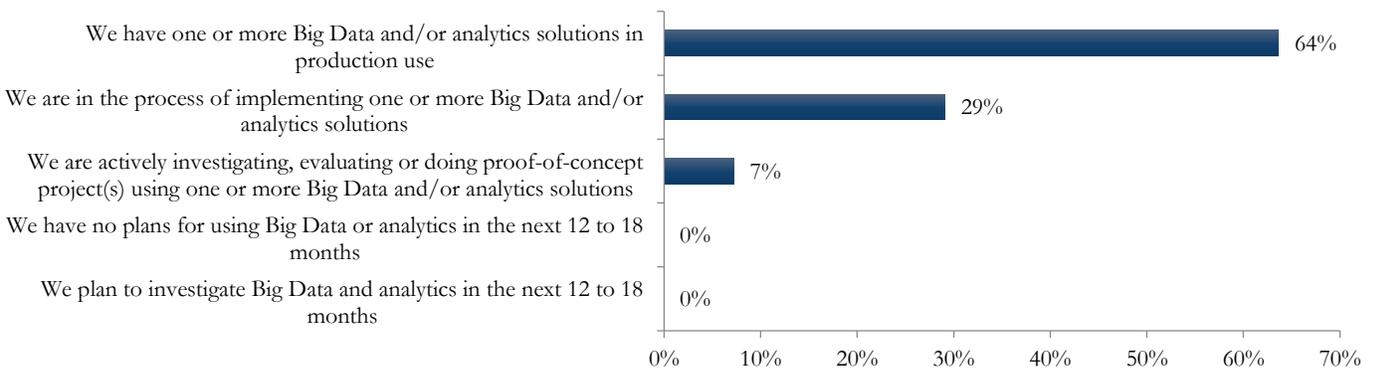
include online and mobile payments; digital wallets; mobile trading on commodities exchanges; financial advisory and robo-advisor sites; and financial management applications.

Fintech is not merely a buzzword or passing trend: the value of transactions enabled by fintech globally is forecast to reach more than \$3.3 trillion in 2017, and to increase at a cumulative average growth rate (CAGR) of approximately 20.5% to more than \$6.96 trillion in 2021. Digital payments currently account for more than 81% of the fintech market.³

Fintech Accounts for Nearly One-fifth of Big Data and Analytics Market

Fintech depends on a flow of big data and analytic insights, and is the heaviest consumer of big data and analytics (BDA) among verticals. The global BDA market accounted for \$48.40 billion in 2016, and financial services accounted for 19% (\$9.2 billion) of that, outpacing all other verticals. BDA is priority 1 for financial services organizations. Stratecast's 2017 BDA Survey surveyed respondents at the director level and above across all verticals. Every financial services organization indicated that BDA was more important than other technologies,⁴ and as shown in Figure 1, 93% of them have at least one BDA solution in production or are in the process of implementation.

Figure 1: 93% of financial services companies have BDA in production or implementation



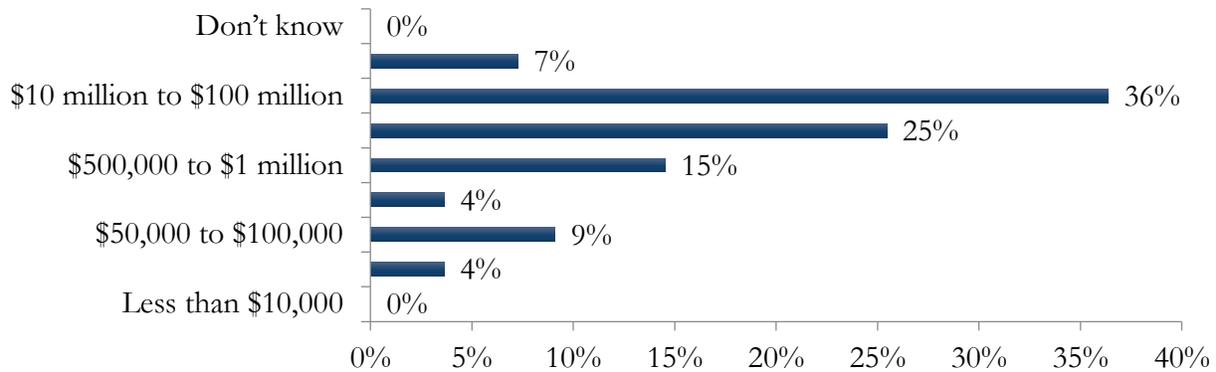
Source: Stratecast 2017 BDA Survey

BDA spending among financial services companies is going up across the board: budgets increased year over year 2015-16 at 87% of companies, and as shown in Figure 2, those budgets are sizable:

³ Specific figures: US\$3,300,958 million in 2017, growing to US\$6,962,224 million in 2021. Source: Statista, *Fintech Highlights*, available [here](#)

⁴ Stratecast | Frost & Sullivan, *2017 Big Data and Analytics Survey*; specific report content: *2017 Big Data Analytics Survey: Big Data Beginning to Dominate but Issues Arising* (BDA 5-05, August 2017), available [here](#)

Figure 2: BDA Budgets among Financial Services Companies



Source: Stratecast 2017 BDA Survey

Addressing Financial Services Challenges with Actionable Analytics

It is a truism that with every opportunity comes a challenge. Financial services firms the world over are experiencing plenty of both, and, as reflected in the sections that follow, those challenges are driving their investment in BDA solutions to gain actionable analytics.

Security and Privacy Dominate the Agenda

Major data breaches⁵ in 2017 alone, as shown in Figure 3, highlight the need to address data security:

Figure 3: Selected Major Data Breaches Thus Far in 2017

Organization	Location	Impacts
Equifax	US	143 million US consumers impacted
Interpark	South Korea	<ul style="list-style-type: none"> 10 million customers impacted North Korean government hacked South Korea banking and financial records; objective: Obtain foreign currencies
Clixsense	US	<ul style="list-style-type: none"> Survey and ad review site More than six million customers/users impacted Banking and payment records hacked with other data
Banner Health	US	3.7 million customers impacted
Wells Fargo	US	50,000 customers impacted
Tesco Bank	UK	9,000 UK customers impacted; at risk: 2.5+ million GBP (\$3.37 million)

Source: Information is Beautiful, World's Biggest Data Breaches

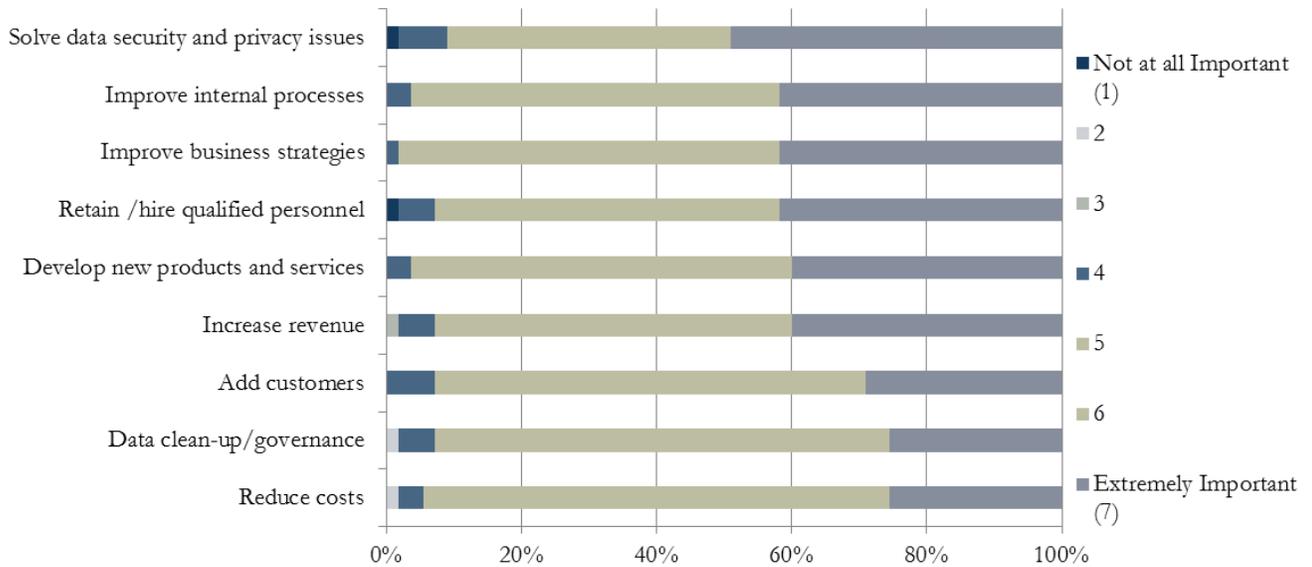
If data breaches have heated up security concerns, the General Data Protection Regulation (GDPR) enacted by the European Commission has thrown fuel on the fire from a privacy perspective. The GDPR could severely limit the ability of organizations to use data they rightfully control. Most importantly, companies located outside the EU are not immune to the GDPR: in the eyes of the

⁵ Information is Beautiful, World's Biggest Data Breaches/ Selected losses greater than 30,000 records, available [here](#)

EC, any company anywhere in the world that holds data on any citizen of the EU is subject to GDPR compliance—and penalties of up to 4% of annual global revenues for non-compliance.⁶

Given these developments, it is not surprising that the results of Stratecast’s 2017 BDA Survey showed that security and privacy top the list of organizational concerns driving BDA spending among financial services organizations, as shown in Figure 4.

Figure 4: Organizational Priorities Driving BDA Spending in Financial Services



Source: Stratecast 2017 BDA Survey

Fully 90.1% of financial services respondents said that solving data security and privacy issues was somewhat, very, or extremely important (the highest values on the scale). The ability to immediately ingest new data as it becomes available into an enterprise data management platform that covers all the bases in governance, security, and compliance is essential to protect against security breaches and to ensure compliance with privacy regulations.

Data Governance and Blockchain: Data Lakes and Disruptive Decentralization

The focus today in financial services, as in most verticals, is on creating centralized data lakes and accessing them with analytics tools. This simplifies integration of all data sources and minimizes data movement for faster analytic insights. Stratecast is also seeing companies moving toward associating financial value to data lakes—similarly to the mapping of network assets to value, as in ITIL’s CMDB⁷—to assess the core values of those data lakes to the business.

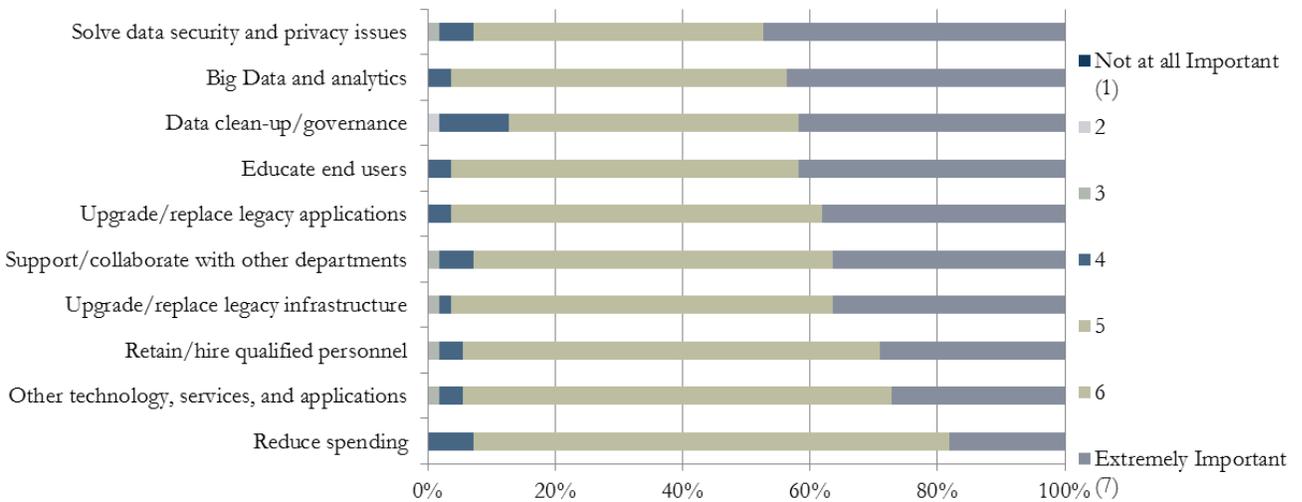
⁶ Sources: Stratecast, *We Have Seen the Future of IT, and it is Big Data: Part 1 – Will IoT Privacy Issues Steal the Future?* (BDA 5-01, 30 June 2017); *We Have Seen the Future of IT, and it is Big Data: Part 2: A Blueprint for Privacy, in the IoT and Everywhere* (BDA 5-02, 7 July 2017); *Big Data is in Big Trouble, Starting in the EU: How the EU’s GDPR Threatens to Destroy Big Data Initiatives and Business Opportunities, in the EU and Elsewhere* (BDA 5-03, 2 August 2017); and *Our Detailed Privacy Blueprint: What All Parties Should Be Doing Right Now to Protect the People and Organizations They Care About* (SPIE 2017-28, 11 August 2017); all available [here](#)

⁷ The IT Infrastructure Library’s Configuration Management Database

Blockchain is a disruptive force that could stand not only data lakes but the traditional banking-driven financial services model—based on maintaining a central ledger for all transaction data—on their heads. To express it most succinctly, blockchain decentralizes transaction execution in order to minimize risk. Blockchain establishes a distributed computing network that maintains records and manages transactions; it uses the network to approve “blocks,” or transactions, which it then adds to the “chain” of computer code. It digitally partitions data for each transaction, and the transactions themselves are encrypted. The benefits of this approach are that the distributed method of approval minimizes, or at least contains, the risks posed by hackers, and that blockchain creates a theoretically unforgeable record of identity and transactions.

Stratecast’s 2017 BDA Survey, as shown in Figure 5, shows data governance is a high IT/IS priority for financial services companies, with 93% citing it as extremely, very, or somewhat important.

Figure 5: IS/IT Priorities Driving BDA Spending in Financial Services



Source: Stratecast 2017 BDA Survey

Other high-priority areas that appear to reflect the readiness of these companies to move toward blockchain include the 98% who cited upgrading and replacing legacy applications as extremely, very, or somewhat important; and the 96% who similarly cited support and collaboration.

A data management platform flexible to quickly adapt to new business models is absolutely essential to future-proof the organization’s data fabric as blockchain and other new business and technology drivers continue to change the landscape in the years to come. In addition to enhancing corporate agility in the face of evolving business models, however, a capable data platform helps financial institutions optimize internal processes and reduce costs; aids in the development of new products and services; and supports both revenue generation and retention.

Risk Management and Compliance Are Big Data Issues

The global financial crisis of 2008-09 drove greater focus on risk management and substantial new regulations across world regions for financial services firms. Most readers will be no stranger to these regulations because they live with them daily, including the Dodd-Frank Act, DFAST, Volcker Rule, Solvency II, Fiduciary Rule, Basel II and III, and the acronym soup of others including CCAR; FATCA; MIFID, MIFID II, and MIFIR; CRD IV; EMIR; BCBS 239; FRTB; AML; and KYC.

Basel III and others require firms to manage market liquidity risk through stress testing. However, risk management is only half the battle. Various regulations apply in different jurisdictions, and some overlap each other, which increases the complexity of the effort required for companies to keep up, and the effect is multiplied, for example, among banks with a regional or global presence. Whether they are complying with best practices-oriented regulations such as Basel III, or regulations aimed at combatting fraud and terrorism, such as AML and KYC, financial services companies require quick infusions of a broad range of data to provide financial snapshots for regulators and, in some cases, to law enforcement. Data management platforms can help firms ensure that they are tracking within acceptable parameters and provide real-time alerting if they are nearing a risk threshold.

An enterprise data management platform with on-board data wrangling, the flexibility to quickly ingest data from a myriad of different systems and sources, and the ability to rapidly execute massive data extracts is the only way to smoothly navigate today's regulatory complexity.

The Financial Sector is Just Warming Up to AI, ML, and Cognitive

The combined technological might of artificial intelligence (AI), machine learning (ML), and cognitive computing appears poised to become a disruptive force in nearly every vertical. AI is forecast to drive GDP gains of \$15.7 trillion globally.⁸ In the financial services community, however, adoption is relatively low thus far. In Stratecast's 2017 BDA Survey, only 20% of financial services firms said they are considering, planning, implementing, or using AI/ML/cognitive. Those who are using AI/ML/cognitive are harnessing its power across the enterprise, as shown in Figure 6:

Figure 6: Financial Services Firms Gain Benefit from AI across the Enterprise



Source: Stratecast 2017 BDA Survey

Customer-facing applications of AI include learning customer patterns and motivations to help guide them toward better financial decisions. In the back office, AI can, similarly, guide a financial institution's investment decisions, while unlocking analytic insights to drive new areas of innovation. AI can automate tasks in many areas including underwriting, reconciliation, the development of risk models, and basic handling of incoming data and queries. Stratecast predicts a sizable uptick in these figures in its next BDA Survey as the financial services community begins to acclimate itself to the advantages of AI.

There is a great deal of talk in the markets about AI, ML, and cognitive, but delivering on the promise of AI requires a vision for applying smart analytics to the business and a platform with

⁸ PwC, *AI to drive GDP gains of \$15.7 trillion with productivity, personalization improvements*, available [here](#)

model automation, automated discovery, natural language processing and generation (NLP and NLG), and the ability to provide recommendations.

IoT Fares Better than AI, but Deployment is Lagging its Economic Potential

The IoT has a total potential economic impact of \$3.9 trillion to \$11.1 trillion per year by 2025.⁹ More than 12 billion devices were connected to the IoT in 2016, and that will grow to more than 45 billion devices by 2020.¹⁰ Yet, Stratecast's 2017 BDA Survey showed that only 24% of financial services firms said they are considering, planning, implementing, or using IoT. Stratecast asserts that this is a case of mindset over business matters. Many in the industry appear uncertain of how the IoT (networks of Internet-connected, tangible devices) can relate to financial services—where in most cases, “money changes hands” without hands physically touching printed currency.

Of the four sectors listed at the outset as broadly defining the financial services space, insurance has thus far harnessed the IoT most effectively. This is because one of its key segments, auto insurance, is an area that pioneered the use of the location-based services that have now evolved into a component of the IoT: the tracking of vehicles and, by inference, drivers. In the early days of location-based services, the main proponents of the technology were corporations that had fleets of vehicles (and drivers) to manage. The insurance industry is now using this same type of tracking to evaluate driver and vehicle safety on both the business and consumer sides for purposes of approving or denying coverage and setting rates.

The truth is that the IoT can pay dividends across all financial services sectors:

- Mobile and online banking, and ATMs, are ground zero for both fraud detection and customer experience. Some banks are crossmatching data from sensors and cameras with user and behavioral data to prevent fraud before it occurs or quickly take action if it does. Conversely, legitimate customer activities can help banks craft new offerings and services.
- In an age of online access to nearly every financial need and service, physical bank branches will either disappear or serve as retail-style showcases. Some banks are using IoT and in-store (in-bank) retail analytics to collect usage and behavior data that can help them to adjust atmosphere, offerings, and even personnel.
- Connected homes and vehicles—and people—represent the next wave of innovation:
 - Consumers are already beginning to execute common day-to-day transactions through smart home devices, and more complex financial transactions are coming.
 - Wearables, which are revolutionizing healthcare,¹¹ appear ready to have a similar impact on financial services. Users are checking email, taking calls, and performing other tasks via Fitbits and Apple Watches, and financial transactions will follow.
 - Many consumers and businesses are accustomed to automated payment for tolls via add-on devices, but Frost & Sullivan's ongoing automotive market analysis indicates the connected car will soon become a wallet on wheels: consumers will tie bank accounts to their cars and be able to pay for anything on the go.

The IoT is beginning to unleash massive volumes of new data on existing systems. An enterprise data management platform needs to be able to handle both the added volume and new types of new

⁹ McKinsey & Company, *Unlocking the potential of the Internet of Things*, available [here](#)

¹⁰ Frost & Sullivan's IoT Universe practice, *Internet of Things 2.0: Predictive Intelligence*, available [here](#)

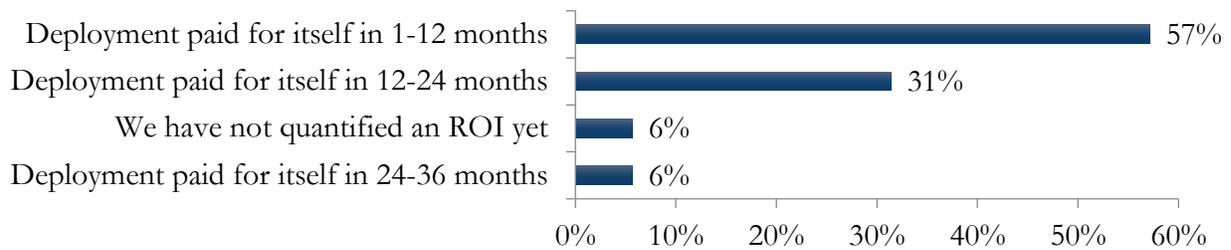
¹¹ Stratecast, *Wearing Your Heart (Rate) on Your Sleeve: How Fitness Trackers and Big Data Solutions are Giving the World a Running Start toward Connected Health*, available [here](#)

data emanating from networks of IoT-connected devices and help organizations make sense of it all and reap value from their IoT deployments.

Bankable Results from Actionable Analytics

Stratecast’s 2017 BDA Survey indicates that financial services firms are using actionable analytics to look inward, improving internal operations; look outward, gaining a better understanding of markets and industries; and optimize processes across the enterprise. As shown in Figure 7, 57% are realizing ROI in 12 months or less, and another 31% are seeing ROI in 24 months or less.

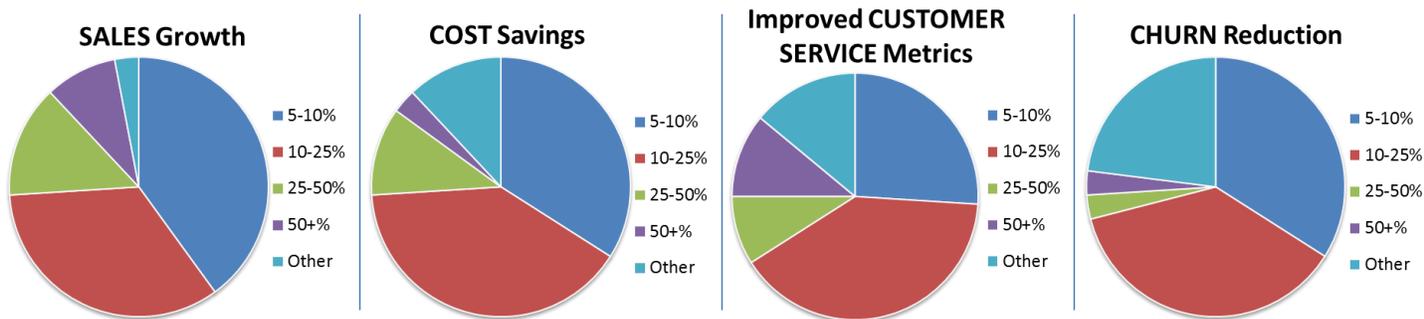
Figure 7: 57% of Financial Services Firms See ROI in 12 Months; 31% in 24 Months



Source: Stratecast 2017 BDA Survey

ROI is crucial, but the Stratecast survey dug deeper to learn other impacts of actionable analytics on some key performance indicators. The results appear in Figure 8.

Figure 8: Impact of Actionable Analytics on Financial Service Firms’ KPIs



Source: Stratecast 2017 BDA Survey

A Top BDA Solutions Provider: Tableau

In its ongoing research of technologies and markets, Stratecast has identified Tableau as one of the preeminent providers of BDA solutions. The company continues to be the world’s most popular business intelligence (BI) platform for managing big data from all sources, delivering the analytical depth that companies need to survive and prosper in ultra-competitive global markets. Some recent innovations include:

- **Hyper**, a high performance database system resulting from Tableau's acquisition of HyPer.¹² Hyper is a fast main-memory database system designed for simultaneous OLTP and OLAP processing (transactions and analysis in a single system) without compromising performance. When coupled with Tableau it takes visual analytics closer to the transactional systems at the core of most businesses. Contrary to some market perceptions, Hyper is not a real-time analytics engine processing all data passing through the Tableau platform. It offers superfast processing of large data extracts, and the larger the extract, the greater the benefit as compared with the long-standing Tableau Data Engine (TDE).¹³
- **Cleargraph** acquisition and other moves supporting AI. Data Source Recommendations built into Tableau 10.4 are the first glimmers of the company building AI, machine learning, and cognitive capabilities into its platform. When fully realized, Tableau's Recommendations engine will enable discovery, help users reuse the work of others, and leverage the knowledge of their community. Model Automation will increase user productivity by automating modeling, offering smart defaults, saving time, and providing ease of use. The acquisition of Cleargraph combines its NLP capabilities with the existing Eviza natural language interface. Automated Discovery will help customers discover hidden insights and answer more complex questions.
- **Cloud and mobile enablement.** More than one-third of Tableau deployments are now on AWS, Microsoft Azure, and Google Cloud, and the company continues to transition its products and organizational mindset from the traditional deployment and installation model to subscription licensing. Enhancements such as Web dashboard authoring, the ability to add published data sources on the Web, online workbook formatting, and new and updated mobile platform apps, are putting the pieces in place.
- Stratecast sees Tableau as a company that is not only the leader in its category but is actually establishing a new category of solutions encompassing BI, data visualization, and business optimization. More broadly, Stratecast believes the market is heading toward the evolution of an end-to-end data platform that does not have to cover all of the data access, management, analysis, and distribution bases on its own but serves as the data dashboard to the enterprise, integrating various data engines and point solutions under the hood. Tableau's introduction of its **Extensions API** is the on ramp to that destination.

Tableau Helps Financial Institutions Drive Innovation and Results

Tableau is helping financial services institutions drive innovation, create new opportunities, realize operational efficiencies, and build competitive advantages—all the while managing risks and maintaining regulatory compliance. Tableau offers:

1. **An enterprise platform that covers all the bases in governance and security** to help financial service companies guard against security breaches and ensure privacy compliance.
2. **Powerful analytics that help financial services firms quickly run scenarios to assess impact** to new business models such as blockchain and other developments to come.
3. **Performance on massive datasets**, helping financial services firms deal with large volumes of IoT data to drive efficiencies and manage risk.

¹² HyPer was originally a research project at the Technical University of Munich (TUM).

¹³ In the words of engineers demonstrating Hyper at Tableau's #data17 event, "If TDE processed a large data extract overnight, Hyper can normally process the identical data extract over lunch."

4. **A data-agnostic platform that works with both existing data sources and new ones** as they become available, adapting to a financial institution’s present and future data infrastructure.
5. **Self-service analytics that drive innovation**, encouraging employees to discover opportunities for new products and services, contributing to customer growth and revenue.
6. **A vision for smart analytics to help financial services companies deliver on the promise of AI** with a platform offering model automation; automated discovery; recommendations; NLP, via the acquisition of Cleargraph; and NLG, through partnerships with Automated Insights and Narrative Science.

Case Study Snapshots: Tableau Drives Value for Financial Services Companies

Case study snapshots in Figure 9 illustrate Tableau driving in the financial services space.

Figure 9: Case Study Snapshots of Tableau at Work in the Financial Services Space

Sector	Client	Case Study Snapshot
Banking	Barclays Bank	<p><i>Enhancing situational awareness and decision making:</i></p> <ul style="list-style-type: none"> • Sit with laptop in meeting, answer Qs against 20 million rows of data on the fly, eliminating the historical 1-2 day turnaround for answers • Showing engaging visuals gets people excited to use data to make better decisions • Recent dashboard, customer complaints: helps improve customer service, get root cause analysis of what complaints are about and find solutions • Send data and insight out via dashboards so senior executives and frontline workers see the same data; when they spot trends, they can plan for them • Tableau increasing innovation, helping people think about things in new ways
Credit card, e-commerce	VISA Europe	<p><i>Making great data visualizations a given to keep the focus on business value:</i></p> <ul style="list-style-type: none"> • Deliver something quickly: sharper and more engaging than anything before • Organic growth across enterprise, moving from old/tired data to visualization • Forget about data presentation issues, concentrate on data value and insight
Capital Markets	EY	<p><i>Using visual data to connect the dots and drive deep customer understanding:</i></p> <ul style="list-style-type: none"> • Use visual data to identify outliers and anomalies and thus identify fraud patterns • Connect various data sources to develop customized sets for clients • Tableau gives useful insight leveraging both unstructured and structured data • Gain deeper insights into customers, leading to better rating plans, growth in policies, and higher retention
Insurance	Allstate	<p><i>Easily crunching even massive data volumes to unlock insights and tell a story:</i></p> <ul style="list-style-type: none"> • Data sizes run from a few thousand records to as much as 20 million records • Look for out-of-pattern trends in data, then drill into what’s behind them • Heavy geographical and medical claims data analysis, share with adjusters and investigators in the field to act based on what data is showing • Before it was always numbers in rows and columns; now eager to do a new analysis; so much easier to actually see trends, story, the power of the data

Sector	Client	Case Study Snapshot
Wealth Management	Cheyne Capital	<p><i>Enhancing real-time portfolio management and fund performance:</i></p> <ul style="list-style-type: none"> • Analysis of funds in aggregation to analyze exposures, cash positions, security purchases, and performance over time • Eliminated spreadsheets and provided flexible reporting on top of the risk management warehouse • Secure, reliable, and scalable for enterprise deployment of dashboards • Users can customize their data visualizations in a few clicks • Traders know, in real time, while they're on the phone obtaining price quoted, how much more of a product they can buy
	Wells Fargo	<p><i>Gaining actionable customer insights to drive strategies and make better decisions:</i></p> <ul style="list-style-type: none"> • Wrangling disparate data and transforming it into meaningful insights informed and accelerated its entire business strategy around customer insights and treatments • Collected/combined/cleaned/categorized data from 70 million unique customers—ranging from small businesses to large financial institutions — to inform and accelerate the redesign of its business banking portal • Achieving more results with fewer team resources, enabling teams to focus on turning analytics into actionable insights and the company to make better, faster business decisions • Reaching broad internal audiences (stakeholders) with a great deal of easily-digestible, visually-appealing information that normally would require a large team to create and distribute
Regulatory Compliance	BNY Mellon	<p><i>Optimized regulatory audit processes—and drove the benefits of that initiative into internal and customer-facing processes to increase efficiency and grow revenue</i></p> <ul style="list-style-type: none"> • Saved \$2.1 million in financial regulatory auditing within 12 months of implementation • Increased accuracy and confidence in financial regulatory compliance by enabling 100% audit versus historically being able to execute only 25% audit • Centralized and automated data retention schedules, including structured and unstructured data that can be subject to legal discovery • Unified processes across legal, risk, and IT teams and is providing a framework to link job duties and data across departments; created global standard taxonomy associating business value with all the information it retains • Formerly kept extensive transaction and customer information merely for regulatory purposes (e.g., legal and federal discovery); now repurposes data for many things, including: <ul style="list-style-type: none"> - Determining cost basis and original asset values to assess capital gains - Viewing history of trades to gain insight into customer investment patterns in order to recommend not only investments but other financial services • Smashed the silos and enabled business user-friendly centralized access to data across all datacenters in all geos

Sources: Tableau and the companies

Stratecast The Last Word

Financial institutions today are facing disruptive market forces such as Bitcoin that threaten the prospect of a decentralized, financial institution-less future. Obviously, such developments collectively constitute a serious threat that financial institutions across all world regions must monitor closely, and act upon. At the moment, however, Bitcoin may be the least of their problems.

To its credit, the financial services industry is getting a handle on big data. Competent data management, however, is simply not enough in today's always-on global economy. The pace of business now demands that financial institutions do everything faster, while continuing to meet the ongoing dual challenge of reducing costs without corresponding reductions in customer experience. Financial institutions must engage with customers more closely than ever before to deal with competition from outside forces—and each other.

Despite these external and internal forces, there is good news here, and plenty of it, in the form of big data. **If managed effectively, big data can provide, in real time, the actionable analytic insights that hold the keys to solving these pressing issues, and to new areas of opportunity.**

A growing number of financial institutions are seeing the light: big data expenditures in this sector accounted for 19%, or \$9.2 billion, of the \$48.4 billion global BDA market in 2016, addressing issues and opportunities including security and privacy; data governance and blockchain; risk management and regulatory compliance; AI; and IoT. One reason for the spending: financial institutions are achieving an excellent return on their BDA investment. Nearly 60% of them achieve ROI in 12 months, and nearly 90% have attained ROI by the 24-month mark.

One of the transcendent providers in the BDA space is Tableau, and the company truly shines in financial services. Tableau's data-agnostic enterprise platform crunches massive datasets to provide actionable, self-service analytics that drive innovation and results. Its vision for smart analytics is geared to help financial institutions deliver on the dual promises of AI and the IoT. At the end of the day, though, what matters most are the dividends its customers are receiving as a result of using Tableau. For every case study snapshot appearing in this piece, there are a multitude of others for whom Tableau is, likewise, making great data visualizations second nature so teams are freed to focus on business value; using visual data to connect the dots and drive deep customer understanding; unlocking insights to tell a story; and more. **Any financial institution not already using Tableau to enhance its business prospects is selling itself and its future short.**

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