

Data Analytics makes new working methods for banks

تحليلات البيانات وسيلة حديثة لعمل البنوك

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Abstract:

The new analytical power is seen as an opportunity to invent and explore new methods that are able to detect correlations between the quantities of available data. Analytics methods are used in various fields such as banking, marketing, retail, healthcare, and more. The new analytics methods use the application of different algorithms to extract models, recognize patterns, and determine future possible values. Banks and financial institutions are actively seeking ways to make the most of big data which, including the application of analytical techniques to existing methods. The research focuses on evaluating the effect of analytics on the banking sector. The goal is to provide a thorough understanding of the analytical capacity, the design and development process of which is a key component that is changing the way financial organizations operate.

Keywords:Data analytics, bank, big data, risks, value creation.

JelClassificationCodes :C81, G21.

ملخص:

يُنظر إلى الأساليب الجديدة لتحليل البيانات على أنها فرصة لابتكار واستكشاف طرق جديدة قادرة على تحليل الارتباطات بين كميات البيانات المتاحة. وتستخدم أساليب تحليل البيانات الضخمة في مجالات مختلفة مثل الأعمال المصرفية والتسويق والبيع بالتجزئة والقطاع الصحي ما إلى ذلك. وتعتمد على تطبيق مختلف الخوارزميات بغرض استخراج النماذج والتعرف على الأنماط وتحديد أو التنبؤ بالقيم المستقبلية الممكنة. وتبحث البنوك والمؤسسات المالية عن طرق تساعد في لتحقيق أقصى استفادة من البيانات الضخمة، بما في ذلك تطبيق التقنيات التحليلية الحديثة. وتركز هذه الدراسة على تقييم تأثير تحليلات البيانات الضخمة على القطاع المصرفي. الهدف من ذلك هو توفير فهم شامل لقدرة أساليب تحليل البيانات، التي تعد عملية التصميم والتطوير مكوناً رئيسياً يغير من طريقة عمل المنظمات المالية. **كلمات مفتاحية:** تحليل البيانات، البنك، البيانات الضخمة، المخاطر، خلق القيمة.

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1. INTRODUCTION

In a few last years, big data has become a modern ubiquitous concept. This revolution is changing science, technology, medicine, education, finance, industry, and ultimately society itself. In the banking sector, we have a large volume of data distributed in different locations or sources in a heterogeneous environment using different databases or documents. The banking area has always been driven by data. The availability of a large amount of data in this area has opened up new avenues of analytical use, which have provided immense opportunities for new working methods. At the same time, some new challenges have been raised that need to be overcome in order to gain maximum benefit from data.

In this context, this proposal discusses the most important applications and issues of data analytics, in the Big Data Era, for the development of the next generation of bank's working methods. It focuses on the possible

application of analytics on banking developments. This study considers the effect and implementation of data analytics in the banking sector. It discusses some of the key advances and transitions that are driven by the advancement of technical and predictive methods in this field. It also highlights significant issues related to big data that banks need to manage.

The remainder of this article is structured as follows. Section 2 covers the opportunities and challenges of big data. Section 3 provides an overview about the value creation process from data analysis. Section 4 discusses the importance of big data and analytics in the financial sector. Section 5 highlights the way banks can use the advanced analytics tools in order to generate patterns from data. Section 6 discusses some big data application in banking sector and the main challenges facing banks.

2. BIG DATA: OPPORTUNITIES AND CHALLENGES

With the advent of digital technology and smart devices, a large amount of digital data is generated on a daily basis. Individuals are putting more and more publicly available data on the web. Many companies collect information on their clients and their respective behavior. As such, many industrial and commercial processes are being controlled by computers. The trend is part of an environment quite popular lately: the proliferation of web pages, image and video applications, social networks, mobile devices, apps, sensors, and so on, able to generate, according to IBM, more than 2.5 million bytes per day, to the extent that 90% of the world's data have been created over the few past years (Cukier and Mayer-Schoenberger (2013a, 2013b); Dietrich et al. (2014); Foster et al (2017)).

It provides a comprehensive description of data evolution. It indeed appears that data is a source of value. Yes, information tends to be a source of interest. Data is created and used as an integral part of our daily activities. As we are looking, the world of data is exploding in unprecedented velocity, variety, and volume. These three often are employed to describe the big data phenomenon. The data size is the main cause of the big data trend and explains the growing quantities of data. The variety refers to the complexity

of the data available today. Increasing 80% of data generated by companies can be categorized as unstructured data: e.g. data stored in files, social media, and multimedia like video and audio.

Big data is a data usage trend closely linked to the “Information Age” (Heudecker, 2013). But what is really subsumed under this phenomenon? Big data is eligible under a few main characteristics:

- It is primarily a large-scale network created by variety, by variety and velocity and comprises large amounts of information at the enterprise and public level, in the categories of terabytes (10¹³ bytes), petabytes (10¹⁵) and beyond of online data.
- It consists of a variety and diversity of data types and formats, many of them dynamic, unstructured or semi-structured and hard to handle by conventional statistical methods.
- Big data is produced by disparate sources as in immersive IoT applications from wireless devices, sensors, streaming communication created by machine-to-machine interactions. (Sedkaoui, 2018a).

Big data originally emerged as a term to describe large datasets that could not be captured, stored, managed nor analyzed using traditional databases. In another definition of big data, a fourth ‘V’ is added, referring to value, big data technologies represent a new generation of technologies and architectures developed to efficiently generate value from large quantities of different data type available, by allowing high-speed collection, discovery and/or analysis (IDC, 2014).

Big data technologies have grown rapidly in the form of data mining systems; search engines; query languages; filtering systems; cloud services, etc.

Big data could fundamentally change the way companies compete and operate. Companies that invest in and effectively extract value from their data will have a distinct advantage comparing to the companies that didn’t invest in data analysis (McKinsey Global Institute, 2011).

Big data nowadays has become one of the biggest concepts in the

world of IT especially with the rapid development of IoT driving the increase of data. It also brings new opportunities for the discovery of new values that are temporarily hidden. The success of large companies such as Amazon, Google, Facebook, Twitter, etc. proves the emergence of a factor in the development of today's hyper-connected world. Companies increasingly aware of the importance of data and information, which represents the result of data processing and it is in the heart of decision-making, throught to reflect on the way to "manage" to enrich and benefit.

Business experiences like Google, Twitter, Facebook, Netflix, and more, indicate that there are a number of opportunities for using big data, but there are still many problems and issues that need to be tackled in order to make good use of this technology. In order to harvest value from big data, companies have to address and overcome some challenges linked to:

1. Big data dimension

Big data gets global attention and can be best described using the three Vs (volume, variety, and velocity). These three dimensions often are used to describe the phenomenon. Each dimension presents both challenges for data management and opportunities to advance decision-making. These 3 V's provide a challenge associated with working with big data. The volume puts the accent on the storage, memory and computes capacity of a computing system and requires access to a computing cloud. Velocity stresses the speed at which data can be captured and meaningful insights can be produced. While the variety makes it difficult to create algorithms and tools that can manage a wide range of data (Sedkaoui, 2018b).

2. Technological context

There are many challenges of using and implementing big data. Manyika et al. (2011) indicate that a key obstacle is the consistency of internal and external databases, implying that there is a challenge in integrating and standardizing data of contrasting formats to enable valuable information flows. Incompatible IT infrastructures and software systems are therefore one of the main issues. IT systems and applications should be able to store, analyze and derive useful information from available data

(structured, semi-structured and unstructured). The most successful companies understand the limitations of the technology behind their big data operation and recognize the importance of integrating analysis with a sound understanding of the environment, a strong market sense and a positive attitude towards data-based insights.

3. Managerial context

In the BD universe, companies seek to unlock the potential of data in order to generate value. The secret to BD optimization is to utilize existing datasets to generate knowledge, enriching the value chain of business (Sedkaoui and Gottinger, 2017). Management's lack of understanding of the potential value that big data can bring to businesses is a major challenge to overcome (Morabito, 2015). The goal was to handle the growing amount of data, information and ensure its use and flow across the organization. Data must be managed at different stages and most of all evaluated (Kudyba, 2014) for companies to create insights and generate value.

In addition, the challenges include not just the previous contexts, but also other issues related to scalability, heterogeneity, quality, timeliness, security, and privacy which are also a big concern. Companies have to tackle these several issues in order to be able to seize full advantage of big data. Therefore, data is not power; it is its use that gives power (Martinet and Marti, 2001). In another way, each data byte tells the story and the data analytics, especially when coupled with IT tools; piece together that story's reveal the underlying message.

3. DATA ANALYTICS AND VALUE CREATION

Traditional methods of encoding information from transactional systems to make it available for statistical analysis do not operate in a situation where there are large volumes of data coming from a variety of sources and where even the formats can change (Sedkaoui and Gottinger, 2017). Data analysis started in the 20th century, when the information age really began.

Zhang has mentioned in his book “data analytics” published in 2017, that the first real data processing machine came during the Second World War. But, the advent of the internet was sparked the true revolution in data analysis. The importance of data analysis started in late 1960 when we begin to speak about databases as repositories of data. E.F. Codd (Codd, 1970) and his research group at IBM labs applied some mathematical principles and predicate logic to the field of data modeling.

Since then, databases and their evolutions have been used as a source of information to query and manipulate data. In 1974, still at IBM labs, the first language for the database was developed. SEQUEL (Structured English Query Language) (Chamberlin and Boyce, 1974), later called SQL for copyright issues, was the forerunner of all the query languages becoming the standard for a relational database.

In the 1970s and 1980s, computers could process information, but they were too large and too costly. Only large firms could hope to analyze data with them. Edgar F. Codd was the first to work on data organization by designing database management systems (DBMSs), in particular of relational databases.

As the size increases, the sophistication of the data structures, the patterns in the data, and the models required to account for the patterns usually grows. Big data has put a great challenge on the current analytics methods. The growth of big data is changing how analyses will be executed. It will also change the scope of analytical questions to be answered, as more data are available. The volume of data will continue to grow and constitutes a continuous source of knowledge in a very real way.

The challenge of turning large data into value or knowledge is related to its complexity, the nature of which is loosely represented by the three Vs. The challenge of turning large data into value or knowledge is related to its complexity nature, which is loosely represented by the three Vs.

So, data now is very different from the data that existed before. In other words, the nature of existing data (greatest dimension, diverse types, the mass of data, structured and unstructured ...) does not authorize the use

of most conventional statistical methods (tests, regression, and classification).

Indeed, these methods are not adapted to these specific conditions of application and in particular, suffer from the scourge of dimension. These issues should be seriously considered in big data analytics and in the development of statistical procedures.

With the advent of Web 2.0 and the semantic Web era, data analysis has become very important, replacing the traditional storing systems in many applications. We can say that they now represent the new technology for knowledge representation, data storage, and information sharing. Even with big data, data collection and analysis will become more and more important. It's then necessary to adopt new approaches, new methods, new knowledge and new ways of working, resulting in new properties and new challenges, as logic referencing must be created and implemented. New analytics methods have to help to find new ways to process that data and make more intelligent decisions.

Data available are more unstructured and produced in real-time, so new tools (through big data analytics) are needed to capture them and turn them into actions and decisions. "Actions" and "Decisions", that's what organizations need, because there is little sense without practice in gathering, collecting, exploiting, storing and even understanding data.

Big data opens up new possibilities of knowledge and provides another form of value creation for businesses. Today companies have large amounts of data. These reservoirs of knowledge must be explored in order to understand their meaning and to identify relationships between data and the models explaining their behavior (Sedkaoui, 2018c).

4. BIG DATA IN THE FINANCIAL FIELD

The banking sector and the financial industry have seen an upsurge of interest in big data. Actually, a growing number of financial institutions are exploring new ways of unlocking the potential of available data to gain

insights that can help them improve their performance and gain competitive advantage through factual and actionable knowledge, timely decisions, risk management, and mitigation and efficient operations in highly complex and often volatile business environments.

This is no surprise to finance experts who know the potential value of data and are conscious that no sector will gain more from big data than the financial and banking services industry. After all, the market is not only powered by data, but also thrives on it.

This is no surprise to finance experts who know the potential value of data and are conscious that no sector will gain more from big data than the financial and banking services industry. After all, the market is not only powered by data, but also thrives on data. It is becoming increasingly important for banks to adopt a data-centric perspective to handle the mounting pressures, a variety of risk situations and succeed in today's digital, global marketplace.

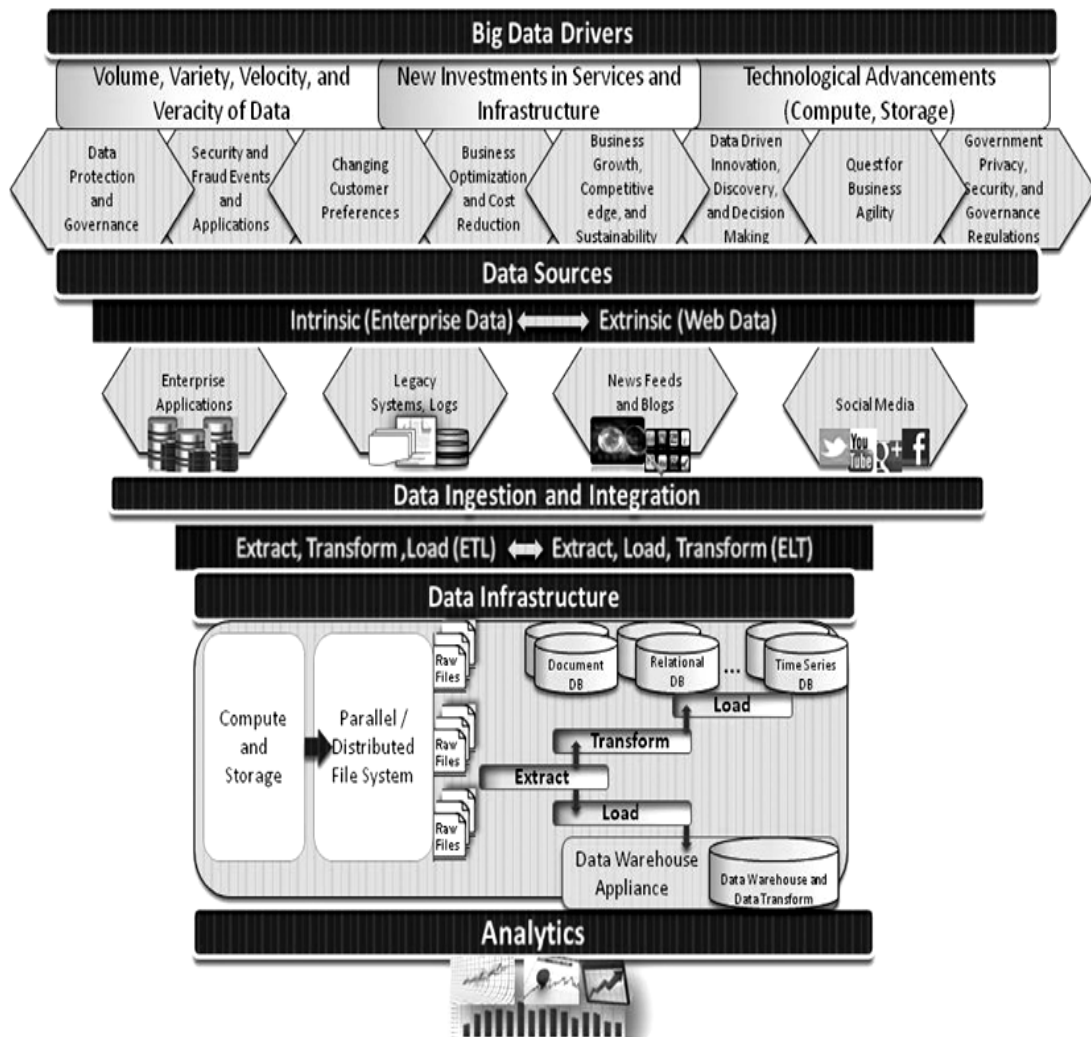
Nowadays, a vast amount of consumer data is available and open to banks. Faster, more efficient data technology enables banks to incorporate new information, such as granular consumer transaction and spending actions, social media presence, and internet browsing, into risk decision-making.

The access to unstructured data offers significant advantages not only for better credit-risk decisions, but also for investment tracking and early warning, identification of financial crime and prediction of operating losses.

Banks have already begun to harness this ability, and many challenges remain. A major question is whether banks can obtain both regulatory and customer approval for models that use social data, and if so, what usage of data is legal and acceptable. Big data has already initiated several innovations in the field of finance and has started to reshape some of the traditional ways of doing business.

Figure 1 depicts the key big data drivers in the financial sector and shows its essential elements.

Figure 1: Big Data ecosystem in finance



Source: Seth and Chaudhary, 2015

A big data ecosystem involves heterogeneous sources of data. The data collected from such sources subsequently go through data ingestion and integration step. Traditional ways of data integration primarily followed an ETL data approach. This approach is not always acceptable and may have some drawbacks, especially when it comes to large amounts of data. Several advancements in the last couple of years have led to the development of novel solutions and architectures that address some of the limitations inherent in the traditional systems and offer unique capabilities to efficiently handle today's big data needs.

The ultimate goal of a big data ecosystem is to facilitate analytics on the available data. Big data analytics provides the ability to infer actionable insights from massive amounts of data and can assist with information discovery during the process.

Data analytics is also being used in the capital markets for governance-based activities such as the detection of illegal trading patterns and risk management. For example, NYSE Euronext has deployed a market surveillance platform that employs big data analytics to efficiently analyze billions of trades to detect new patterns of illegal trading within realistic time frames. The analytics platform allows Euronext to process approximately 2 terabytes of data volume every day, and this volume is expected to exceed 10 petabytes a day by 2015.

The deployed infrastructure has been reported to decrease the time required to run market surveillance algorithms by more than 99% and improve the ability of regulators or compliance personnel to detect suspicious or illegal patterns in trading activities, allowing them to take proactive investigative action to mitigate risks (IBM, 2012). Big data technologies such as Hadoop and NoSQL working in conjunction with event-stream processing systems such as Storm also play a key role in the functioning of financial market (Bertolucci, 2014).

Many financial organizations have already started to reap the benefits of their data in the field using a combination of existing and new big data technologies. More innovations and technological improvements in this

field are expected to follow in the very near future as more financial units begin to incorporate big data solutions.

5. DATA ANALYTICS USES FOR BANKS

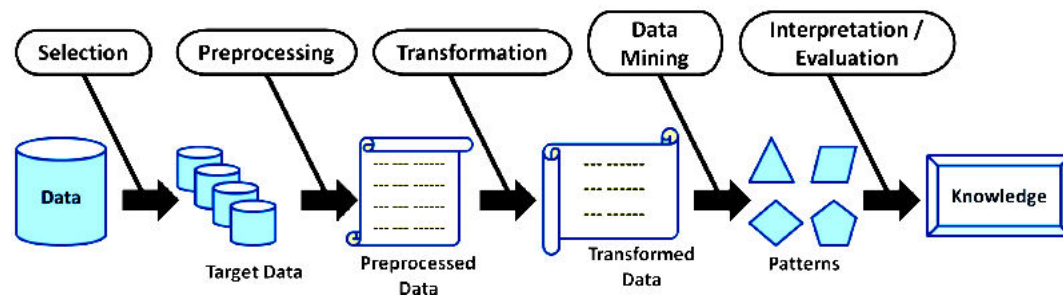
Today, with online banking and credit card and mobile payment systems, banks have access to a large amount of customer information. In addition to the uncertainty, data is also increasingly available.

The most important asset of large volumes of data has to do with the fact that they make it possible to apply knowledge and create considerable value. Combined with advanced analysis methods, new explanations can be provided for several phenomena. There are two ways to turn data into a valuable business asset (Sedkaoui, 2018c):

- Turning data into information is one of the phases in the data value chain. Data content is used to gain useful information and to successfully implement businesses strategies. This automatically involves database information in company decision-making processes;
- Turning data into products or processes adds value to companies. This is produced when data analysis must be implemented in the physical world.

Before one attempts to extract useful knowledge from data, it is important to understand the overall approach or the process that leads to finding new knowledge.

The process specifies a sequence of phases (with potential feedback) to be followed for the Knowledge discovery in database (KDD), as illustrated in the following figure.

Figure 2: Knowledge discovery in database

Source: Gullo, (2015)

To advance successfully each step, effective data collection must be applied, description, analysis, and interpretation (Sedkaoui and Gottinger, 2017). Each step is usually realized with the help of available software tools. Data mining is an important phase in this process – the use of different algorithms to extract models from data. Additional phases such as data preparation, data collection, data cleaning, the integration of sufficient prior knowledge and the correct analysis of mining results, ensure that useful knowledge is generated from data.

1. Impact on the banking sector

Banks can use analysis method in many different areas. According to The Financial Brand (2014), financial institutions are unable to take advantage from vast amounts of data, and banks are using only a small portion of the information to create insights that would improve customer experience. The study argues that banks apply big data analytics have a 4% market share advantage over banks that do not. It focuses on the following key areas.

Risk Management: The banking sector is risk-based, so every loan and investment needs to be assessed. Data Analytics allows banks to create new insights into their processes, operations, clients and markets to help them avoid risks. Advanced analytics can boost the predictive power of risk models, exponentially improve system response times and effectiveness, provides more extensive risk coverage, which creates significant cost savings.

Fraud Containment: Data analytics bridges the technology and intelligence gap to help banks spot financial crime patterns early and implement countermeasures more quickly. Many of the techniques used to detect fraud require recognizing identical and repeatable pattern matches of people, places, systems, and events. Data analytics also reduce false alerts, enabling security systems and fraud experts to work more efficiently and effectively on real threats. In short, data analytics helps to predict the next fraud and recommends preventative action, keeping financial institutions one step ahead of the bad guys. Palmer (2014) suggests that the stages of enterprise indicated in the following, counter-fraud measures:

Table 1 : How big data can help bank's operations

Stage	How big data can help?
<i>Detect</i>	Applying advanced analytics to all key fraud data to aid in predicting if action is potentially fraudulent
<i>Respond</i>	Applying fraud insights to take action in real-time
<i>Investigate</i>	Performing and managing inquiries into a suspicious activity that are supported by data analysis and collaborative sophisticated case management.
<i>Discover</i>	Using new big data analytics capabilities that help in the identification of suspicious activity by analyzing historical data to search for patterns of fraud and financial crimes

Online lending: Although online lending is fundamentally a risk-based activity within the financial community, many banks are now using it as a capital generator tool. This requires intelligent systems capable of approving or rejecting a loan application in mere minutes. Data analysis may play an important role in the design of these systems. Improving the loan rate by 1-2% (without taking the unwanted risk) can mean millions of

dollars of profit for financial institutions.

Big data was born out of the need for a data set becoming so large and complex that traditional methods are no longer sufficient to process this it. And the financial markets are getting inundated with a flurry of data that is increasing in complexity as well as in size. To make the most out of this amount of data, that are Meta tagged piecemeal, produced in real-time, and arrive in continuous streams from multiple sources, the issue for banks and financial institutions is not limited to the “simple” technical issues of collection, storage, and processing speed.

The use of big data requires rethinking the process of collecting, processing and the management of data. It’s the “analysis” that will be applied to data which will justify big data, not the collection of data itself (Sedkaoui and Gottinger, 2017). It is necessary to transform the available data into actionable knowledge to realize the true potential of Big Data and extract valuable information or factual strategic insights from it. Data can be organized and transformed into information that will later be transformed into knowledge and then into value.

Nonetheless, there are many technical challenges that need to be tackled in order to realize the full potential of big data. Jagadish and al (2012) provide a thorough review of such problems on the basis of the theory of the data analysis pipeline:

- *Data Acquisition and Recording*: It is necessary to capture the context in which data has been generated, to be able to filter out non-relevant data and to compress data, to automatically generate rich data description support metadata, and to track and record the source.
- *Information Extraction and Cleaning*: Data must be transformed in order to extract knowledge and to express it in a way that is appropriate for analysis. Data may also be of poor quality and/or unknown value. Data cleaning and data quality assurance are therefore important.
- *Data Integration, Aggregation and Representation*: data may be

very heterogeneous and may have specific metadata. Data integration, even in more traditional situations, requires a great deal of human effort. New approaches that can increase the efficiency of data integration are important, as manual approaches will not be scalable to what is needed for big data. Various data aggregation and representation techniques may also be required for different data analysis applications.

- *Query Processing, and Analysis:* Big data methods must be capable of dealing with noisy, dynamic, heterogeneous, untrustworthy data and those defined by complex relationships. Nevertheless, given these challenges, big data, even if noisy and unpredictable, may be more useful in finding more accurate hidden patterns and knowledge than small samples of good data. Additionally, current (often redundant) relationships between data can provide an opportunity for cross-checking data and thus improve data quality. Supporting request processing and data analysis requires scalable mining algorithms and strong computing resources.
- *Interpretation:* Analysis outputs derived from large data need to be interpreted by decision-makers, and this may require users to be able to analyze the conclusions at each point of data processing and potentially re-trace the data analysis process. Rich source is important in this regard.

Big data analysis is essential when banks want to engage in predictive analysis, natural language processing, image analysis or advanced statistical techniques such as discrete choice modeling and mathematical optimization, or even if they want to mash up unstructured content and analyze it with their business intelligence. Companies will be able to suggest data management for decision-making. The new analytical power is seen as an opportunity to invent and explore new methods that are able to detect correlations between the quantities of available data.

6. DISCUSSION

Big Data is a growing and modern threat that banks are faced with. This trend is often defined as three “V”: high-volume (the amount of data), high-speed (the speed in which data is produced, capture, and analyzed) and high-variety (the various type of data) information resources. Such features are difficult to manage with traditional methods or techniques.

Nonetheless, banks can collect petabytes of data every day, and traditional techniques are struggling to exploit these vast amounts of data. In fact, traditional methods cannot go as fast as thousands of credit card transactions happen each second and errors occur before anything can be accomplished.

In contrast, more than 70% of the data are semi-structured or unstructured. Structured data exists in a fixed area within a row-column database, but unstructured data refers to data that cannot suit the database properly (email messages, images, web pages, etc.). The latter is almost difficult to analyze using traditional methods. Without being able to leverage big data banks are missing significant opportunities to prevent and detect fraud and manage risks.

Banks must also contend with a new concern: anti-money laundering (AML) regulations. In the age of state-sponsored terrorism, AML has become a real problem for financial institutions. With a wave of anti-AML regulations born every day, banks are under pressure to ensure that financial cybercriminals do not leverage them to launder funds, while local regulators are breathing down the banks’ backs.

This perfect storm of a surge in data and fraud threats from every angle has driven banks to seek out new mitigation solutions. The recognition that traditional security methodologies are no longer enough to contend with this phenomenon has generated a new financial security mindset that leverages innovative approaches to secure banks.

Data analytics solutions address the challenges of the “three Vs” where traditional methods struggle: Volume, Velocity, and Variety of data. The first challenge with traditional tools is to deal with large data volumes

as banks can create terabytes of new data. Most banks work with data volumes that do not conform to the size of their sector (EY, 2014).

They often use data analysis that is unreliable when it comes to the detection of fraud. Most of the frauds are not apparent when sampling. To be effective in fraud detection, banks have to leverage the complete data set. This is possible with data analytics tools that enable banks to analyze all the data set available to the bank. Hadoop, a platform that manages large data sets through clusters of machines, is one of the main tools that can exploit such a vast amount of data streams.

The second challenge is to identify or even prevent fraud in a high-speed data environment. Banks should evaluate transactions as quickly as possible in order to take appropriate corrective action in the event of a threat.

They have got to process data in almost real-time to do that. If this is not possible with traditional methods, sophisticated techniques can be applied to advanced analytics like predictive modeling which will identify and avoid fraudulent transactions much sooner and before any damage is done.

To counter these rapidly changing fraud schemes, banks need tools that allow them to be versatile and adapt to these schemes. For example, a SAP fraud management solution powered by “SAP HANA” big data software, built on in-memory technologies, could easily exploit and process high data volumes. The application can identify and block a suspicious transaction in almost real-time. A warning will then be sent to the investigator for review. SAP solution also allows banks to customize and adapt the solution to evolving threats by changing the rules to the new requirements.

The third challenge involves the exploration and the analysis of structured and unstructured data. In this context, it should be mentioned that most of data is unstructured. Nonetheless, this kind of data is very difficult to be analyzed and managed using traditional methods. The ability to analyze text and other unstructured data can give lots of insight into the bank's risk

management.

Text analysis is a good example of challenging unstructured data storage in order to prevent fraud. It is a text structuring method which uses different analysis methods to identify patterns and text connections. As the text is open-ended and can be interpreted in numerous ways, analysts need to start with a hypothesis and know what they are looking for in the text, which is not easy to shape accurately.

Analyzing the new sources of data has also been a challenge in practical terms. Firstly, it has been difficult to recruit skilled people within the field of “data science”, secondary, the central bank’s IT infrastructure has not always met the requirements laid down for the storage of large amounts of data. The methods of analysis also often generate complex models, which makes interpreting results difficult and the mediation of policy recommendations even more so. So, the implementation of the new strategies requires more resources, new skills, and clearer coordination among the central bank’s various policy areas.

Central banks also need to join forces in exploring and assessing the usefulness of selective big data sources and in defining a framework that can be used systematically as part of exploring their relevance for the central banking tool-kit. This would require a feasibility study and showcasing a few relevant sources.

Data analytics provides the ability to infer actionable insights from massive amounts of data and can assist with information discovery during the process. The main challenge of using data is not in the collection but in the choice of which data should be sought and how to make sense of it.

CONCLUSION

This paper highlights the importance of analytics and the role it plays as a complement to create new working ways for banks and financial institutions. The data value increases over time and depends on multiple uses that are made. Advanced analytics helps banks control both rising compliance costs and the risk of non-compliance. Clearly, analytics has the

capacity to affect nearly every area of finance in the big data universe.

Nonetheless, financial service companies are still lagging behind in adopting the big data analytical process, which implies the untapped potential for value creation open to banks. Financial institutions that don't develop the resources and capabilities to effectively use big data will be challenged to develop a sustainable competitive advantage. In this framework, they must have an absorption capacity of all available data, allowing them to assimilate, reproduce knowledge and creating value.

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