KAPITEL 1 / *CHAPTER 1* [1]
SHAPING INTERNATIONAL BUSINESS UNDER THE IMPACT - BIG DATA

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Introduction

This theme has been widely reflected in research such as TechAmerica Foundation (2012), Silicon Graphics (1990), or Gartner who incidentally pioneered the first accepted definitions of Big Data. From academic studies, the work of Davenport (2013) and Francis X. Diebold.

Which separates classic analytics from application analytics by the level of use of Big Data by its characteristics. The most essential characteristics being: volume, velocity and variety, explained and analysed by Laney (2001) and Chen (2012). Other researchers such as Chunquan Li, Yaqiong Chen, Yuling Shang and Mikalef (2018) have completed by adding a number of new characteristics: veracity, value, variability and visualization.

Therefore, the research aims to identify and evaluate the impact of Big Data on international business strategies, operations, marketing processes and supply chain management. In addition, the research aims to identify the benefits and challenges of using Big Data in international business and provide practical recommendations for the effective management and use of Big Data in the context of economic globalisation.

Researching the impact of Big Data on international business is important and exciting because it can help companies improve their performance and remain competitive in an increasingly digitalised world, while managing the challenges and risks associated with the use of Big Data.

Research hypotheses

1.The use of Big Data in international business leads to increased efficiency and reduced costs through improved processes and more informed decision making

2.Big Data can help international companies provide a more personalized customer experience, which can increase customer satisfaction and loyalty.

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3.Implementing Big Data solutions in international business can also face certain obstacles and challenges, such as difficulties in managing data, security and privacy issues, or lack of qualified data analysis staff.

I. Although Big Data is ubiquitous at this stage, it is still developing as a concept and has uncertain origins. It is essential to note that the evolution of the term Big Data comes as a result of recent developments, namely the explosive growth of available data [Viktor Mayer-Schönberger, Thomas Ramge. Reinventing Capitalism in the Age of Big Data. London: Basic Books, 2018. ISBN 9780465093694.]. Francis X. Diebold, argues the emergence of the term Big Data in the mid-1990s within Silicon Graphics, an American manufacturer of high-performance computers. John Mashey, formerly CEO of this company, produced a device package for the company that he titled "Big Data and the nest wave of InfraStress", which also demonstrates to some extent his clear knowledge of the Big Data phenomenon. At the same time, Silicon Graphics published an advertisement on Big Data in several magazines such as Black Enterprise (March 1996, p.60), later in Info World (17 November 1997, p.30) and in CIO (15 February 1998, p.5) [Francis X. Diebold. A Personal Perspective on the Origin(s) and Development of Big Data: The Phenomenon, the Term, and the Discipline. University of Pennsylvania, 2012].

As defined by Gartner, an American IT research and consulting company - "Big DATA are information assets in high volume, high velocity or variety that require new forms of processing to enable improved decision making, insight discovery and process optimization.".

The term refers not only to the data, but also to the various frameworks, tools and techniques involved. Technological advancement and the emergence of new communication channels (such as social networks) and new and more powerful devices have presented a challenge to industry players in that they have to find other ways to manage data[Amir Gandomi, Murtaza Haider. Beyond the hype: Big data concepts, methods, and analytics. International Journal of Information Management, 2014].

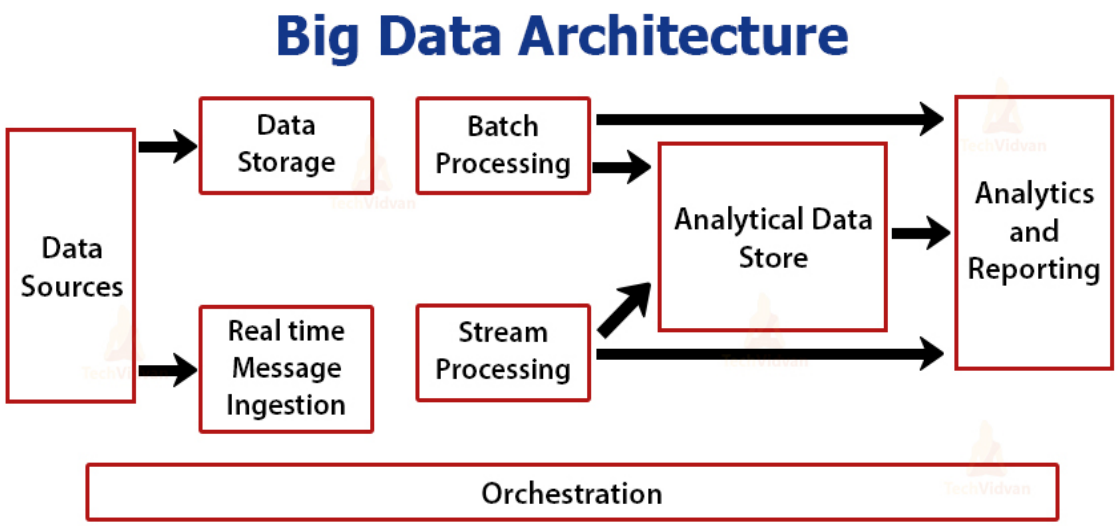

Figure N1. Big Data Architecture

Source https://www.heavy.ai/technical-glossary/big-data-architecture

Clearly, size is the first characteristic that comes to mind when considering the question "what is big data?" However, other characteristics of big data have emerged recently.

For example, Laney (2001) suggested that volume, variety and velocity (or the three Vs) are the three dimensions of data management challenges [Laney D. 3-D data management: Controlling data volume, velocity and variety. Application Delivery Strategies by META Group, 2001]. The three Vs have emerged as a common framework for describing big data [Chen H., Chiang R. H. L., Storey V. C. Business intelligence and analytics: From big data to big impact. MIS Quarterly, 2012]

Similarly, the TechAmerica Foundation, a technology trade association in the United States, defines Big Data: "Big Data is a term that describes large volumes of complex and variable high velocity data that require advanced techniques and technologies to enable the capture, storage, distribution, management, and analysis of information."[Demystifying bigdata: A practical guide to transforming the business of Government, TechAmerica Foundation's Federal Big Data Commission. 2012.]

The volume is about big data. Big data sizes are reported in multiple terabytes and petabytes. One terabyte stores as much data as could fit on 1500 CDs or 220 DVDs, enough to store about 16 million Facebook photos. According to the annual Data Never

Sleeps infographic, released in 2022 by Domo, an American cloud software company based in American Fork, Utah, USA, more than 140 thousand photos are uploaded every minute by Facebook users.

Definitions of large data volumes are relative and vary depending on factors such as time and type of data. What might be considered big data today may not reach the threshold in the future as storage capacities increase, allowing even larger data sets to be captured. In addition, the data type, discussed in the variety, defines what is meant by "big". Two data sets of the same size may require different data management technologies depending on their type, e.g. tabular data versus video data. Thus, definitions of big data also depend on the industry. Therefore, these considerations make it impossible to define a specific threshold for large data volumes.

Variety refers to the structural pluralism in a dataset. Technological advances allow firms to use different types of structured, semi-structured and unstructured data. Structured data, which constitutes only 5% of all existing data [Cukier K. Data, data everywhere: A special report on manag-ing information. The Economist, 2010], refers to tabular data found in spreadsheets or relational databases. Text, images, audio and video files are examples of unstructured data that sometimes lack the structural organisation required by machines for analysis. Encompassing a continuum between fully structured and unstructured data, the format of semi-structured data does not conform to strict standards. Extensible MarkupLanguage (XML), a textual language for data exchange on the Web, is a typical example of semi-structured data. XML documents contain user-defined data tags that make them machine-readable.

A high level of variety, a defining characteristic of big data, is not necessarily new. Organisations have accumulated unstructured data from internal sources (e.g. sensor data) and external sources (e.g. social networks). For example, facial recognition technologies are empowering retailers to obtain information about in-store traffic, the age or gender composition of their customers, and their movement patterns in stores. This invaluable information is leveraged in product promotion, placement and staffing decisions.

Clickstream data provides online marketers with a wealth of information about

customer behaviour and browsing patterns. Clickstream provides advice on the timing and sequence of pages viewed by a customer. Using big data analytics, even small and medium-sized businesses can mine massive volumes of semi-structured data to improve website design and implement effective cross-selling and personalized product recommendation systems.

Speed refers to the rate at which data is generated and the speed at which it should be analysed and acted upon. The proliferation of digital devices, such as smartphones and sensors, has led to an unprecedented rate of data creation and is driving a growing need for real-time analytics and evidence-based planning. Data coming from mobile devices and flowing through mobile apps produces torrents of information that can be used to generate real-time, personalized offers for everyday customers. This data provides robust customer insights such as geospatial location, demographics and past buying patterns that can be analysed in real-time to create real value for customers.

Given the popularity of smartphones, retailers have to cope with hundreds of thousands of streaming data sources demanding real-time analytics. Traditional data management systems are not capable of handling huge data streams instantly. This is where big data technologies come in. They allow companies to create real-time insights from large volumes of "perishable" data .[2]

In addition to the three Vs, other dimensions of big data have been mentioned by large advanced technology corporations

Veraciousness. IBM coined Veracity as the fourth V, which stands for the inability to belong to data sources. For example, customer sentiments in social networks are uncertain in nature because they involve human judgement. Nevertheless, they contain valuable information. Thus, the need to deal with imprecise and uncertain data is another facet of big data that is addressed using tools and analytics developed for managing and extracting uncertain data.

Variability (and complexity). SAS introduced Variability and Complexity as two additional dimensions of big data. Variability refers to the variation in data

[2] Y.H. Kuo, A. Kusiak. *From data to big data in production research: the past and future trends.* Int. J. Prod. Res. [online]. 2018. Disponibil: https://doi.org/10.1080/00207543.2018.1443230

throughput. Often the velocity of big data is not consistent and has periodic peaks and troughs. Complexity refers to the fact that big data is generated by a multitude of sources. This imposes a critical challenge: the need to connect, fit, clean and transform data received from different sources.

Value. Oracle has introduced Value as a defining attribute of big data. Based on Oracle's definition, big data is often characterized by "relatively low value density". That is, data received in its original form usually has a low value relative to volume.

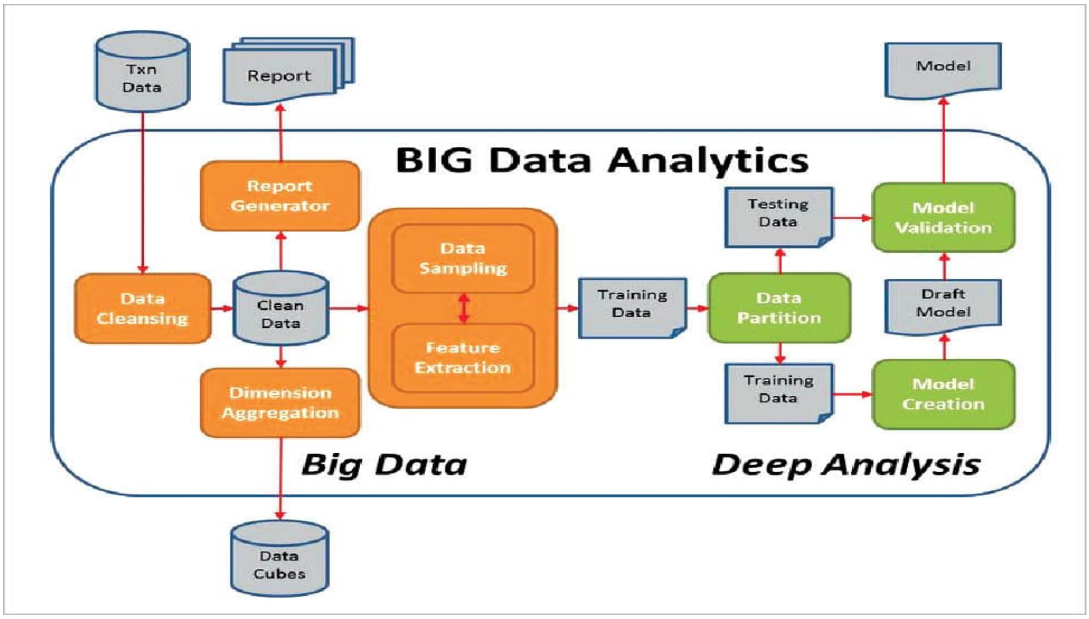

Figure N2. Big Data Analytics

Source: https://www.opensourceforu.com/2017/09/open-source-tools-you-can-use-to-handle-big-data/

By 2003, only five billion gigabytes of data existed worldwide. The same amount of data was generated in just two days in 2011. By 2013, this amount was generated every ten minutes. It is therefore not surprising that 90% of all the world's data has been generated in the last few years. All this data is useful when processed, but it was neglected long before the advent of the Big DATA concept

With the massive growth in the number of Internet users, there has been an exponential increase in the data generated. Data is generated, for example, from the millions of messages that are sent and communicated via WatsApp, Facebook or Twitter, from the trillions of photos generated and hours of videos uploaded to Youtube every minute.

This means that vast amounts of data are generated every day in the economy as well as through people's personal and social activities. The European Commission estimates that the total global amount of data in 2025 will be 530% higher than in 2018. Areas where Big DATA is used and its role Almost any industry can reap the benefits of Big DATA services. Companies of all sizes are the first to benefit from the advantages of handling big data.

In transportation, Big Data helps run GPS in smartphone apps that generate data from government agencies and even satellite imagery. In aviation too, a huge amount of data for transatlantic flights to optimise fuel efficiency, balance cargo and passenger weight, and analyse weather conditions to ensure maximum safety. Big Data collected via GPS and social platforms can help reduce traffic jams.

And efficient regulation of traffic flows also contributes to time and fuel savings, as well as lower CO2 emissions[Cathy O'Neil. Weapons of Math Destruction: How Big DATA increases inequality and threatens democracy. Crown New York, 2016. ISBN 9780553418811].

In advertising and marketing, Big Data is a major component of advertising to target specific segments of the consumer base. Advertisers buy or collect large volumes of data to identify what consumers like.

Another segment such as financial companies are strong experimenters as well as major players that continue to adapt their methods for the credit card customer segment [Barney J. B., Clark D. N. Resource-based theory: Creating and sustaining competitive advantage. Oxford University Press on Demand, 2007]. In the field of financial banking, Big Data also plays an important role because is used for fraud detection, risk management and mitigation, customer relationship optimisation and personalised marketing.

Similarly, Big Data is widely used in the entertainment industry to gain insights from consumer reviews to predict audience preferences and interests .

Weather sensors and satellites help collect large volumes of data to track weather conditions. Meteorologists widely use Big Data to study natural disaster patterns to prepare weather forecasts.

Big Data is also having a significant impact on the healthcare industry. Healthcare providers and organisations have been using Big Data massively for various purposes, including predicting disease outbreaks, detecting early symptoms of preventable diseases, electronic health monitoring, real-time warning, improving patient engagement, anticipation and prevention of serious medical conditions, strategic planning, telemedicine and research. Analysis of large sets of clinical data - e.g. anonymised medical records or data entered by patients into various applications - can enable better diagnosis, treatment and drug development, with concomitant cost savings [Elif Şen, Ecem Körük, Nisan Serper, Banu Çaliş Uslu. Big Data Analytics and Simulation for Better Strategic Management. Journal of Current Research on Engineering, Science and Technology, 2019. ISSN: 2651-2521].

Big Data enables companies to innovate, either by better analyzing people's needs and wants or by proposing entirely new products. In agriculture, farmers can use data from satellites and sensors to make better use of resources such as water or sunlight and adapt crops to changing climate conditions.

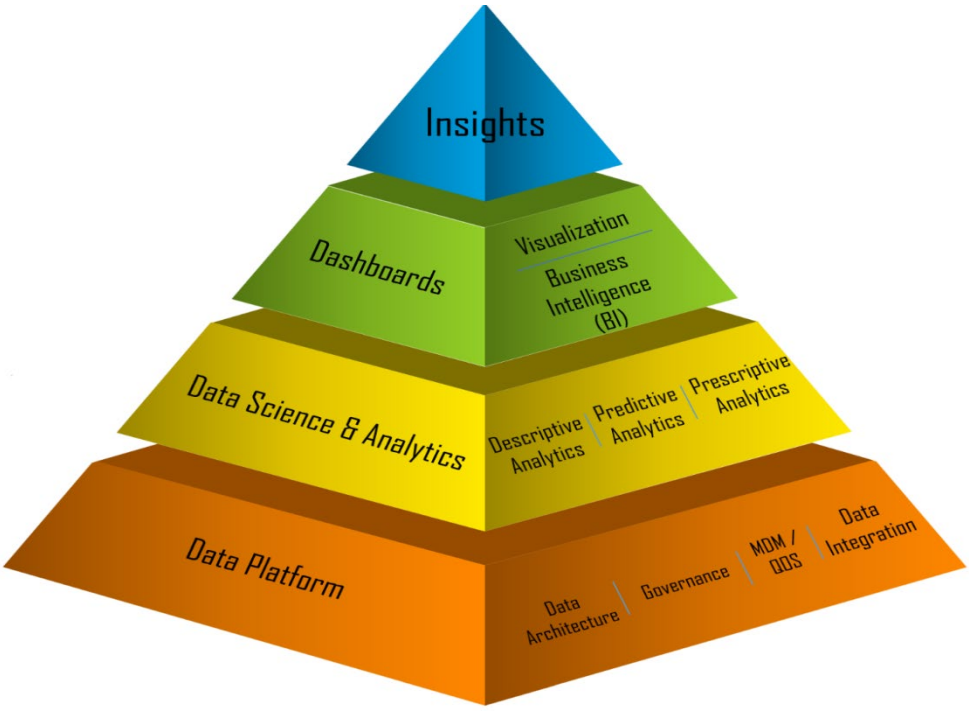

Figure N3 Insights big data

Source: https://consultingeig.com/analytics/

Data and advanced analytics can make public services more efficient, increase transparency and better tailor services to individual needs.

In business, data analytics helps organisations use their Big Data to identify new opportunities. Moreover, it creates smart businesses that continually grow through efficient operations that bring in higher profits and simultaneously satisfied customers.

II. The implementation of Big Data is widely accepted by many industries and companies, which helps them improve their business processes. Big Data provides a valuable opportunity to universal markets, each of the industries is trying to evaluate its possibilities in order to analyze all the information to make the most optimal decisions[Chen H., Roger HL Chiang, Veda C. Storey. Business Intelligence and Analytics: From Big Data to Big Impact. MIS quarterly, 2012]. Similarly, the more Big Data is used, the more it will contribute to business evaluation which will ultimately lead to making the best business decisions. Such a scenario will maximize profit as well as changing traditional approaches to new approaches to business.

Some companies, such as Amazon, eBay or Google, considered pioneers in the field, are examining the factors that can control performance in order to define what actually causes sales revenue growth as well as user interactivity [McAfee A., Brynjolfsson E., Davenport T. H., Patil D. J., Barton D. Big data. The management revolution. Harvard Bus Rev, 2012].

Brick and mortar companies[Refers to the physical presence of an organization or business in a building or other structure. The term brick-and-mortar business is often used to refer to a company that owns or leases retail stores, manufacturing plants, or warehouses for its operations], also uses Big Data for rigid testing of its ability to advise customer data by collecting transactions from millions of customers via loyalty cards. The information collected is used to analyse new opportunities, for example, how to get the most effective promotions for certain categories of customers, and to understand their decisions for final pricing.

Other companies use data mining to collect information from social media, airlines, Ford Motor or Pepsico, analyse consumer posts on social media such as Facebook or Twiter to examine their opinion of their products [Barney J. B., Ketchen

Jr D. J., Wright M. The future of resource-based theory: revitalisation or decline? Journal of management, 2011].

However, using Big Data, as a fundamental driver of decision making that directly involves new capabilities, the vast majority of companies are far from accessing all data resources. Companies in various sectors have gained crucial insight from structured data collected from different enterprise systems and dispersed it across commercial database management systems.

Data analytics influences infrastructure components, so companies need to focus on this now and later to gain competitive advantage.

Zynga is a game maker that collected customer service data and used that data to design a new version of its game. Another example is Caesars Corporation, which analyzed health insurance data for 65,000 employees and their families about how they used health care and used this data to confront certain drug companies [Popovič A., Hackney R., Tassabehji R., Castelli M. The impact of big data analytics on firms' high value business performance. Information Systems Frontiers, 2016].

Organisations can collect data from their customers to improve their business. For example, IBM has developed a cooperative and responsive methodology to help retirees in Italy who need services such as healthcare and other emergency services [Zhang Hang, Liu Yun. The Research Based on Big Data Management Accounting Model Building. Science Innovation, 2016]. The developed technology is based on some sensors distributed around the house, which measure heat, oxygen level, wear and tear, water and electricity, i.e. anything abnormal in these patterns will alert the responsible service such as fire brigade, paramedics or police depending on the situation. This collaborative technique has helped reduce the cost of care for pensioners by up to 30 per cent and also helped to deliver what is needed in a shorter time with less cost.

Many companies are interested in Big Data analytics to improve their business, for example IBM and Microsoft are prominent representatives. IBM has accounted for many big data options that allow users to store, manage and analyze data across various resources; it has a good play in business-intelligence and healthcare. Compared to IBM,

Microsoft has also shown strong work in cloud computing activities and techniques, another example is Facebook and Twitter, which collect various data from user profiles and use them to increase their revenue.

Most US airlines rely on a local study that 10% of flights have a 10-minute gap between estimated arrival time and actual arrival time. In early 2001, Passur started to present its arrival predictions through a service called "RightETA" [Viktor Mayer-Schönberger, Thomas Ramge. Reinventing Capitalism in the Age of Big Data. Basic BOOKS, 2018]. It calculates time by consolidating available above-board information about weather, flight schedules and other factors with the company data itself collected. Likewise, it includes the stream from the networks of a radar station that is set up near airports to collect data from all the planes in the sky, with an enormous range of data being collected about all the planes, producing a huge amount of digital data[Borenstein M., Hedges L. V., Higgins J. P., Rothstein H. R. Introduction to meta-analysis. John Wiley & Sons, 2009.].

Moreover, Passur keeps all the information that is collected, so they have multidimensional data for over 10 years. Passur provides support for airlines so that they know when their planes will land and, as a result, can plan for a multi-billion dollar value. The simple formula is that using big data analytics will lead to the best prediction, and the best prediction will produce the best decision.

Organizations focus on recognizing trends to gain a competitive advantage and gain opportunities from data analytics. Insights from big data analytics have the potential to enable business process oversight and measurement, strengthen quality management and customer relationships [Banica L., Hagiu, A. Big Data In Business Environment. Scientific Bulletin-Economic Sciences, 2015].

Big data analytics is a new trend that is starting to emerge on the scene in the last decade, many smart companies are trying to implement big data analytics to be competitive in the industrial environment, so the idea here is how to be agile to implement big data to improve business.

The risk in using big data analytics is also about privacy issues. Not all necessary information can be accessed easily, so companies need to consider the rules of

retrieving information from other websites or from individuals' private accounts.

Once Big Data can be used with respect to all risks, companies will realize how much revenue will increase and customer service will be continuously discounted to billions of people. It will also help in forecasting and planning in online sales, and the main benefit of big data is the competitive advantages that can be gained by listening to customers' ideas, supporting them and presenting them with what they really want[Davenport H., Jill D. Big data in big companies International Institute for Analytics, 2013].

The issues that arise in the Big Data environment are lack of skills in using the technologies, lack of knowledge about Big Data and possibly lack of experience in using big data analytics.

Leveraging big data analytics in industrialization procedures can promote industrialization agility and performance. Big Data analytics also supports performance predictors that enable decision makers to use additional data to achieve organizational goals. When organizations use big data analytics, they can predict already unpredictable things and improve process performance.

Companies realize the benefits from optimizing operational processes by reducing costs, reducing inventories, and also influence improved operational efficiency [Sosna M., Trevinyo-Rodríguez R. N., Velamuri S. R., Business model innovation through trial-and-error learning: The Naturhouse case. Long range planning, 2010]. An organisation's big data analysis capabilities (such as the resources of data, access, integration and delivery) and organisational factors (such as big data analytics strategy) could accelerate the effective exploitation of big data analytics in processes and operations.

II. Business models with BiG Data

Big Data offers unprecedented opportunities to gain and maintain competitive advantage, making it "one of the most significant technological disruptions to business since the meteoric rise of the internet and the digital economy"[Chen HM, Chiang RH, Storey VC. Business intelligence and analytics: From big data to big impact. MIS Quarterly, 2012. ISSN: 1165-1188]. This view is supported by empirical findings,

which suggest that firms that use Big Data outperform those that do not, both in terms of productivity and profitability[McAfee A, Brynjolfsson E. Big data: The management revolution. Harvard Business Review, 2012].

The concept of the business model (BM) has gained increasing attention from both practice and research since the dot-com revolution of the 1990s [The dot-com revolution refers to the period from the late 1990s to the spring of 2000, when Wall Street, corporate America, the general public and the media caught a wave of euphoria generated by the internet and the use of high purpose technology for business]. A firm's BM describes how a firm conducts its business, uses its resources and leverages those of its suppliers and partners to develop and deliver goods and services in order to create and capture value.

To prepare their business model for a digital future, companies are increasingly trying to use Big Data derived from new digital technologies such as wearable minisensors and the Industrial IoT [Ehret M., Wirtz J. Unlocking value from machines: Business models and the Industrial Internet of Things. Journal of Marketing Management, 2017.], giving rise to a phenomenon known as "big data business models"[Schroeder R. Big data business models: Challenges and opportunities. Cogent Social Sciences, 2016.].

Big Data business models are those business models that rely on the intensive use of technologies to process and analyse large volumes of data. These BMs focus on collecting and analysing data, with the aim of obtaining valuable insights to improve business processes and increase performance.

Due to big data, the digital connection between consumers and goods not only captures their experience of using goods, but also becomes a form of a new economic resource that can drive business model innovation for companies [Ng I.C. New business and economic models in the connected digital economy. Journal of Revenue and Pricing Management, 2014.]. Until now, firms operating in traditional industries, such as consumer electronics and appliance manufacturers, could rely solely on retail sales data to analyze consumer buying behavior to forecast production volume. They can also invest in customer relationship management tools to track customer loyalty

and try to influence purchasing decisions.

If the adoption of IoT, which involves installing sensors and devices embedded in consumer electronics and appliances, is anything to go by, it has enabled manufacturers to capture data about how consumers use their products. It is clear that such usage data as an economic resource will transform the relationship between manufacturers and consumers, which in turn will transform manufacturers' resources and revenue streams.

There are a number of big data business models, which include:

1.Data analytics platforms - these provide software solutions for processing and analysing data, enabling users to gain valuable insights and make more informed decisions.

2.Data analytics services - these provide data analytics and consulting services, helping companies optimise their business processes and increase efficiency.

3.Cybersecurity solutions - these use data to identify security threats and take preventative measures to protect companies' data and systems.

4. Programmatic advertising companies - these use data to create and deliver relevant and personalized ads based on users' interests and behavior.

5. Machine learning services - these use data to develop predictive models that can be used to make automated decisions or optimise business processes.

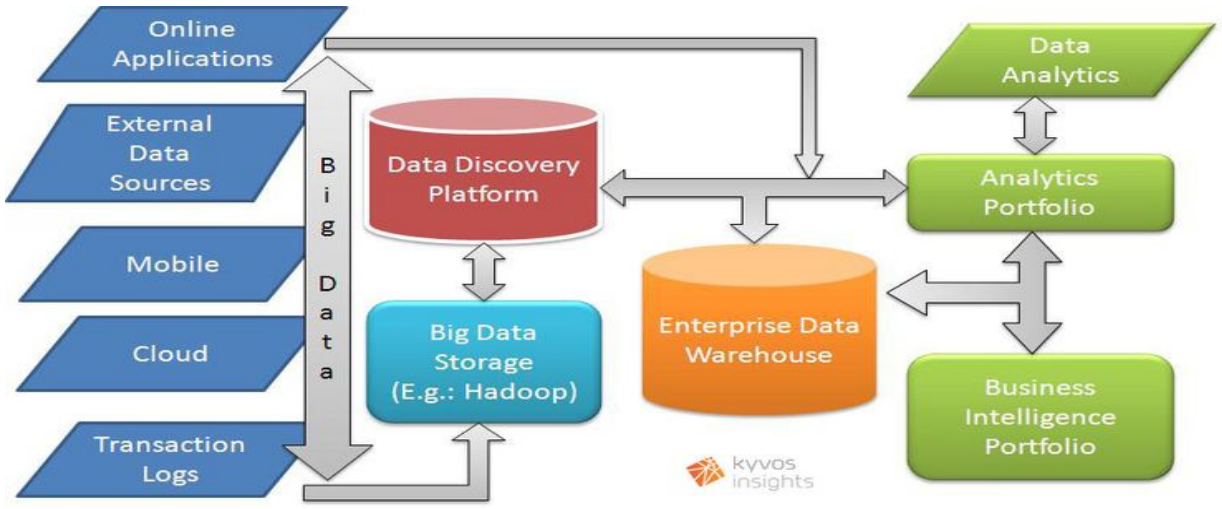

Figure N4. Architecture of Bid Data

Source: https://www.eckerson.com/articles/ten-characteristics-of-a-modern-data-architecture

In general, big data business models are focused on using data to gain valuable

insights that enable companies to optimise their processes and increase their performance.

The rise of new business models based on Big Data and related technologies points to the need that they should no longer be seen as mere assets or resources, but rather as a set of strategic resources that can support the creation and capture of organisational value. However, pursuing a big data business model can also have serious consequences, such as those experienced by Facebook when it faced public backlash over data privacy.

In general, a business model is a blueprint of how an organisation conducts its business. Nowadays, most companies are data-driven and three ways companies can get value from Big Data are highlighted: first, companies can use Big Data and analytics to improve internal processes. Second, they can use Big Data to enrich their products, services and customer experiences. Third, companies can monetise their internal data by selling it to external parties.

In this regard, three types of Big Data business models can be distinguished, namely, data users, who use Big Data for internal purposes, data providers, who aim to commercialize Big Data, and data enablers - who provide data users and data providers with Big Data infrastructure solutions (e.g., hardware and software tools) as well as Big Data-related services (e.g., outsourced consulting and analytics services) [Schroeder R. Big data business models: Challenges and opportunities. Cogent Social Sciences. 2016.].

The three types of Big Data business models are presented in Table 1.

The commonly used analogy, "data is the new oil" [Hartmann P.M., Zaki M., Feldmann N. Capturing value from big data-A taxonomy of data-driven business models used by start-up firms. International Journal of Operations & Production Management, 2016], indicates the extent of the ongoing hype around Big Data. This hype has prompted many organizations around the world to invest heavily in Big Data technologies and experiment extensively with them, often with the aim of "revamping" the traditional business model or implementing completely new BDBMs.

Table 1 Business models with Big DATA

Tipul	Surse de valoare (exemple)
Data users	• Big Data to inform strategic decision-making • Using analyzing Big Data to improve internal operations • To grow products, services and customer experiences with Big Data • To use information from Big Data analysis to develop new products and services
Data providers	• Collecting primary data and selling it to data users • Aggregating and packaging internal data for sale
Data facilitators	• Providing Big Data infrastructure solutions to both data users and vendors • Providing consulting services related to Big Data • Providing outsourced Big Data analytics services (e.g. in the cloud)

Source: elaborated by autor

Before a new or improved business model can be developed, an active research process is required to identify and evaluate opportunities. This involves collecting, processing and analysing relevant data to uncover customer value, which is the preparatory or incubation stage that senses market trends. In this stage, the company can obtain the user behavior preference analysis report by collecting, processing and analyzing data so as to locate target users and exploit user requirements, identify opportunities and make decisions. When conceptualizing a new product or service idea, the imperative for the company is to design a commercially viable business model to create value.

Value creation therefore requires business model innovations from a strategic perspective. This stage of value creation involves applying big data to solve practical problems. Based on the results of Big Data analysis, the company can redesign its supply chain within the enterprise to optimise business processes or find new partners

to achieve collaborative innovations.

In the final stage of the business model corresponding to the value realisation phase, the company examines the business model innovations from an economic perspective. Value realisation from an economic perspective comprises three aspects:

(1) improving operational efficiency;

(2) increasing material use efficiency; and

(3) finding new revenue streams.

With the holistic realization of all three aspects, a firm is better positioned to sustain its competitive advantage.

Big Data can be used in many international business models, and some of the most common examples include:

E-commerce: Many e-commerce companies use Big Data to analyze user behavior, provide personalized recommendations, and improve the user experience.

Financial industry: Big Data is used in the financial industry to analyse credit risk, fraud, market fluctuations and to make investment decisions.

Transport and logistics: Transport and logistics companies use Big Data to analyse transport routes, delivery times, optimise operations and improve efficiency.

Tourism: Companies in the tourism industry use Big Data to analyze traveler preferences and behavior, personalize offers and improve the travel experience.

Healthcare industry: Big Data is used in the healthcare industry to analyse patient data to identify and improve healthcare services.

Manufacturing: Companies in the manufacturing sector use Big Data to analyse production processes, identify problems and improve efficiency.

In China, traditional industries contribute at least 80% to gross national product and 70% to national tax revenues. Following the export-led manufacturing strategies adopted by Asian Tigers such as South Korea and Singapore, China has successfully captured global manufacturing output with cheap labour from less than 3% in 1990 to 28% in 2021 [In 2021, China was the world's largest producer of goods, with an industrial output of about US$7.8 trillion, according to data published by the World Bank].

However, China's rising wage costs have eroded its comparative advantage in labour-intensive manufacturing industries. In 2000, China's real wages exceeded Vietnam's by 92%. Growing at an average annual rate of 11.4% from 2000 to 2013, China's real wages became 168% higher than Vietnam's. With rising labour costs posing a real threat to the competitiveness of its traditional industries, the Chinese government has initiated innovation and productivity efforts to sustain its comparative advantage [Cheah S., Yu C. Assessing economic impact of research and innovation originating from public research institutions and universities-case of Singapore PRIs. Triple Helix, 2016].

In 2015, the "Internet plus" strategy sponsored by the Chinese government aimed to stimulate economic growth through digital transformation [Wang B., Loo B.P.Y. Hubs of internet entrepreneurs: the emergence of coworking offices in shanghai, China. Journal of Urban Technology, 2017]. Along with the strategy, it presented a plan for 11 key industries, including manufacturing and retail. The Chinese government has further supported digital business transformation through the adoption of Big Data and cloud technologies. As the world's second largest consumer economy, China saw its domestic market as a window of opportunity to generate greater demand for capital equipment and business services [Wang Q. Haier. New Model: Internet Transformation Roadmap. China CITIC press, Beijing, 2015]. Big Data as a new form of resource in today's market can bring radical business transformation to traditional industries.

However, the application of big data in China's traditional industries is still in its infancy. To accelerate economic development, it is imperative that firms in these industries find appropriate ways to innovate business models for their development, as well as collaborate with those in emerging industries.

In China, technological development has been gradual among traditional industries, progressing primarily through imitative innovation [Yu Y.Z., Liu D.Y. Technological progress path selection of traditional industry and burgeoning industry in china. Finance and Trade Research, 2013]. The emergence of big data movement not only generates new industries, but also brings revolutionary transformation to traditional industries in several ways. First, the exponential growth in the types and

volume of external and internal data that a firm must collect, store, process and analyze requires considerable investment in physical and infrastructural resources. Firms need to plan and make strategic changes to their technology platform and data architecture to support their business model in a scalable and sustainable way. Secondly, as more data is collected from potential and existing customers, work processes, skill sets and job descriptions of staff will need to be redefined, bringing an inevitable change in the expected competencies of human resources and the structure of the organisation. Finally, as changes take place at the infrastructural and structural levels of a firm, the capabilities of its top management team to anticipate and respond to big data threats and opportunities to continually innovate the business model are essential.

Suning Commerce Group is a leading retailer based in Nanjing, Jiangsu Province, China, which produces a wide range of home appliances, consumer electronics, everyday products, books and other product categories. With an annual revenue of 264.9 billion Chinese yuan and a net profit of 3.3 billion Chinese yuan, it achieves a 2.5% share of the Chinese online retail market [Suning Commerce Group Co., Ltd. 2021 Annual Report. [online]. 2022. https://www.suning.cn/static///snsite/contentresource/2022-05-05/a27a44cf-f85f-4e59-992f-4077f8d1398b.pdf].

Suning has grown rapidly in recent years with the improvement of its production capacity through big data platform. In particular, it actively participates in every link of the product transformation value chain, acquiring and analyzing data at every stage from product design and development to product manufacturing.

By making their platform accessible to its community of suppliers, retailers and end-users, Suning aimed to get feedback on the problems each stakeholder faces, as well as suggestions to solve them by improving relevant value chain activities, from incubating product ideas and design to production and brand building.

Through big data, Suning's product team has uncovered value in the hotel market at various stages. First, the team collected the behaviors of potential and existing customers from online and offline storefronts. Exploring both structured and unstructured data from various data sources, they built a comprehensive **skeleton of the core dataset.**

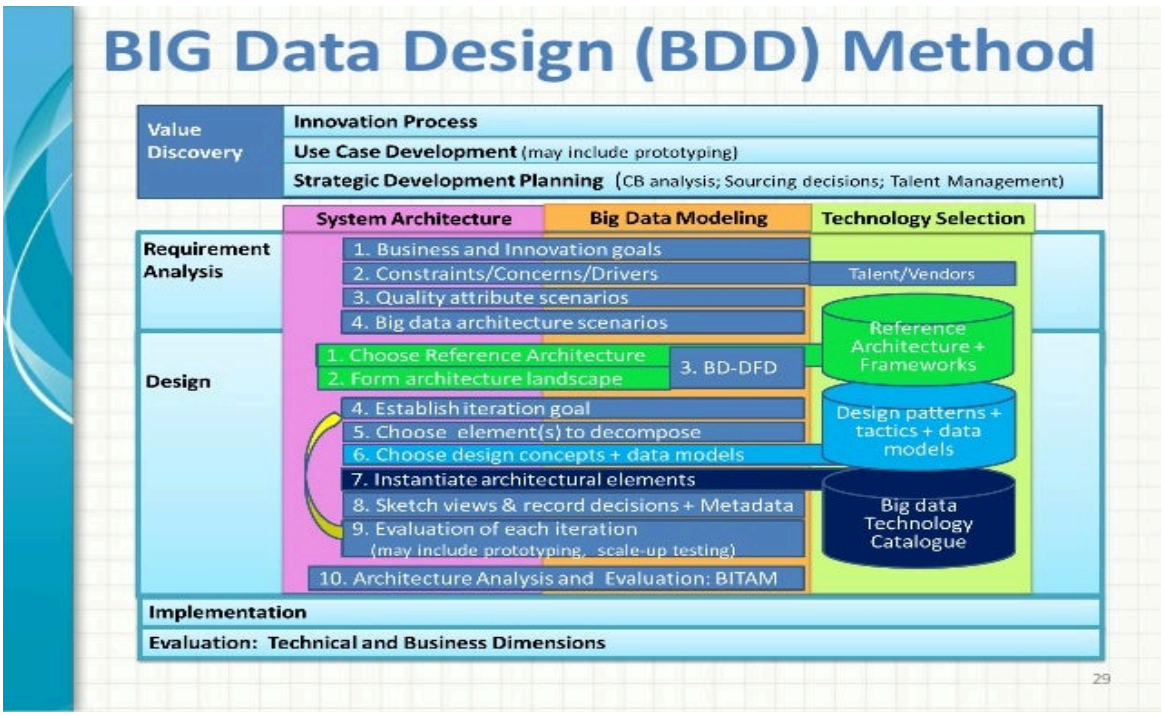

Figure N 5. Big Data Method Design

Source: https://www.intechopen.com/chapters/68814

Big DATA can play an important role in international business by providing valuable information on global markets, competitors, consumer trends and other key aspects of the international business environment. In general, the use of Big Data can help an international business conduct a more informed analysis of its competitors and develop customized business strategies that address market needs and preferences [Mikalef P., Krogstie J., Wetering R., Pappas I., Giannakos M. Information Governance in the Big Data Era: Aligning Organizational Capabilities.HICSS, 2018.].

This can help the business improve its performance and gain a competitive advantage in different international markets.

For example, when identifying market opportunities, Big Data can be used to analyse data on consumer preferences and behaviour in different international markets so that companies can identify market opportunities and develop tailored marketing strategies.

To identify market opportunities with Big Data, an international business should follow a few steps:

Data collection. The company should collect data from various sources, such as

social media sources, search engines, opinion polls and other relevant sources. This data should include information about consumer preferences and behaviour in different international markets, as well as information about market trends and competitors' behaviour.

Data analysis. After collecting the data, the company should analyze it to identify trends and patterns that may indicate market opportunities in different international markets. Data analysis should include data processing techniques such as statistical analysis, trend analysis and cluster analysis.

*Identifying m*arket opportunities. After analysing the data, the company should identify market opportunities in different international markets. These opportunities should be based on solid data and take into account market trends, consumer behaviour and competitors.

Develop customized marketing strategies. After identifying market opportunities, the company should develop customized marketing strategies to address the needs and preferences of consumers in those international markets. These strategies should include market segmentation, development of tailored offerings, and use of marketing channels relevant to each market.

At the same time, Big Data offers the possibility to perform competitor analysis. Thus, Big Data can help companies identify competitors and monitor their activities in different international regions so that they can develop more effective business strategies and remain competitive in the market [Zhang JJ, Lichtenstein Y, Gander J. Designing scalable digital business models. In: Baden-Fuller C and Mangematin V (eds) Business Models and Modelling. Bingley: Emerald Group Publishing, 2015].

Supply chain optimization using Big Data can be achieved in an international business by the following methods:

Stock monitoring. The company can use sales and inventory data to identify consumption patterns and forecast future demand. This can help set optimal stock levels, avoiding excessive or insufficient stocks.

Supplier monitoring. The company can use data about the performance of its suppliers to evaluate and improve the quality of supply services. This can include

delivery times, product quality and costs.

Transport route analysis. The company can use data on transport routes to identify the most efficient routes and reduce transport costs. This may include optimal route analysis, use of intermodal transportation, and evaluation of transportation providers.

There are case studies showing how international companies use Big Data to analyse transport routes and improve logistics efficiency. An example of such a company is DHL, which has started using Big Data to improve package route planning and improve delivery times.

DHL has developed a platform called "Resilience360" [DHL RESILIENCE360 helps customers prevent losses and improve the resilience of supply chains. Press Release: São Paulo [online]. 2017. Available: https://www.dhl.com/br-en/home/press/press-archive/2017/dhl-resilience360-helps-customers-prevent-losses-and-improve-the-resilience-of-supply-chains.html], which uses Big Data and predictive analytics to assess risks and plan transport routes. This includes analysing weather data, traffic data and other relevant data to identify the most efficient transport routes and avoid potential delays or problems.

DHL's Resilience360 platform is used by many international companies, including companies in the transportation, energy and pharmaceutical industries. It helps companies optimise transport routes and improve logistics planning, thereby reducing costs and improving delivery times.

Here are some examples of how Big Data can be used for risk management in an international business:

Market data analysis. The company can use Big Data to analyze and assess market risks such as currency fluctuations, changes in regulations and competition. This can help prevent financial losses and identify market opportunities.

Market data analytics can be a valuable tool for managing risk in an international business, especially when combined with Big Data technology. By using real-time data and monitoring market activities, informed and proactive decisions can be made, thereby reducing risk and improving business performance. Here are some ways in which such analysis can be carried out to manage risk:

1.Social media monitoring - Big Data can be used to monitor conversations on social media, forums and other online channels relevant to the business. This can provide a broader insight into customer feedback, satisfaction with the company's products or services, and can help to quickly identify issues for resolution.

2.Sales data analysis - sales data analysis can help identify sales trends and demand in real time and help anticipate market developments. This information can be used to make decisions on production, inventory, distribution and pricing.

3.Competitor data analysis - Big Data can be used to analyse competitor data such as pricing, marketing and sales strategies and distribution. This can help identify growth opportunities and reduce the risk of being outpaced by competitors.

4.Data Risk Analysis - Big Data can be used to identify potential risks in your business, such as cybersecurity issues, delivery issues or legislative and regulatory changes. By identifying these risks, you can take proactive steps to minimise their impact.

Supplier monitoring. The company can use Big Data to monitor the performance of its suppliers and assess the risks associated with them. This can include monitoring deliveries, product quality and compliance with international regulations.

There are numerous examples of international businesses that have used Big Data analytics to monitor their suppliers. One example is the company Amazon, which uses Big Data analytics to monitor the performance of their suppliers and identify problems in real time.

Amazon uses Big Data technology to collect and analyze data about delivery time, product quality and customer feedback to monitor and evaluate the performance of its suppliers. Based on this data, Amazon can take steps to improve the relationship with its suppliers as well as ensure a better experience for its customers.

Another example is Walmart, which uses Big Data analytics to monitor the performance of its suppliers and optimise their supply chain. Walmart collects data on delivery time, product quality, and shipping costs to evaluate the performance of their suppliers and identify opportunities for improvement.

By monitoring suppliers with Big Data, international businesses can optimise

their supply chain and reduce risks and costs. They can also improve the customer experience by ensuring a quality product offering and delivering it in the shortest possible time.

Identify security risks. Companies can use Big Data to identify security risks associated with business partners as well as the international markets in which they operate. This can include monitoring online activities, security incidents and online reputation of business partners.

There are numerous examples of international businesses using Big Data analytics to identify security risks and improve the security of their operations. One example is insurance company AIG, which uses Big Data analytics to identify risks and assess the impact of security events on their operations.

AIG collects data from a variety of sources such as social media, websites, blogs, forums and other public sources to assess security risks and identify emerging trends and patterns. The company also uses advanced technologies such as behavioral analytics, sentiment analysis, and machine learning to process this data and generate valuable insights to improve the security of their operations.

Another example is cybersecurity company FireEye, which uses Big Data analytics to identify cyber attacks and protect their customers against them. The company collects data from a variety of sources such as social media, websites, blogs, forums and other public sources to identify emerging trends and patterns.

By identifying security risks with Big Data, international businesses can take steps to protect their operations and reduce the risk of financial or reputational loss. They can also implement proactive security measures to prevent unpleasant events and ensure they are prepared for any eventuality.

Compliance risk assessment. The company can use Big Data to assess compliance risks with international laws and regulations as well as internal company policies. This can help prevent fines and other negative consequences associated with non-compliance with laws and regulations.

Insurance data analysis. The company can use Big Data to analyze and assess insurance risks associated with its international operations. This can help select the best

insurance options and reduce insurance costs.

Big Data can influence the development of products and services with the help of analytics, companies can identify trends in different international markets and develop products and services that meet the needs and preferences of consumers in those markets. This can help increase sales and profits, as well as strengthen the company's position in the market.

An international business can use Big Data to develop new and improved products and services by collecting and analysing market data, customer feedback and industry trends. Here are some examples of how Big Data can be used for this purpose:

Analysis of customer preferences and behaviour. The company can use Big Data to analyse customer preferences and behaviour so it can develop products and services that better meet their needs. This can include analysing demographics, buying preferences and customer feedback.

Identifying market trends. The company can use Big Data to identify market trends and develop products and services that are in line with them. This can include monitoring competition, analyzing consumer trends, and identifying emerging market opportunities.

Testing products and services. The company can use Big Data to test its products and services prior to market launch. This may include testing in virtual environments, analysing customer feedback and evaluating the performance of products and services.

Personalising offerings. The company can use Big Data to tailor its offerings to address individual customer needs. This can include customising products and services, as well as offering personalised offers to individual customers.

A global business can personalise its offerings with Big Data by collecting, analysing and interpreting data on customer preferences and behaviours. This approach allows the business to offer products or services tailored to individual customer needs, which can increase customer satisfaction and loyalty.

Here are some examples of how an international business can use Big Data to customise its offerings:

1. Collection and analysis of customer behaviour data. The business can collect

data from various sources such as website, mobile apps, social media or customer feedback to better understand customer behaviour and preferences. For example, analysing website browsing data can show which products or services were searched for frequently or which pages were visited the most. This information may be used to provide personalized product or service recommendations.

2. Customer segmentation. With Big Data, the business can segment customers into distinct groups based on their characteristics and preferences. This approach allows the business to offer customised offers, tailored to the needs and preferences of each segment. For example, a hotel can offer a special holiday package for families with children or honeymooning couples.

Use of advanced technologies. Using advanced technologies, such as artificial intelligence or machine learning, can help the business analyse data and provide personalised recommendations in real time. These technologies can be used, for example, to suggest products or services based on real-time customer behaviour.

In this way, an international business can improve its marketing strategy and offer personalised offers tailored to customer preferences and needs.

This approach can help increase customer satisfaction and loyalty and boost the business' revenues and profits.

Identify unmet customer needs. The company can use Big Data to identify unmet customer needs and develop products and services that address those needs. This can include analyzing customer feedback, monitoring social media discussions, and identifying gaps in competitors' offerings.

Big DATA can play an important role in international business by providing valuable insights into global markets, competitors, consumer trends and other key aspects of the international business environment. In general, the use of Big Data can help an international business to conduct a more informed analysis of its competitors and develop customized business strategies that address market needs and preferences [Mikalef P., Krogstie J., Wetering R., Pappas I., Giannakos M. Information Governance in the Big Data Era: Aligning Organizational Capabilities.HICSS, 2018].

This can help the business improve its performance and gain a competitive advantage in different international markets.

III.*Challenges in implementing and using Big DATA, quality of data used*

The general challenges of Big Data can be grouped into three main categories based on the data lifecycle: data, process and management challenges [Akerkar R. Big data computing CRC Press. Taylor & Francis Group, Florida, USA. 2014].

Provocările legate de date se referă la caracteristicile datelor în sine (de exemplu, volumul datelor, varietatea, viteza, veridicitatea, volatilitatea, calitatea, descoperirea și dogmatismul).

The challenges of the process are related to series and techniques: how to capture the data, how to integrate the data, how to transform the data, how to select the right model for analysis and how to deliver the results. Process challenges are the group of challenges encountered during data processing and analysis, from data capture to interpretation and presentation of final results. Since large, data sets are typically non-relational or unstructured, processing such semi-structured data sets at scale is a significant challenge; possibly more so than managing Big Data.

Management challenges cover, for example, privacy, security, governance and ethical issues. Management challenges related to Big Data are a group of challenges encountered, for example during data access, management and governance. Data warehouses store massive amounts of sensitive data, such as financial transactions, medical procedures, insurance claims, diagnostic codes, personal data, etc.

Organisations and businesses need to ensure that they have a robust security infrastructure that allows employees and staff of each subdivision to only view data relevant to their department. Furthermore, there must be standard privacy laws that can govern the use of this personal information and strict compliance with these privacy regulations.

Existing studies around the challenges of Big Data have paid attention to the difficulties of understanding the notion itself [E. Hargittai. Is bigger always better? Potential biases of big data derived from social network sites. The ANNALS of the American Academy of Political and Social Science. 2015], decision making about what

data is generated and collected, privacy issues, and ethical considerations relevant to mining this data.

The challenge for companies is how companies can use big data in a way that benefits them on the one hand and society on the other, while minimising legal and ethical risks.

In assessing risks, companies should first understand the laws that may apply to big data practices. Second, they should be aware of the important research in big data aimed at identifying potential biases and inaccuracies.

The exponential increase in data volume is one of the biggest challenges that IT needs to understand and solve. The sheer volume of data can be a huge challenge for some businesses, but the benefits that can be gained from data analytics outweighs the risk. Managers in many companies around the world say they don't have enough skills to understand the term and that it takes longer to learn more in this area so they can explore and benefit from the advantages of Big Data [Peter Groves, Basel Kayyali, Steve Van Kuiken, David Knot. The Big DATA Revolution in Healthcare: Accelerating Value and Innovation. 2013. ISSN 1660-4601.]

Many organisations have a huge amount of data, but cannot use it because it is still in raw, semi-structured or unstructured format, which is difficult to analyse. Businesses face a real challenge as data accumulates, the percentage of data that can be processed is decreasing.

The implementation and use of Big Data brings with it a number of challenges for companies that want to use it to their advantage. Among these challenges is the quality of the data used, which can be influenced by several factors.

The first factor is the sheer volume of data. With so much data available, it is difficult to determine which is relevant and which is not. Some data may be erroneous or incomplete, and others may be redundant or irrelevant.

In addition, data can be collected from various sources such as social networks, IoT devices or business management systems, making it difficult to validate and integrate. Managing large, and rapidly growing, volumes of data has been a difficult problem for many decades. In the past, this challenge has been mitigated by processors

that have become faster, giving us the resources needed to cope with increasing volumes of data [Golfarelli M., Rizzi S. Data warehouse design: modern principles and methodologies. Columbus: McGraw-Hill. 2009.]

Large volumes of data can be difficult to manage and may require specialized technologies such as distributed databases, indexing systems and search engines.

Another important challenge in implementing Big Data is related to data security. As more new data is collected and more sophisticated analysis methods are applied, decisions may be made with limited or no human intervention. Over time, Big Data and advanced applications in data science will enable operational decisions at a whole new level, across a wide variety of disciplines.

Big Data is capable of providing insights into human behaviour. Data elements that people leave behind in their day-to-day activities are used, which can come from mobile phone location tracking or credit card purchase transactions. But generating decisions/conclusions based on personal information obtained from various sources can raise serious suspicions about privacy, data ownership and data control issues [Vladimir Florian, Gabriel Neagu. Specific Approaches and Solutions in the Management, Governance and Analysis of Big Data (BIG DATA). National Institute for Research and Development in Computer Science - ICI Bucharest. 2016.]

Lack of sophisticated infrastructure to ensure data security, such as integrity, confidentiality, availability and accountability, and data security challenges become amplified when data sources become ubiquitous.

While the use of Big Data offers great opportunities to gain valuable insights from collected data, there are also significant risks associated with its processing and storage. Companies must take appropriate security measures to protect data from unauthorised access, theft and loss. Privacy is the most sensitive issue, with conceptual, legal and technological implications [Lock M. Data management for BI: big data, bigger insight, superior performance. Aberdeen Group White Paper. 2012]. This concern increases in importance in the context of big data.

Privacy being a general concern that has a wide range of implications for anyone wishing to explore the use of big data for development in terms of data acquisition,

storage, retention, use and presentation. For companies, the privacy issue is more related to the sensitive data they work with. Whether it's financial data, customer lists, prospective projects, it's all valuable data that may or may not be disclosed. Companies have several options in terms of where they keep their information.

Some of the challenges are secure data storage. Various security challenges related to data security and privacy are discussed, which include data breaches, data integrity, data availability and data backup.

Building a viable solution for big and multi-faceted data is a challenge that companies are constantly learning and then implementing new approaches. For example, one of the biggest issues with Big Data is the high cost of infrastructure and human resources required. Companies need to invest in data storage and processing systems as well as specialists with expertise in Big Data. In addition, large volumes of data may require specialised hardware and software, such as servers, databases, processing algorithms and storage technologies.

In addition, human analysis is often required to sort the data so that valuable insights can be constructed. While the computing technologies needed to facilitate this data are keeping pace, the human expertise and talent needed by business leaders to use Big Data is lagging behind, proving to be another big challenge.

Another challenge is to ensure data standardisation and a common set of definitions. Without standardisation of data and common definitions, it is difficult to compare and analyse data from different sources. In addition, without a common set of definitions, data can be misinterpreted, leading to incorrect decisions.

The constant growth of data in all its different forms has led to a growing demand for Big Data processing in sophisticated data centres. These are generally dispersed in different The first factor is the sheer volume of data. With so much data available, it is difficult to determine which is relevant and which is not. Some data may be erroneous or incomplete, and some may be irrelevant. In addition, data can be collected from different sources such as social networks, IoT devices or business management systems, making it difficult to validate and integrate. Managing large and rapidly growing volumes of data has been a difficult problem for many decades. In the past,

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In addition, sorting the data so that valuable insights can be constructed often requires analysis that only humans can perform.

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The steady growth of data in all its different forms has led to a growing demand for Big Data processing in sophisticated data centres. These are generally dispersed across different geographical regions to incorporate resilience and spread risk, for example, Google has 23 data centres, spread across four continents. Significant resources have been allocated to support data intensive operations (i.e. acquisition, storage, mining and cleansing, aggregation and integration, processing and

interpretation) - all of which lead to high data storage and processing costs. The cost of data processing and other data center operational expenses is a sensitive issue that can also impact how organizations adopt and implement technology solutions [Al Nuaimi E., Al Neyadi H., Mohamed N., Al-Jaroodi J. Applications of big data to smart cities. Journal of Internet Services and Applications. 2015.]

International businesses operating in multiple countries may use different technologies and information systems, which can make it difficult to integrate data and systems.

Cultural and linguistic diversity could be another challenge for companies, as data collected from different countries and regions can be influenced by cultural and linguistic variations, which can make it difficult to interpret and analyse.

It is important to note that data protection regulations are a challenge in the use of Big Data, as international businesses must comply with data protection regulations in the countries in which they operate. These regulations may differ from country to country and may impose strict requirements for data storage and processing.

Data access and information sharing being one of the challenges for international business, some countries may limit access to certain types of data or impose restrictions on the export or import of data. This can make it difficult to collect and use data effectively. It is common to expect reluctance from private companies and other institutions to share data about their customers and users, as well as their own operations. Obstacles may include legal or reputational considerations, the need to protect their competitiveness, a culture of secrecy and, more broadly, a lack of appropriate incentives and reporting structures. There are also institutional and technical challenges when data is stored in places and in ways that make it difficult to access and transfer.

The more information digital service providers obtain about users, the more an unregulated power imbalance can lead to users' preferences and even weaknesses being exploited for commercial or political purposes.

Highly calibrated advertisements raise concerns about possible manipulation in which consumer preferences and even weaknesses are exploited.

Automated assessments based on the data collected could lead to individuals or groups of individuals being categorised in ways that could lead to their exclusion from professional opportunities or medical coverage.

As data collection and storage methods have become more sophisticated, many organisations are faced with the problem of holding very large archives or database-type storage spaces that they would need to find a use for. For example, credit card companies are constantly recording data on commercial transactions, supermarkets are recording data on purchases, use of discount coupons, etc. [Dunham MH Data mining: Introductory and advanced topics. Pearson Education India. 2006]

The challenge is to extract data from a variety of sources: databases, messages, emails, transactions, etc. As a result, data from primary sources is raw, "raw" and hidden in different sources. Data may be scattered for technical reasons (e.g. due to the existence of old data systems that are incompatible with current IT systems) or organisational reasons (e.g. data or information available and used only at departmental level). At the same time, due to the fact that a business process can extend outside the organisation, data can be shared by several organisations [Delen D, Demirkan H. Data, information and analytics as services. Decision Support Systems. 2013] Often web services are used as potential sources of data [Motahari-Nezhad HR, Saint-Paul R, Casati F, Benatallah B. Event correlation for process discovery from web service interaction logs. 2011]

There is now a great need to ensure the quality of the data extracted. Analyzing the quality of event log data identified several categories of problems, namely[Bose RPJC, Mans RS. Wanna Improve Process Mining Results? It's High Time We Consider Data Quality Issues Seriously. Proceedings of the 2013. IEEE Symposium on Computational Intelligence and Data Mining, CIDM 2013 - 2013 IEEE Symposium Series on Computational Intelligence, SSCI. 2013]:

1)Missing data - certain types of mandatory information are missing from the log. Missing data mostly reflects a problem with the logging activity;

2)Wrong data - although the data is provided in the diary, it can be proven that, based on the background information, it was recorded incorrectly;

3)Inaccurate data - in this case there is a problem of accuracy in recording data. For example, if time stamps are not recorded accurately, problems with the ordering of events may occur;

4)Irrelevant data - the analysed records contain irrelevant data and the event logs need to be filtered.

To capture related and valuable information, intelligent filters are needed that should be robust and intelligent to capture useful information and eliminate useless information that contains inaccuracies or inconsistencies - this is a challenge in itself. For the latter, efficient analytical algorithms are needed to understand the provenance of the data and to process the vast data in stream and reduce the data before storage.

Use of Big Data by companies and government institutions in the Republic of Moldova

Publicly available information on the use of Big Data by Moldovan companies to grow their businesses is uncertain and very limited.

According to estimates, the IT industry in the Republic of Moldova has more than 16,500 professionals, mainly serving the European and American markets. The focus on services is across several industries, notably government, banking, fintech, automotive, healthcare and telecoms, while including platform technologies such as Big Data, cloud and Internet of Things (IoT) [ICT Sector Overview. Republic of Moldova. Invest Moldova. [online]. 2022, Available: https://mitp.md/p/public/files/6_ICT_sector_overview_2021_2022.pdf].

As there is no complete transparency regarding the use of these technologies, we can however identify some examples of companies using Big Data in the Republic of Moldova, including:

Orange Moldova - uses Big Data to improve customer experience by personalizing offers and services. Specifically, the company has collected data on user behaviour on its mobile network, such as number of calls, text messages, data traffic and service usage preferences.

This data was processed through data analysis algorithms to identify patterns and trends in user behaviour. Based on this information, Orange Moldova developed

tailored offers and services to meet the individual needs of its customers.

For example, if a customer uses the internet a lot on their mobile phone, Orange Moldova can offer a subscription that includes more data traffic. Or, if a customer makes a lot of calls abroad, the company can offer a special roaming package.

In this way, Orange Moldova has been able to offer better and more personalised service to its customers, leading to an improved customer experience and increased brand loyalty.

Moldcell - uses Big Data to monitor the network and identify possible problems and solutions to optimize it. By collecting data from customers' mobile devices, Moldcell has been able to gain insights into signal quality, web page load times and other network usage data. This data was processed through data analysis algorithms to identify patterns and trends in network operation.

Based on this information, Moldcell was able to identify possible problems in its network and develop solutions to optimise it. For example, if a particular antenna sector was found to have poorer signal quality, the company could take steps to improve coverage in that area.

Moldcell was also able to use the data to anticipate the needs of its customers and develop customised services and offers. By understanding how customers use the network, Moldcell was able to offer data packages tailored to each customer's individual needs.

In this way, the use of Big Data has enabled Moldcell to optimise the operation of its network and offer better and more personalised services to its customers.

Victoriabank - uses Big Data to assess credit risk and improve decision-making. With Big Data analytics, the bank can collect, process and analyze a wealth of customer and transaction information to identify credit risks and make more informed decisions about approving or rejecting credit applications.

VictoriaBank uses predictive analytics and machine learning algorithms to assess credit risk. These algorithms are able to quickly and efficiently analyze customer information such as credit history, income, debt and transaction history to determine the degree of risk associated with each credit application. This information is then used

to determine the terms and conditions of the loan, as well as whether or not to grant credit.

VictoriaBank also uses Big Data to improve decision-making on products and services offered to customers. Big Data analytics can help the bank understand customer needs and preferences so it can develop customized products and services that meet those needs. This approach can lead to increased customer loyalty and an improved customer experience with the bank.

Datanet Systems - provides data analytics services and customized solutions for various companies and organizations.

Simpals - uses Big Data in advertising and e-commerce to improve the effectiveness of marketing campaigns.

Simpals is a technology company based in the Republic of Moldova that focuses on developing solutions for advertising and e-commerce. In advertising, Simpals has used Big Data to improve the effectiveness of marketing campaigns by analyzing data about online users, their behavior and interests.

Using this information, Simpals developed a programmatic advertising system [Internet sales-house launch NUMBERS.MD. [online]. 2012, Available: https://simpals.com/ro/lansarea-internet-sales-house-numbers-md] that allows companies to personalize their advertising campaigns and deliver them to relevant audiences. This system uses machine learning algorithms to analyze user data and determine the best times and channels to deliver ads.

In e-commerce, Simpals has used Big Data to improve the efficiency of the product and service recommendation process. Using information about users' behaviour and shopping history, Simpals has developed a personalised recommendation system that helps users find products and services that are relevant to them.

Conclusions Big Data is becoming an indispensable resource for many organisations and has the potential to be an extremely valuable resource.

Monitoring flows within a business is particularly important, therefore Big Data supports this with real-time alerts received from smart meters, database events and log

data, mismatches between consumption and billing, changes in consumption patterns compared to historical levels and processes associated with investigating security levels and questionable services. Another important function being the integration of multiple streams in a way that allows real-time analysis and comparison, providing the tools to identify fraud faster, protecting infrastructure and revenue. A key challenge for Big Data governance is to find mechanisms for apportioning responsibility within this complex network so that erroneous and unjustified decisions - as well as fraudulent, unethical, abusive, discriminatory or wrongful actions - can be identified, corrected and appropriately sanctioned.

The actual purpose of the publication being to present the concept of Big Data and associated technologies in order to better understand the benefits of these new tools, concepts, technologies and methods that will transform research, society, the economy and even the human being.

As an interdisciplinary subject, however, Big Data has the potential to become the subject of increasingly in-depth research among the academic and professional communities, and could be the subject of valuable future research at any time.

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