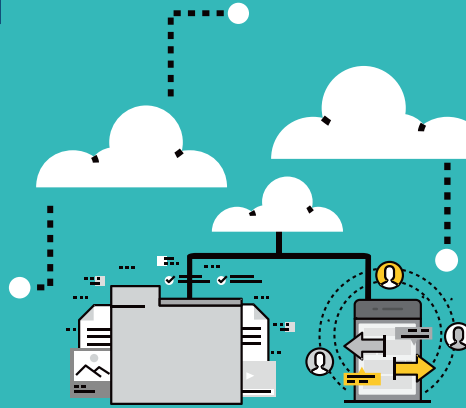
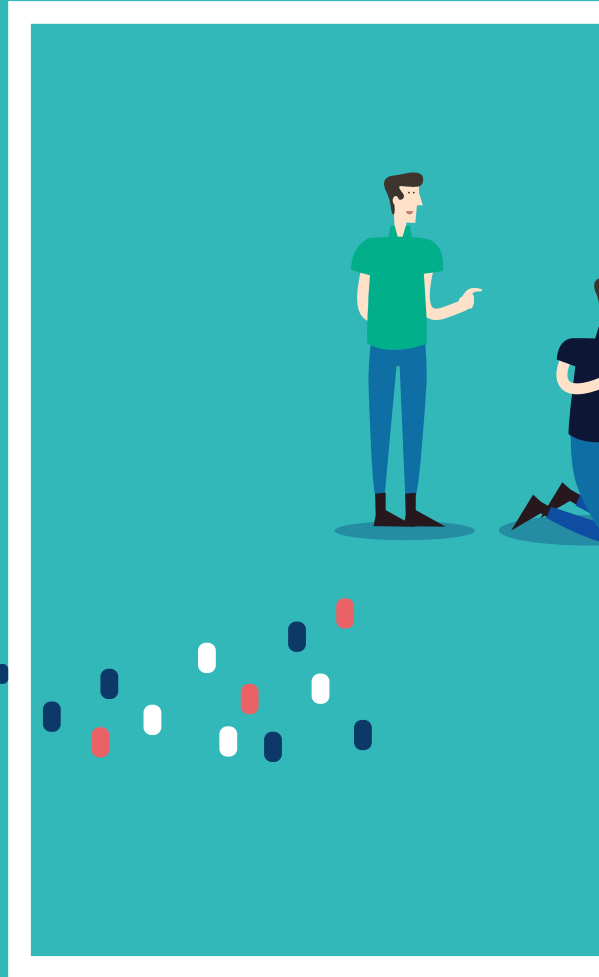




THINGS TO
EXPECT FROM

BIG DATA

IN 2017: A FORECAST



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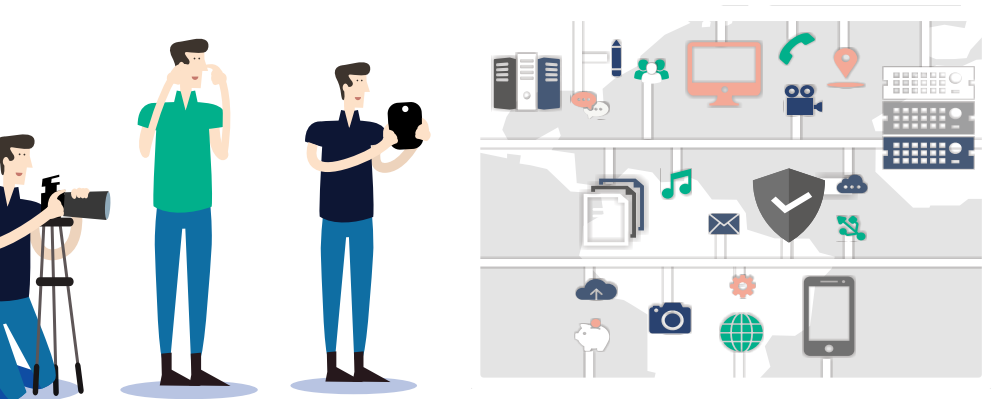
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Big Data: Definition and Development

Big data are datasets that are too large for traditional data processing applications to derive value from. These large data sets have become an inevitable trend lately, with the arrival of new waves of data in this digital era. It has led to the increase of the three Vs: volume (amount), velocity (speed), and variety (range) of data and information.¹



However, other experts have referred to big data not as the large data set itself, but rather the technology used to process these large data sets. These technologies are a response to the demand for a new data management strategy to deal with the emergence of growing data from Internet of Things, Open Data, social network data, and other data-rich services. New forms of processing were needed to enable enhanced decision making, insight discovery, and process optimization. Examples of big data uses could be for predictive analytics and user behavior analytics.

Although the term has emerged since late last century, big data only started to be dealt with from a decade ago, when user-generated webs (Web 2.0) such as social networking sites became popular in 2005 and began generating new waves of data like never before. It was also at this year that various software for storage and analysis of big data sets such as MapReduce and Hadoop were first



developed.² Fast forward to today, and big data has only gotten bigger with more data being generated through handheld devices and Internet of Things (IoT), along with developments of many other big data analytics software.

In the span of a decade, usage of big data by businesses and governments have become extensive. Many companies, such as American Express, T-Mobile, and Walmart, have taken steps to incorporate big data and they have received positive benefits for their business.³ Investment has also grown from previous years, with 48% of companies investing in big data in 2016 and a third calling their investments as “very significant.”⁴ It was found that businesses were attracted to big data because it drives opportunities for innovation in three key areas: creating new business models (54%); discovering new product offers (52%), and monetizing data to external companies (40%) (Press, 2015). The estimated value of the big data market in 2015 has reached \$59 billion and is expected to double to \$102 billion by 2019 (Rossi, 2016).⁵

For governments, big data has contributed massively to public services by providing increased efficiency and improving decision making. Among the services that gain the most from big data are healthcare, transport, education, and adult social care. Countries with the highest rate of big data technologies application are from the developed group, with Australia, Japan, Singapore, South Korea, the U.K., and the U.S. leading the rest.⁶ It is no doubt then that big data has had a substantial impact on both businesses and governments worldwide.

What to Expect of Big Data in 2017

As big data keeps on developing, it is interesting to see its growth in the future. Regarding volume, it is no doubt that we will continue to generate larger amounts of data through the proliferation of handheld devices and Internet-connected services.⁷ This scenario calls for the need of big data to be introduced and applied in organizations. Thus, we can expect for more companies and governments to embrace big data analytics tools to take advantage of the abundant volume of data that they will acquire in the year to come. When the proper big data technology is applied, it could revolutionize both business and government operations, which should serve as an incentive for these two sectors in embracing big data.

Next year we could also see more businesses turn to Hadoop, the popular open-source big data analytics software. The research firm Forrester has seen an increased interest in companies to start running analytical applications on Hadoop clusters, and not just for data storage. Another incentive for organizations to apply big data is the need to transform the terabyte of big data that is not being used, called dark data, into data that are usable for economic and service purposes.

Furthermore, in 2017, we could expect significant developments of big data analytics technologies, mainly to increase efficiency, usability and to meet the growing needs of companies and governments. Due to the data generated from the Internet of Things, big data projects will go through multiple updates in a single year, which will drive a healthier investment and faster return on big data projects.⁸ Therefore, more tools for analysis will emerge. Both Microsoft and Salesforce have planned new features in the future, one of them to help non-coders create apps to view business data, which will boost wider accessibility for big data analytics operations.⁹

1. Big Data for Business

The incoming of technology such as big data provides impacts to the business models in term of business' plan and marketing system. It is advised



that big data in business can contribute to increasing its' efficiency and competitiveness ability.¹⁰ The availability of big data introduces enterprises to the style of a predictive marketing campaign. Until 2016, this predictive marketing tool has been applied extensively to various giant retail e-commerce companies such as e-bay, Amazon, Alibaba, etc. Through predictive marketing, enterprises are now able to develop more personalized experiences for each of their customers. Several CEOs and IT experts believe that in 2017 and beyond, companies that are eager to show development in this field will receive higher growth ceiling than those who are not.¹¹

While big data may become a new side project for established companies, it is predicted in 2017 that big data can become the essential need for new start-up companies. Among 101 reasons behind start-ups' failures, incorrect market prediction and financial failure stand out as two top reasons.¹² Through the use of big data, startups can improve their analysis of the market trend and replace their irrational belief toward intangible luck. As a result, the most benevolent outcome of big data use for start-ups is that they will able to alleviate the operational cost while at the same time, construct a better customer engagement experience as well as its business plan.

2. Big Data for Governmental Purpose

Beside economic purpose, big data can contribute in stimulating

development in e-governance and smart city implementation. Big data allows more efficient data storage and processing, which in return allow the government to map issues strategically and more accurate.¹³ That advantage enables the government to intervene the problem faster and result in the development of more strategic and accurate policies. This can happen since big data can provide a more dynamic and real-time information, compared to the standard report which used data from past performance.

“Joining up public sector data sources can make government more efficient, save money, identify fraud and help public bodies better serve their citizens” Claire Vyvyan, *Vice President – Enterprise Solution Groups at Dell*.¹⁴

Though the internet has proliferated better than before, big data still mainly utilized by the government in the northern world. The USA, which already involves big data for the government since early 2000, comes together with several European nations, such as the UK and Spain, in becoming countries with most advanced big data users. While in developing region like Asia, China, Singapore, and India are taking a big step in 2016 to adopt big data usage. Nonetheless, it can be seen on overall perspectives that big data becomes more prevalent among the government in 2016. Therefore, looking at the current pace and trend of digital society worldwide, it is strongly possible that more developing countries in Asia, South America or Africa will try to bring big data for governmental purposes in 2017.

However, we must ensure that government does not use big data for the purpose of repression. For instance, in China, information retrieved from big data is processed to develop a stricter censorship policy and strengthen their position as a big brother among the Chinese society.¹⁵ Hence, it is imperative that the citizen must be involved in this situation by making the data transparent and accessible. In Helsinki so far, the policy formulation and decision-making process are opened online, and this resulted in greater public

acceptance.¹⁶ Thus, it is foreseen that in 2017, more government, particularly in the developed countries, will use big data in deeper measurement as a mean to address the problem in their jurisdiction.

3. Big Data, Big Jobs Ahead

With the improvement of big data usage among businesses and governments today, the need for data engineer with specialization in big data is currently trending. Though the demand is consistently increasing, the number of human resource in the job field is still insufficient. An average computer science or IT graduates are not enough since data engineering needs extensive analysis and planning capability. A data engineer knows how to analyze the data and how to translate those numbers and information for the benefit of the companies in the most efficient manner. If money is your priority of job selection, in 2016, the median salary for data engineer with big data specialization is about \$124,000 a year. American Bureau of Labor itself analyze that worker with statistician ability is projected to receive 34% salary increase over the next eight years.¹⁷ Considering the positive trend made in big data usage among companies, it is possible that big data specialist's salary will grow higher and higher in the upcoming year.

Furthermore, doing business in the digital era is no longer merely about one's traditional business knowledge. The additional ability of computer science and IT pose a significant difference for someone career's, even in the business world. Thus, some voices consider whether doing business is no longer a privilege for MBA (Master of Business Administration) graduates, but for MSA (Master of Science Analytics) graduates as well. While computers and robots are starting to take over simple human work – and probably more complicated job – shortly,¹⁸ perhaps a data engineer profession will be as demanding as being an accountant, or as reputable as being a dentist today.

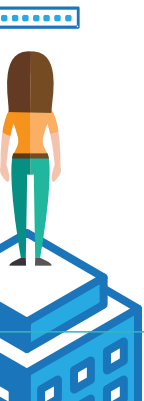
Challenges for Big Data in 2017

For all the openings and opportunities big data might offer for the foreseeing years, it still spurs problems which need a fair share of recognition. By seeing both sides of what big data truly is, we would be able to critically adapt without being unprepared for further changes which could be brought in the field, competitively and strategically.

1. Openness versus Privacy

At one point big data is seen as a mechanism of massive data collection, and its limits are not as tangible compared to manual data collections through humans' interactions. More importantly, we must understand the dynamics of big data by knowing how does a large amount of data being extracted through various social media activities.¹⁹ One of the examples which could illustrate how big data works could be seen from Facebook, as the company recently shifted its policy which would allow the company to sell personal information we stored in our accounts to advertising companies.²⁰ It is common to see how advertisers try to understand, for example, our shopping behavior from the given data by analyzing the likeliness of us in buying something. Despite the existing users' data policy provided by Facebook—in which the company will protect personal data upon consent, through this illustration we could see how big data, which may contain our personal data, can be freely distributed to some extent for the sake of productivity and economic benefit. In line with this, other privacy issues involve the loss of anonymity. With so much data being collected and analyzed, “analysts may not be able to completely guarantee that they can strip away all identifying features of specific people without a proper framework and rules in place.”²¹

As a typical issue in digital transformation, the problem of privacy will likely to persist in the upcoming year, 2017. With the more extensive





And through understanding this, it should improve our technology literacy, where we should be more aware of all the policy guidelines and agreement which could be used by us to protect ourselves by understanding our rights. To proactively engage with Big Data and address consumer, government, and legal issues, social media users must lay the framework for determining how they own and can use data.²² According to Smith and Ekwensi,²³ the key to bridge the issue must include agreements for informed consent, along with the ability to terminate that consent. Internet users also need to figure out a way to track and monitor how the data is being used or may be used in the future.



2. Manpower for Big Data

As previously mentioned above, the number of demand for data engineer professionals in the future may increase significantly, and that more opportunities may be opened. However, as a relatively new mechanism of analytics, one of the issues faced by big data analysis is the lack of human resources with the qualified expertise to process big data.

According to a 2015 MIT Sloan Management Review, 40 percent of the companies surveyed are struggling to find and retain the data analytics talent.²⁴ Bussiness.com (2016)²⁵ pointed out the growing high demand through the prediction from International Data Corporation (IDC) which forecasted a need by 2018 for approximately 181,000 people with deep analytical skills, and a requirement five times that number for jobs with the need for data management and interpretation skills. According to the interview conducted by Press (2016)²⁶ towards Michael Stonebraker, co-founder and Chief Technology Officer of Tamr, the current number is still far from sufficient, and the need for big data analyst will not be met until 2019. This means it is important for educational platforms to improve their syllabus especially on the specific majors which would cherish the most from the innovations brought by big data analysis. As mentioned above, big data widens up the job market which could push the competitiveness in the market by adding big data analytic skills into the requirement. This means, the phenomenon of big data brings significant opportunities and challenges, both at the same time. Once again, 2017 will face the same struggle of filling the needs of big data specialists.

3. Technology Inequality

Referring to the whole case study, we can see how big data is only useful for mature corporations which could put the analysis into a result that could boost productivity, or for countries who are no stranger towards technological development. However, we must not close our eyes towards the existence of global technological gap among nations, or more commonly known as the digital divide. For those who do not suffer from the digital divide, big data analysis would provide a chance to not only reform business and market activities, but also to identify and respond to critical events, such as crop failure, fires, infectious diseases or violence against

women and children. Big data gives preemptive predictions which can even identify the symptoms of radicalism or predict political preferences.²⁷ However, according to the existing technological data provided by IMF (2015), the primary factor driving the recent increase in inequality across countries is technological progress.²⁸ If it is being projected in the bigger picture, it could also be used to understand how only developed countries could benefit from what big data can offer right now. Developing countries are catching up especially with their flourishing innovations in the technology area. However, the privilege might not be as fruitful for least developing and underdeveloped countries whose governments are paying more attention towards the first necessity of the people, leaving concerns on digital advancement behind. Seeing how technological progress is hugely uneven worldwide, 2017 seems to promise less to little change in equality, and big data utilization is still majorly centered in the developed world.

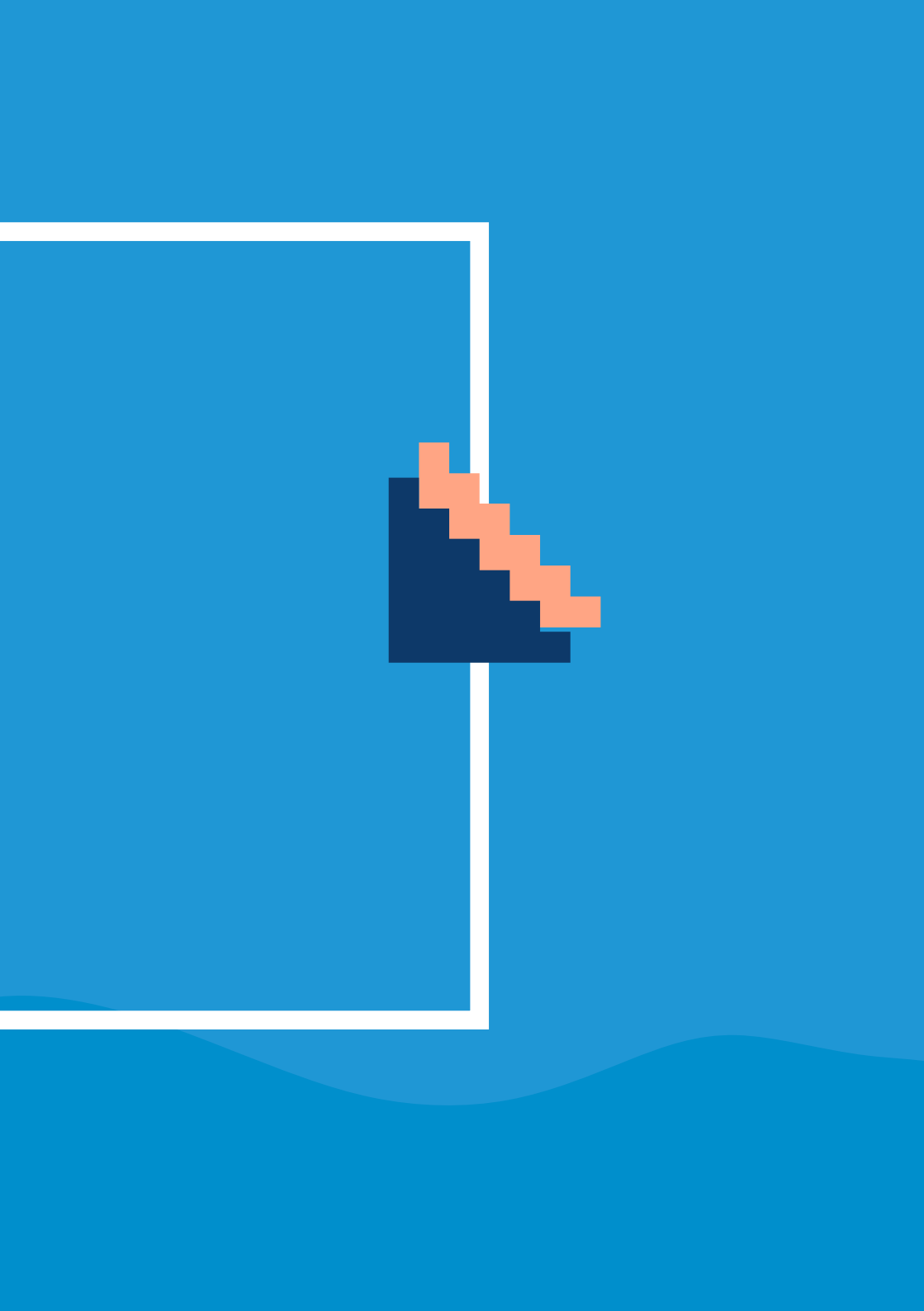
Conclusion

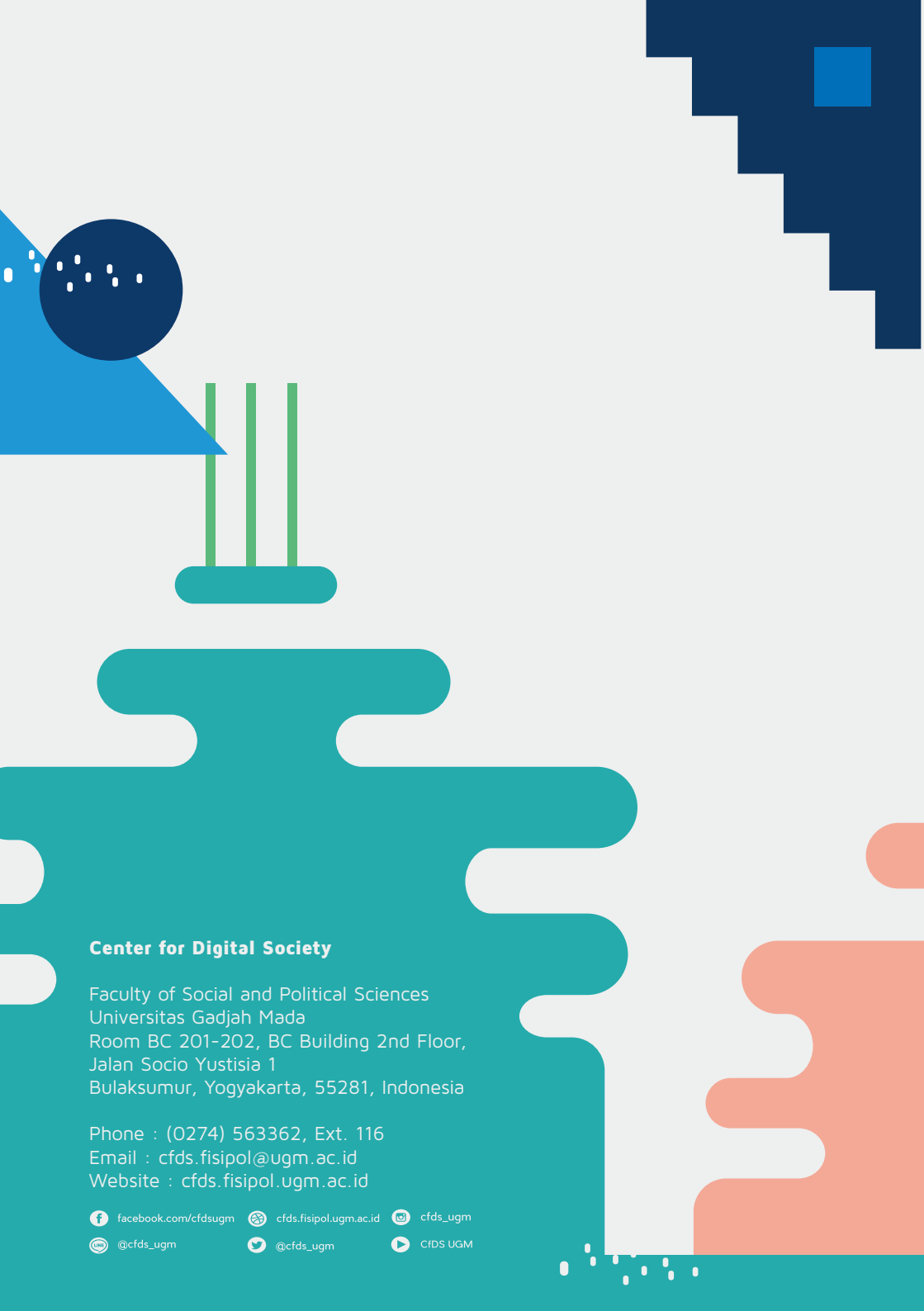
We look back at what this writing proposed from the first place, what to expect from big data in 2017. Apparently, we can expect many things from big data in the upcoming year. Vast changes are projected to occur, which might reform both the market and government paired with daunting challenges. With this trend, an internal alteration within the society is also expected. For example, as mentioned above, digital literacy became crucial to tackling privacy issue. Moreover, digital literacy might also become the answer for the new jobs opening ahead provided by this sector. Big data gives all of the interconnected global stakeholders which include governments, corporations, and people a new realm of effectiveness and strategic prediction for the future. Great things are expected from big data analysis and its innovations, yet our ideals in the future must also be paired with precautions measures of how to utilize big data.

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