pISSN 2798-2106 eISSN 2808-4470

Studi Ilmu Sosial Indonesia
Vol. 1, No. 1, 1-12

BIG DATA AND NEW THINGS IN SOCIAL LIFE

[1]Wahyudi, [2]Revinsyah Nabil Kautsar Kabalmay, [3]Muhammad Wayassirli Amri

[1]Universitas Indonesia Jakarta
[2]Politeknik Perkapalan Negeri Surabaya
[3]Universitas Islam Indonesia Yogyakarta

correspondence: wahyudi.ui.2013@gmail.com

Abstract

The Industrial Revolution 4.0 has become a new paradigm in today's era marked by increased connectivity, interaction, and boundaries between humans, machines and other resources. The rapid development of technology with its characteristics is the interconnectivity of intelligent systems and automation. The use of technology, one of which is big data, has a widespread impact. Big data technology gives rise to new forms of social life. One of them is through social media where users can connect with people around the world. Users communicate any ideas to other users. All forms of gadgets have made this happen. Social media has attracted the enthusiasm of users in their daily practice in society. With such a high data growth rate, it is followed by all the consequences that must be addressed and adjusted based on social construction in a civilized, moral and ethical technological society. This requires technology that can keep pace with the increasing data growth rate over time and the increasing use of information and communication technology. In addition, each related party needs to respond with policies that are able to regulate the order of social life. Ultimately, big data presents many challenges to privacy so it is necessary to design fair and feasible procedures. How exactly the policy package responds to each challenge may vary, but will ultimately work if it can ensure fair and appropriate protection for those at risk from this new form of privacy hazard.

Keywords: big data, social media, internet, social life, users, privacy.

Wahyudi, W., R. N. K. Kabalmay, & M. W. Amri. 2021. Big Data and New Things in Social Life, Studi Ilmu Sosial Indonesia, 1(1), 1-12.

Introduction

The Industrial Revolution 4.0 has become a new paradigm in today's era. Since 2011, the Industry 4.0 era has emerged marked by increased connectivity, interaction, and boundaries between humans, machines and other resources. The Industrial Revolution 4.0 is also called a combination of the era of automation technology and cyber technology. Currently, the Industry 4.0 era has been marked by the widespread use of technology (Darmawan, 2021). The rapid development of technology with its characteristics is the interconnectivity of intelligent systems and automation. There are several technologies that are considered to be the main pillars of Industry 4.0, namely, Data Science, Internet of Things (IoT), Big Data, Artificial Intelligence (AI), Cloud Computing and Additive Manufacturing.

3D printer technology is a part of additive manufacturing technology that has been around for the past three decades. Cloud Computing is a method of storing various services over the internet. The resources in question are examples of applications such as data storage, servers, databases, networks, and software. Cloud computing is a popular option because it has many advantages, such as cost, increased productivity, speed, efficiency, performance, and security. Data science develops messages because it is supported by not only statistical methods, but also AI-based methods. AI-based methods are growing rapidly and are getting more accurate because they are supported by the availability of abundant data (which is often called a corpus). The abundance of data occurs because of the use of IoT in society. The ability to acquire, store and process this abundant data is made possible by the presence of big data technology.

Social life in the world has involved big data technology. The availability of digitally recorded social data is increasingly abundant. This shows that technology has been able to provide added value in the lives of all levels of society (Al Hakim et al., 2014). The implementation of big data or data sets in large quantities has generally been applied to types of businesses that can provide better changes to society (Khayru, 2021; Sinambela & Putra, 2021).

For industry circles or practitioners, big data has opened up opportunities to set business strategies and innovations in terms of processing, analyzing and storing data with high volumes and high volatility rates quickly and effectively (Darmawan, 2012). Big data has been used as one of the decision makers in business (Gunawan et al., 2012).

Big data has also encouraged the development of a form of industrial revolution 4.0 called Society 5.0 as a concept of a human-centered and technology-based society developed by Japan. This concept was born as a development of the industrial revolution 4.0 which is considered to have the potential to degrade human roles. Through Society 5.0, artificial intelligence will transform big data collected through the internet in all areas of life (the Internet of Things) into a new wisdom, which will be dedicated to improving human abilities to open up opportunities for humanity. Next is a review of the impact of big data technology, especially on social life.

About Big Data

The term "big data" refers to data that is so large, fast or complex that it is difficult or impossible to process using traditional methods. Accessing and storing large amounts of information for analytics has been around for a long time but the concept of big data gained momentum in the early 2000s (Mardikaningsih et al., 2015). Thus, big data has internet media originating from various complex sources where the process is carried out in stages (collection, organization, storage to analysis) and requires very expensive resources.

Big data must meet 6V: Volume (amount of quantity); Variety (various forms: documents, sound recordings, pictures, videos, etc.); Velocity (fast data changes due to its nature coming from various sources); and Value (the process of finding the meaning behind a set of data); and Veracity (assurance of accuracy of available data). The large scale and complex procedures have caused big data to be grouped into five categories, namely: 1) data sources; 2) content formats; 3) data stores; 4) staging data; 5) data processing. Big data can be found in many sources. Currently, there are several sources that most often contribute large amounts of data and have good quality. Among others are.

a. The internet is the largest data provider and is most often used by all parties because the way the internet itself works is to store all data from its users. So, any search activity will be saved and then become a data set. This is the reason why the cache on the browser or device used to surf the internet is very easy to fill because it contains all data from the results of surfing activities on the internet. This data can be used according to the interests of its users.

b. Smartphones are also a contributor to data on a large scale because any activity is automatically stored by the device. The biggest data source on a smartphone itself is the application installed on it. So, every time this application runs, data will be obtained and collected by the system.
c. Social media which is now widely accessed by anyone on a large scale. Every photo, video, including tweets on social media is already called data.
d. Digitizing certain media then creating data sources and managed by various parties. For example, the company provides data in the form of music, which is then released to the public in the form of audio and can be enjoyed on a number of platforms or applications.

The presence of big data technology encourages technology companies such as IBM, Google, Amazon and Microsoft to provide a data processing platform (a place to analyze data) for big data so that the analysis results obtained appear near to real time. That way, each user does not need to store data that is so large, numerous and varied that it will cost a lot of maintenance. This makes big data an asset that has promising economic value.

Big Data and Social Media

Social media has become a major part of most people's lives. It allows users to interact with each other, receive news, and connect socially. Traditionally it is used by individuals to relate to other people. Over time it has enabled businesses and organizations to connect with customers and individuals (Retnowati & Mardikaningsih, 2021). The use of social media has grown, as has the industry currently using it (Xu et al., 2014). Social media applications which are technological innovations are increasing as organizations recognize the amount of raw data available on social media platforms. A social networking service (or social networking site) is an online platform distributed across multiple remote computers. Millions of people around the world use social media to upload text, photos, videos, update their current status and post daily comments. The rapid growth of online social networking link sites (e.g., Facebook, Myspace), media sharing networks (e.g., YouTube, Instagram), microblogging (e.g., Tumbler, Twitter), has prompted researchers to investigate published content and analyze user behavior (Feng et al. al., 2018; Heidemann et al., 2012). Social network refers to the structure among people or other social entities with

the ends linked to their associations (Busalim, 2016). In this structure, nodes are considered as people (or things) in the network, and interactions are expressed through edges or links between them. The social network is derived from mathematical graph theory, which is defined as a graph, G= (V, E), where V is the set of vertices or vertices that refer to people or objects, and E denotes the set of edges or ties indicating the relationship that connects each of them. people (Bello-Orgaz et al., 2016).

Social media is categorized as big data because it is a source of data or information that can be shared or exchanged between individuals or groups (communities) via URLs. Specifically for social media data, Batrinca and Treleaven (2015) classify it into two types: historic data sets (data that has previously been accumulated and stored) and real-time data (data taken directly without any specific time lag).

Viral and discussion sourced from social media usually focuses on text-based material such as Tweets from Twitter, Posts from Facebook or Instagram, Videos from Youtube. Multimedia and image-based social media applications have also become popular. These social media apps rely on images and videos to connect people with one another (Azizah, 2015). Users can edit images and videos and add filters, which are used to change the look and feel of images. Examples of image-based social media applications include Instagram, Tik tok and Snapchat. The popularity of this type is rapidly growing with sites having hundreds of millions of users.

In the Indonesian Digital Report issued by We Are Social and Hootsuite in 2020, there were 175.4 million internet users in Indonesia in January 2020. The number of internet users in Indonesia increased by 25 million (+17%) between 2019 and 2020. Internet penetration in Indonesia reached 64% in January 2020. Social media users in Indonesia were 160.0 million users in January 2020 or more than half of the population. More than 80 percent of them are users of YouTube, WhatsApp, Facebook, and Instagram. While half are Twitter and Line users. These platforms have different functions. There are messengers like WhatsApp, microblogging like Twitter, and image-based ones like Instagram. Despite the differences in their respective functions, what unites all these platforms are text and images. In essence, these texts and images are the "language" used to communicate between users. The difference is in the real world, statements from everyone's mouth will be easily forgotten and ignored,

while on social media, these statements can be saved. The number of social media users in Indonesia increased by 12 million (+8.1%) between April 2019 and January 2020. Social media penetration in Indonesia reached 59% in January 2020. Mobile connections in Indonesia, there were 338.2 million connections in January 2020 The number of mobile connections in Indonesia increased by 15 million (+ 4.6%) between January 2019 and January 2020. The number of mobile connections in Indonesia in January 2020 was equivalent to 124% of the total population.

Today there are millions of texts, images, and videos that come from the hustle and bustle of human interaction on social media. The number continues to grow rapidly. All that is stored is a digital footprint that has meaning in any form and is the latest way to understand human behavior (Mendrika, 2021). The importance of big data is not just about how much data you have, but what you can do with it. When someone is able to combine big data with accurate analysis, it is possible to take advantage of it according to their interests.

Big Data and Novelties

The concept of the data–information–knowledege–wisdom (DIKW) hierarchy (Rowley, 2007) or often referred to as the wisdom hierarchy provides a reasonable reason why the big data phenomenon is so developed. With the large potential of the data currently and in the future, the potential for information available to be transformed into knowledge is also great so that it can optimize decision making (wisdom). Thus, if big data can be handled properly, it will provide great benefits for the organization, especially it will be wiser to make decisions based on data (data driven) in conditions of dynamic environmental changes.

Big data has high volume characteristics, from terabytes to zettabytes. This has consequences for storage capacity and data processing capacity that cannot be handled by current conventional information technology and methods. Storage methods and techniques applied to date lead to parallel processing in a distributed system environment, both in terms of storage media and processing.

The velocity characteristics of big data change the point of view of batch data processing, into dynamic data processing. The data is no longer viewed statically, but dynamically as a stream. Apart from being a data stream, big data is also related to the movement of large amounts of data (high volume movement) such as spatial data, images, and others.

Big data comes from various events. All human activities that use computers, gadgets, sensors and other equipment (IoT) generate big data. In addition to various sources, in terms of structure, they also vary, ranging from structured, such as: transaction data (money market, e-commerce, etc.), semi-structured, or unstructured, such as: image, opinion text on social media. and web pages on the internet. For this reason, methods and technology are needed to integrate big data from various sources and from these different formats.

The main problem of big data is known as the data deluge phenomenon, a phenomenon where the data growth rate is higher than the rate of an organization's ability to process and analyze data. Therefore, processing and analyzing data really requires unconventional technology and technology that can keep pace with the data growth rate that increases over time and the increasing use of information and communication technology.

In addition, Boyd and Crawford (2012) argue that big data has created a new knowledge system that changes the object of knowledge. Not only that, big data is able to analyze, describe and predict patterns of communication, behavior and even social and non-social issues such as crime, patterns of disease spread, and so on (Tene and Polonetsky, 2013).

Big data has transformed the conventional paradigm of social science into what is known as computational social science which demonstrates the human ability to observe a world that is so complex and dynamic environment as it is today (Chang et al., 2014). For Mason et al. (2014), computational social science is not just a paradigm, but a research field that examines the intersection between computer science, statistics, and social science, where computational methods are used to answer problems related to society. In contrast to computational social science, another word that is also popular among academics is social computing which emphasizes the design of support systems to facilitate human social interaction, including studying how and why humans produce content (Mason et al., 2014).

Big data also gives rise to new branches of science, one of which is Digital Humanities. Although not yet categorized as a scientific discipline, Digital Humanities is a new study that is currently developing to explore human involvement with the development of technology, media and computing methods (Svensson, 2010).

Tene and Polonetsky (2013) argue that big data challenges the principle of personal data or the so-called personally identifiable information data minimization concept; consent (individual control); and individual access rights. Personal data and privacy in the internet space is a debate in the big data era. Is personal data available in public spaces such as the internet categorized as public data, which raises the question of why access to such data is limited to commercial companies only? If not, does a researcher have the right to access and collect personal data on the internet for the sake of scientific development? Who will be responsible if these actions can infringe on someone's right to privacy?

Big data requires an adequate procedure to reduce the potential for privacy violations. To minimize the violation of privacy rights, a person can use de-identification or disguise the identity of the data owner so that it cannot be tracked or determined by subject such as pseudonyms, abbreviations, encryption, coding, and so on. However, this method does not yet have a standard procedure and has no legal force.

Crawford and Schultz (2014) provide suggestions regarding procedural data due process. A procedure for collecting and processing data that enforces the principle of justice or the right of due process as in the legal system. There are law enforcement principles that are applied in the big data process so that data users must follow procedures or procedures that have permanent legal force to maintain fairness for the owner of personal data. Due Process in the legal system will limit the authority of the regulators involved in upholding the principle of the rule of law. In big data systems, Due Process is difficult to implement due to the absence of regulations governing the interaction between application designers, algorithms, output from the computer itself, or data owners. This will be a challenge for the relevant authorities to formulate policies on this matter.

By using computing tools, data is collected over the internet quickly and easily. However, this invites debate regarding data as a public good. If the data stored on the internet is categorized as public goods, why is access to the data so limited and only available to global-scale commercial companies? The next issue related to this is the privacy and ownership of the data itself. Whether public goods data available on the internet (including personal information) can be accessed, collected and analyzed by certain parties and how it relates to human rights to protect and maintain their privacy. This is still a debate that has not found a bright spot and legal certainty.

Conclusion

The presence of the internet and its derivative products has raised the status of various groups of people in all parts of the world. Big data is a collection of processes that consist of large volumes of data and can accommodate structured and unstructured data which have several functions and benefits related to the need for large data storage with faster and more efficient data reading processes.

In relation to big data, this technology can provide added value in people's lives. Almost everyone uses what is called social media to access various information and share personal daily activities. Of course, many upload photos, videos and text into these social media applications. All of this information is a type of data that will be recorded and stored in a database system with a large capacity. With such activities, you can imagine what size social media such as Facebook, Twitter, Instagram must allocate to accommodate data every day. The best solution to overcome this problem is to use big data that has good performance in handling large-scale data.

On the other hand, social media does not always represent real life, various manipulations in an increasingly sophisticated cyber world is not impossible to make it possible for users to draw wrong conclusions and fail to understand social reality. Users must be critical and knowledgeable so as not to easily draw conclusions without clear sources.

With regard to policies, planning and data synchronization can be implemented with a policy on data integration (data-driven policy). Big data can be used to create new policies in the future. In the long-term plan, policies resulting from big data are expected to have an impact on economic progress in Indonesia.

In addition, the most basic element that needs to be done to achieve these things is to cultivate a data mindset and achieve data (data sharing) which will have an impact on the ease of data integration between institutions and industries which are considered to be still separate. Although it is difficult and there are many obstacles to make it happen, but this may be solved in the future and must start from now. The government must act as an enabler by cultivating data in its government system so that an ecosystem can be created. Currently, the government has indeed learned by building the data.go.id site. This site

is the center of various data, such as infrastructure and poverty index. However, assessing that the management is not optimal because the data displayed is not up-to-date. Data should be used to determine policy and it will have an effect on society.

Ultimately, big data presents many challenges for privacy so it is necessary to design fair and feasible procedures. How exactly the policy package responds to each challenge may vary, but will ultimately work if it can ensure fair and appropriate protection for those at risk from this new form of privacy hazard.

Daftar Pustaka

Adams, D. A, R.R Nelson, & P.A. Todd. 1992. Perceived Usefulness, Ease of Use, and Usage of Information Technology: A Replication. *MIS Quarterly*, 16(2), 227-247.

Al Hakim, Y.R., M. Hariani, D. Darmawan, R. Mardikaningsih, & Moch. Irfan. 2014. Pembelajaran Mahasiswa Melalui Media Jejaring Sosial, *Jurnal Ilmiah Manajemen Pendidikan Indonesia*, 1(2), 109-124.

An, Y. J. & Cao, L. 2014. Examining the effects of metacognitive scaffolding on students' design problem solving and metacognitive skills in an online environment. *Journal of Online Learning and Teaching*, 10(4), 552-561.

Andayani, D. & D. Darmawan. 2004. *Pembelajaran dan Pengajaran*. IntiPresindo Pustaka, Bandung.

Azizah, N., Saraswati, M. Hariani, R. Mardikaningsih, & T. Wijayanti. 2015. Keterlibatan Pemasaran Online Untuk Meningkatkan Minat Mendaftar Mahasiswa di Perguruan Tinggi, *Jurnal Ilmiah Manajemen Pendidikan Indonesia*, 1(4), 257-270.

Bello-Orgaz G., Jung J.J., Camacho D. 2016. Social big data: Recent achievements and new challenges. *Inf. Fusion.*, 28, 45–59.

Batrinca, B. & P. C. Treleaven. 2015. Social Media Analytic: A Survey of Techniques, Tools and Platforms. *AI & Soc.*, 30, 89-116.

Boyd, D., & K. Crawford. 2012. Critical Questions for Big Data. *Information, Communication & Society*, 15 (5), 662-679.

Busalim A. H. 2016. Understanding social commerce: A systematic literature review and directions for further research. *Int. J. Inf. Manage.*, 36(6), 1075–1088.

Chang, R. M., Kauffman, J. Robert, & Young Kwon. 2014. Understanding the Paradigm Shift to Computational Social Science in the Presence of Big Data. *Decision Support Systems*, 63, 67-80.

Crawford, K., & J. Schultz. 2014. Big Data and Due Process: Toward a Framework to Redress Predictive Privacy Harms. *Boston College Law Review*, 55, 93-128.

Darmawan, D. 2004. Pemasaran Internet dan Penerapannya, *Jurnal Bisnis, Ekonomi dan Sosial*, 4(2), 52-73.

Darmawan, D. 2008. *Sistem Informasi Manajemen*, Badan Penerbit Mahardhika, Surabaya.

Darmawan, D. 2008. Internet Marketing: Menggeser Pemasaran Konvensional. *Jurnal Akuntansi, Manajemen Bisnis dan Sektor Publik*, 4(2), 128-148.

Darmawan, D. 2012. *Manajemen Informasi*. Metromedia, Surabaya.

Darmawan, D. *et al.* 2020. The Quality of Human Resources, Job Performance and Employee Loyalty, *International Journal of Psychosocial Rehabilitation*, 24(3), 2580-2592.

Darmawan, D. et al. 2021. *Psychological Perspective in Society 5.0*, Zahir Publishing, Jogjakarta.

Darmawan, D., M. Saleh, Soemardiono, M. S. Anwar & Hermawan. 2021. Optimalisasi Manajemen Kualitas Total untuk Memberdayakan Sumber Daya Manusia, *Jurnal Ilmu Manajemen*, 1(1), 63-72.

Davis, F. D., R. P. Bagozzi., & P. R. Warshaw. 1989. User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35 (8), 982-1002.

Dearden, L., Reed, H. & van Reenen, J. 2006. The Impact of Training on Productivity and Wages: Evidence from British Panel Data. *Oxford Bulletin of Economics and Statistics*, 68(4), 397-421.

Dong, X., Y. Chang., Y. Wang., & J. Yan. 2017. Understanding usage of Internet of Things(IOT) systemsin China: Cognitive experience and affect experience as moderator. *InformationTechnology & People*,30(1), 117-138.

Fatimah, S., A.K. Wahyudi, E. Retnowati, D. Darmawan, R. Mardikaningsih & M. Kemarauwana. 2018. The Importance of Scale in Attention Organizations to Issues, *Academy of Management Review*, 43(2), 217–241

Feng Y., Zhou P., Wu D., Hu Y. 2018. Accurate content push for content-centric social networks: A big data support online learning approach. IEEE Trans. Emerg. *Top. Comput. Intell.*, 99, 1–13.

Gunawan, A., Yuliana, D. Darmawan, & S. Arum. 2012. *Manajemen Terapan dan Bisnis*, Spektrum Nusa Press, Jakarta.

Heidemann J., Klier M., Probst F. 2012. Online social networks: A survey of a global phenomenon. *Comput. Netw.*, 56(18), 3866–3878.

Hutomo, S. & D. Darmawan. 2011. Optimalisasi Manajemen Sumber Daya Manusia Menuju Keunggulan Bersaing, *Jurnal Ilmu Sosial*, 5(1), 13-22.

Ishak, M., I. Zaidi, D. Darmawan & Z. Yang. 2016. Conceptualizing Cultural Organization Studies, *Management Review*, 9(2), 146-158.

Jaimez-González, C. R., & Castillo-Cortes, M. 2020. Web Application to Support the Learning of Programming Through the Graphic Visualization of Programs. International *Journal of Emerging Technologies in Learning*, 15(06), 33.

Khasanah, H., S. Arum, D. Darmawan. 2010. *Pengantar Manajemen Bisnis*, Spektrum Nusa Press, Jakarta.

Khayru, R.K. 2021. Opinions about Consumer Behavior during the Covid-19 Pandemic, *Journal of Social Science Studies*, 1(1), 31-36.

Luthans, F. 2011. *Organizational behavior, An Evidence-Based Approach*, McGraw-Hill, New York.

Magnusson, M & T. Ercis. 2021. Innovation Management in the Application of Human Resource Empowerment and Marketing Techniques, *International Journal of Work Innovation*, 2(4), 373-389.

Mahyanalia, R., K. S. Siagian, D. Darmawan, A. Gunawan & S. Arum. 2017. Job Insecurity and an Integrative Review for Future Research, *Journal of Management*, 43(6), 1911–1939.

Mardikaningsih, R., A. Gunawan, D. Darmawan & A. Karina. 2015. *Manajemen, Teknologi, dan Bisnis*, Addar Press, Jakarta.

Mardikaningsih, R. & D Darmawan. 2020. *Sistem Pengendalian Mutu*. Metromedia, Surabaya.

Mardikaningsih, R. & D. Darmawan. 2021. Peranan Sistem Informasi Persediaan terhadap Persepsi Kemudahan Penggunaan, Kegunaan yang Dirasakan, dan Kepuasan Pengunjung Toko Buku, *Realible Accounting Journal*, 1 (1), 43-57.

Mason, Wi., J. W. Vaughan, & H. Wallach. 2014. Computational Social Science and Social Science. *Mach Learn*, 95, 257-260.

Mendrika, V., D. Darmawan, T.S. Anjanarko, Jahroni, M. Shaleh, & B. Handayani. 2021. The Effectiveness of the Work from Home (WFH) Program during the Covid-19 Pandemic, *Journal of Social Science Studies*, 1(2), 44-46.

Noe, R. A, Hollenbeck, J. R., Gerhart, B. & Wright, P. M. 2006. *Human Resources Management: Gaining A Competitive Advantage*. 5th Ed. McGraw-Hill/Irwin, New York.

Ohk, K., S. B. Park., & J. W. Hong. 2015. The Influence of Perceived Usefulness, Perceived Ease of Use, Interactivity, and Ease of Navigation on Satisfaction in Mobile Application. *Advanced Science and Technology Letters*, 84, 88–92.

Padma, A., N. Aisyah, D. Darmawan, I.A. Azmi & A. R. Putra. 2018. Contingency Approach to Strategies for Service Firms, *Business Research*, 7(2), 178-189.

Putra, A. R., D. Darmawan, & E. A. Sinambela. 2017. Pengawasan dan Koordinasi Kerja serta Pengaruhnya terhadap Produktivitas Kerja Karyawan, *Jurnal Ilmiah Ilmu-ilmu Ekonomi*, 10(2), 12-24.

Retnowati, E. & R. Mardikaningsih. 2021. Study on Online Shopping Interest Based on Consumer Trust and Shopping Experience, *Journal of Marketing and Business Research*, 1(1), 15-24.

Rowley, J. 2007. The wisdom hierarchy: Representations of the DIKW hierarchy, *Journal of Information Science*, 33(2), 163–180.

Saboo, A. R., V. Kumar, & I. Park. 2016. Using Big Data to Model Time-Varying Effects for Marketing Resource (Re) Allocation. *MIS Quarterly*, 40 (4), 911–939.

Simmhan, Y., S. Aman, A. Alok Kumbhare, & L. Rongyang. 2013. Cloud-Based Software Platform for Big Data Analytics in Smart Grids. *Computing in Science & Engineering*, 15 (4), 38–47.

Sinambela, E.A., R. Mardikaningsih & D. Darmawan. 2014. *Inovasi Pendidikan dan Profesionalisme Guru*, IntiPresindo Pustaka, Bandung.

Sinambela, E.A. & A.R. Putra. 2021. Self-Assessment System, Tax Technology and Tax Evaison, *Journal of Marketing and Business Research*, 1(1), 51-58.

Svensson, Patrik. 2010. The Landscape of Digital Humanities. *Digital Humanities*, 4(1).

Tene, O., & J. Polonetsky. 2013. Big Data for All: Privacy and User Control in the Age of Analytics. *Northwestern University School of Law*, 11(5), 239-272.

Wahab, E., A. Aziz, D. Darmawan, M. Hashim & Y. Fan. 2017. Marketing New Products to Mainstream Customers, *Journal of Economics and Business*, 8(2), 239-246.

Wahyudi, I, D. Bhaskara, D. Darmawan, Hermawan & N. Damayanti. 2006. Kinerja Organisasi dan Faktor-Faktor Pembentuknya, *Jurnal Ekonomi dan Bisnis*, 4(2), 95-108.

We Are Social. 2020. Digital in 2020 report. *https://datareportal.com/reports/digital-2020-indonesia*.

Woerner, S. L. & B. H. Wixom. 2015. Big Data: Extending the Business Strategy Toolbox. *Journal of Information Technology*, 30 (1), 60–62.

Xu, L., W. He & S. Li. 2014. Internet of things in industries: A survey. *IEEE Transactions on Industrial Informatics*, 10(4), 2233–2248.

Yoo, Y. 2015. It Is Not about Size: A Further Thought on Big Data. *Journal of Information Technology*, 30 (1), 63–65.

Zuboff, S. 2015. Big Other: Surveillance Capitalism and the Prospects of an Information Civilization. *Journal of Information Technology*, 30 (1), 75–89.