Big Data: Balancing its Usefulness in Managing an Organization Performance and Ethical Consideration

Nur Azini Binti Mohd Zaki, Adibah Jamaluddin, Vani a/p Tanggamani, Azlina Rahim, Nor Ashikin Alias

Big Data: Balancing its Usefulness in Managing an Organization Performance and Ethical Consideration

Nur Azini Binti Mohd Zaki[1], Adibah Jamaluddin[2], Vani a/p Tanggamani[3], Azlina Rahim[4], Nor Ashikin Alias[5]

[1]Finance Department, Hospital Sultan Abdul Halim, Kedah, Malaysia, [2]Faculty of Accountancy, Universiti Teknologi MARA, Shah Alam, Malaysia, [3,4,5]Faculty of Accountancy, Universiti Teknologi MARA, Melaka, Malaysia

Corresponding Author's Email: azlina@uitm.edu.my

Abstract

Big data is one of the important technologies that create superior competitive position for an organization. In the digitalized age, big data provide organization with useful insights for enhancing their decision-making process. This is because information can be collected, analyzed and utilized quicker, larger, and in more complicated scale than most people could ever grasp. However, big data has the potential to have a beneficial or negative impact on the lives of millions of people. It could enhance futures when utilized properly. Businesses utilize data to compile information from many sources in order to create knowledge, enhance predictions, and personalize offering. As a result, big data has also come under fire for being an invasion of privacy, potentially discriminatory, and plain creepy. Hence, the purpose of this study is to lift the big data usefulness in the organizational performance and the ethical consideration. Big data ethics seek to establish a moral and ethical standard for data use since the issue of ethics in big data work towards fostering a sustainable big data industry. Big data makes it possible to access data-information that might violate people's privacy unintentionally or on purpose, be used improperly. This calls into question the morality of sharing and using data for commercial purposes. In conclusion, it can be said that organizations need ongoing interactions and alignment between the core values model of the organization, those engaged in big data and the interests of stakeholders in order to realizes the ethical value from big data in this era of digital technology revolution that makes access to big data potable and interconnected.

Keywords: Big data, Performance, Ethical, Malaysia

Introduction

Organizations and decision-makers are currently paying close attention to big data since they may acquire useful insights in developing capabilities and achieving a competitive advantage (Lee, 2017). Big data enables the collection of real-time data from millions of end users via well-known social networking platforms like LinkedIn, Facebook, Twitter, and Netflix. Then,

in real time, big data analytics are utilised to direct, automate, and optimise decision-making procedures that aid in the accomplishment of organisational objectives (Nair, 2020). Big data management would be necessary for organisations to realise the social and economic value from the data (Oussous et al., 2018). This analysis would help to understand users' data consumption behaviour and value to other applications like monitoring network traffic, create business models, and so forth. The rapid development of big data is being driven by the social media and information technology phenomenon, which are compelling businesses to develop their capabilities and exploit big data in order to be competitive (Lee, 2017; Sharma, 2014). Big data may redefine innovation, competition, and production while improving organisational strategic management (Mazzei and Noble, 2017).

According to Elgendy & Elragal (2016), big data has the ability to assist and improve decision-making in organisations as well as to promote efficiency in public sector businesses. Big data not only can be applied to leverage business change and enhance decision making but valuable information also can be extracted to support informed decision. Besides its usefulness in helping the organisations, big data also help organisations to create knowledge, improve the decision-making process, develop business models, and have an impact on organisational strategic decisions, they also showed that there are still challenges to overcome. According to Chessell (2014), when businesses employ big data analytics to improve their operations, they might not be aware of the technology's ethical implications. Martin (2015), highligted potential ethical problems with selling consumer data to a secondary market. Another study Hyrynsalmi (2017) discussed the moral dilemmas associated with using data-driven gamification which involves gathering user data and using it to alter user behaviour though data-driven gamification solutions are implemented with the best of intentions, they may unintentionally end up doing more harm than good. Flordi and Taddeo (2016) discovered that the ethical problems anticipated in the biomedical context include ignoring group-level ethical harms, altering the nature of fiduciary relationships, failing to clearly differentiate between "academic" and "commercial" big data practises that may be harmful to the data subjects involved, and lacking the resources and intellectual property rights that are required based on the analysis of aggregated datasets. In the meantime, Devlin (2017) believed that the data industry faces a severe task in applying ethical judgement to the entire data analytics process of the project under consideration, starting with the initial request and continuing through to the eventual decommissioning. However, given the fierce competition in the market, businesses are likely to exploit the large, diverse, and complicated datasets that are available to them for developing organisational strategies. On the one hand, earlier research has demonstrated the value of big data analyics while simultaneously posing ethical questions about its usage. On the other hand, according to recent studies, big data as a transdisciplinary and evolutionary fusion of new technologies will help to produce strategic insights and sustainable developments (Ahmad et al., 2019). This creates a research and management challenge to gain understanding of big data management and to generate clarity on its sustainable development by looking at its ethical uses.

Literature Review
Big data and data analytics in the modern, digitalized world have led to the term's adoption among business professionals, IT professionals, and scholars. Blackburn et al (2017) and De Mauro et al (2015) noted that although big data is used in a variety of contexts, including the convergence of a broad range of trends in computing, information processing, computational

methods, analytical tools, information on the socio-cultural shift impacting business and society, etc. According to De Mauro et al (2015) big data represents the information assets characterised by such a high volume, velocity, and varied that require specific technology and analytical methods for its transformation into value. This definition also considered the existing definitions of big data and the related primary research topics. This concept of big data specifically relates to the application of particular tools and processes for information analysis. Additionally, Harrison et al (2015) added that by using big data analytics as the "backbone" of business intelligence systems gives organisations accesss to high quality, targeted information that aids in understanding market positions, opimising strategic decision-making, and monitoring organisational competitiveness . The argument over how businesses may derive value from big data at various levels of analysis continues in light of the fierce market competition and availability of enormous, varied, and complicated datasets, as stated by (Gunther et al., 2017). Elgendy and Elragal (2016) noted that the massive amounts of data produced by digital technologies must be kept and evaluated in order to be valuable for integrating data analytics into the organisational decision-making process. For instance, by utilizing big data, retail businesses might gather insight on client demographics such as age and gender as well as in- store movement patterns. This information could then be used to inform decisions about stalling levels, product promotion strategies, and other matters. Organizations would therefore be required by situational demands to leverage technology capabilities to make quick, precise, and efficient operational and strategic decisions utilizing big data management methodologies. It can be inferred from the explanation above that big data has the ability to provide organisations with useful insights for enhancing their decision-making process. On the other side, big data analytics refers to the many analytic tools and techniques used by organisations to increase their operational effectiveness, with the potential to strategically generate new revenue streams and acquire a competitive advantage.

Organizational Performance
Organization's performance, refers to the capacity to meet its objectives, stakeholders' expectations, and market survival. It is also known as the action of evaluating and assessing an organization's performance in relation to its objectives and goals, which involves contrasting actual outcomes with desired outcomes. The organisational performance compares the organization's actual outputs or productivity to its goals or desired outcomes. According to Nair (2020), higher performance depends on the organization's ability to handle innovation, safeguard, and employ intangible knowledge assets in a way that will be advantageous to the organization. Organizational performance also includes all actions or activities carried out by managers at various levels of the organisational hierarchy in order to assess the degree to which an organisations has accomplished its goals. This process involves making sure that organisational resources are being used appropriately.

Application of Big Data Analytics and Organizational Performance
Big data analysts can employ a wide range of various analytical software solutions that are readily available on the market to enhance organisational performance and make smarter business decisions that will help the organisation succeed. To use big data analytics, which will undoubtedly aid in enhancing corporate performance, an organisation must gain analytical insight into a vast volume of data. The well-known example that would bolster this claim is "Amazon," a company that generates 35% of its revenue from consumer suggestions

based on big data analytics. The use of big data analytics has the potential to provide value to businesses, and its successful implementation necessitates specialised knowledge in processing large data, deciphering its meaning, and developing insights from its use. According to the most recent report on Fortune 1000 firms, 91% of enterprises are investing in big data analytics, up from 85% the year before. Big data analytics application is regarded as a tool for the ideal management of organisational resources and supervision of commercial operations. It accelerates corporate transformation, strengthens the supply chain, and advances manufacturing and industrial automation. According to Columbus, 87% of firms see the use of big data analytics as a strategy to gain a competitive edge in the next three years, and 89% think enterprises who don't use big data analytics are more at risk of losing market share than those that do. The use of big data analytics represents both a technological development and a completely new operational paradigm. Making business decisions based on research and data rather than on gut feeling. Like this, firms can achieve their goals and gain a competitive advantage by adopting an analytical approach. Superior organisational performance and the successful customer deployment are directly tied to the use of big data analytics. The effectiveness of analytical tools has a substantial impact on the reliability of data and/or information, business decision-making, and organisational success. Big data analytics is also used to distinguish between high and low performing organisations as a result, those businesses that employ big data analytics become proactive and future focused, cut their cost of customer acquisition by 47%, and saw a gain in revenue of roughly 8%. The use of big data analytics has received crucial consideration on the business agenda in recent years due to its ability to increase efficiency and profitability by 5-6%. Therefore, by enhancing a business's performance across all areas—financial, marketing, partnership, and competitive advantage—big data analytics can create benefits for every organization. Consequently, the use of big data analytics can enhance organizational performance.

Ethical Concerns in Big Data of Managing Organizational Performance
Big data may influence how users behave, generating ethical questions about potential violations of the fundamental civil, social, political, and legal rights noted by (Davis and Patterson, 2012). There is a need to reconsider the philosophy of professional ethics, policy-making, and decision- making given how quickly big data is developing and how this affects individual abilities to appreciate its potential in making informed decisions. LaBrie et al (2014) believed it was crucial to examine customers' attitudes and reactions to t e use of their data, citing the growing privacy and risk concerns considering identity theft, dubious marketing tactics, data mining, and profiling. According to the Institute of Big Ethics (2016), ethical businesses should address big data-related issues like respecting privacy and security when using personal information, obtaining consent before processing personal information, and ensuring stakeholders are treated fairly and that big data is used honestly. Abouelmehdi et al (2017) used the example of healthcare research and while agreeing that there are many opportunities for using big data to advance research in this area, they also identified a few barriers and challenges referred to as technical, skilled talent, privacy, and security issues, which could impede the true potential of health-related research. Organizations should also assume responsibility for fostering transparency and preventing the exploitation of information pertaining to personal data. Businesses should evaluate how using big data technology may have broader effects. Additionally, if more people become aware of how much information is being collected and how it is utilized. There may be a significant consumer backlash if it is thought to be being misused (LaBrie and co. ,2014). Therefore, these

researchers concluded, firms should be cautious when choosing information practices making sure they are beneficial to the business and that its constituents are morally upright.

Additionally, Martin (2015) recognized two layers of ethical problems related to the "big data" industry: I'll start at the business level. These include things like consumer surveillance or widespread (hidden) tracking as well as the gathering, aggregation, and utilization of data and information, including potential privacy violations. The second is harmful demand at the supply chain level, where the need for consumer data forces the organizations to gather and sell vast amounts of information with lower standards—from unidentified or dubious sources. In accordance with earlier research, a recent study (Lokshina and Landing, 2018) questioned the ethicality of big data usage. The themes, according to these academics, may be used to create a critical framework that offers direction for evaluating developing big data activities in terms of ethics and governance. While Floridi and Taddeo (2016) claimed that "the ethical challenges posed by data science can be mapped within the conceptual space delineated by the three axes of research: the ethics of data, the ethics of algorithms, and the ethics of practices," these three areas of study—while distinct—are also intertwined.

Addressing the Issue of Ethics in Big Data Through Involving Stakeholders

Researchers have been raising issues due to the practical importance of big data in scientific, social, and business contexts. Digitalized development (2016) states that by 2020, most big data will be geo-located throughout the world. However, many other people have also offered suggestions about how to deal with "ethics" in big data analytics and its administration. Wielki referring to the social and ethical challenges in the utilization of big data. A macro (data) ethics has been proposed by Floridi and Taddeo (2016) to address the various ethical concerns of data science within a unified, all-encompassing, and inclusive framework.

All parties involved in handling big data, such as data scientists, data engineers, database administrators, etc., should be included in discussions about how to use big data ethically, considering the five big data ethics principles, which are to maintain customer privacy, ensure confidentiality when sharing private information, maintain transparency, and so on. Customers' data usage knowledge should be raised, big data analytics should not interfere with people's free will, and big data should not be used to institutionalise, unadjust or unconscious prejudices like sexism or racism. Big data's impact on stakeholders will undoubtedly vary based on the sector, the goal, the stakeholder's involvement, and other factors. In addition, While Gunther (2017) contends that in order for businesses to use big data effectively, they would need to constantly realign their work processes, organisational structures, and stakeholder interests. While examining the impact of big data on various stakeholders in the patient-centric healthcare system (patients, medical practitioners, hospital management, etc. Palanisamy and Thirunavukarasu (2017) spoke about the potential benefits of employing big data analytics to construct a variety of healthcare frameworks that might aid in gathering high-quality knowledge and sharing it with various healthcare stakeholders. It's interesting to note that research done in many nations yielded results on big data usage ethics.

For instance, 2017 research by the European Economic and Social Committee examined the ethical aspects of big data (privacy, secrecy, openness, identification, and free choice) in an

effort to strike a compromise between them and the need for EU economic expansion. Given that they are unaware of the potential uses for data, this study thought that it was important to educate and empower individuals by helping them understand the dynamics, interests, and values that are impacted by data analytics. Review of moral issues with big data management used to forecast users' actions and create their online personas. While stakeholders regarded the advantages of a data-driven economy as intelligent solutions, personalized/customized service offerings, customer preference and behaviour prediction, accelerated scientific research, informed business decisions, improved healthcare quality, and so forth. The hazards and moral dilemmas associated with the use of big data were seen as data quality and breach issues, increased expenses, little control over the use of personal data, objectification, discrimination, and so forth.

Meanwhile, Granickas (2015) argued that it is crucial to take proactive measures to develop and implement policies that lead to an increase in trust and reputation because these actions will eventually lead to smoother processes for the release, acquisition, and re-use of open data. This is because there are constantly growing expectations between governments, organisations and other stakeholders regarding ethical OGD re-use. The information above suggests that big data has the potential to give organisations useful insights for improving their decision-making process. On the other hand, big data analytics describes the various analytical methods and tools employed by businesses to boost operational efficiency, with the ability to strategically create new sources of income and gain a competitive edge. While Chessell (2014) contends that organisations should exercise caution when utilising techhnology because all parties (the organization, customers, and stakeholders) may have different viewpoints on what is "ethical, " the research noted above emphasised the significance of stakeholder involvement. In order to create ethical policies for the use of analytics and big data, he advises utilizing an ethical awareness framework.

Manin (2015) believed that organisations in the big data industry needed to address the ethical issues and problems by developing sustainable industrial practices. This contrasts with Freitas et al (2019); Nair and Saiz-Alvarez (2019) who stressed the need for ethical governance for sustainable development. For the purpose of achieving sustainable development, Steurer (2005) describes the sustainable development-stakeholder relationship management (SD-SRM) perspective as a distinctive research approach that may be tied to the larger corpus of stakeholder theory. Funhermore, according to Friedman and Miles' (2006) normative stakeholder theory approach, stakeholders ought to act and perceive the goal of an organization in accordance with ethical norms.

Summary and Conclusions
Big data provide complicated, multifaceted challenges. The use of data and evidence is becoming more widely acknowledged as a significant opportunity, but it also needs to be critically examined. As technological advancements proceed quickly, two keyways of examining big data have been identified: challenging the veracity of the methodology and the veracity of the outcomes. Public trust in research methodologies is impacted by a few factors, including who will access the data, why they want to access it, where they will access it, what they will access, and what the intended result or consequence will be. The designation of champions who are qualified to address public concerns, professional competence and diligence on data protection, and other key measures for accountability to the public have all

been recognized. It was recognised that a more comprehensive ethical framework was required because the connection between ethics and public perception is not simple.

Data protection law enforcement was brought up as a relevant concern. The general people can get the impression that there are no procedures for accountability other than protests. It was decided that a neutral, impartial national organisation such as a Council for Big Data Ethics, was required to centrally represent and resolve important ethical issues as well as to proactively alleviate data trust gaps through public inspection. Such a Council ought to draw on a broad spectrum of skills, information, and passions from the public, private, academic, and other laypersons. It was also agreed that policymakers, for government data, should strengthen central data functions in order to address strategic objectives, such as creating incentives for data sharing, harmonising data standards for usability, supposing trusted, federated data infrastructures with common rules for data access, recovering data for use that has been lost due to fragmentation of service providers and contracting, obtaining the public's mandate, and informing. Long-term, it was decided that spending money on training, public involvement, and analytical capabilities will enhance the utilisation of big data.

Limitations, Implications and Future Research
The study has some restrictions, some of which are mentioned here. This paper has discussed big data studies to provide a comprehensive overview of the ethical difficulties in big data management in the current age of digital technology, when big data analytics are applied in all academic sectors. As a result, researchers that are interested in a particular subject may need to adjust the stakeholder analysis approach framework. For instance, customers who have adopted connected lifestyles are increasing in the marketing sector, but they are not aware of the methods used to gather, share, and use data on their purchasing patterns. Despite the complexity of this information for the marketer, it is their responsibility to use data in an ethical manner. As a result, these marketers might need to utilise a paradigm that focuses on "operationalizing" data usage ethics. This essay is based on data acquired through reading the literature on earlier investigations into data analytics ethics. But considering that big data analytics is a rapidly developing phenomena with broad implications, it could be helpful to comprehend its use through an empirical or case study. Another drawback is connected to the practical difficulties in applying the "stakeholders analysis approach framework" to realise value from moral evaluations of big data practises and get insights at various decision-making levels.

Big data collection and analysis at different scales would necessitate a flexible organizational structure that enables the realisations of real value in real-time and incorporates external and internal big data resources with diverse stakeholder interests in accordance with the organization's core values. Prior research, however Gunther et al (2017), revealed that stakeholder issues sometimes didn't surface until after the company had integrated massive volumes of data into their business model. Consequently, it may be difficult to produce big data insights that are consistent with the organization's basic values and the interests of stakeholders. This suggests, however, that this limitation can be overcome by more investigation into how to include flexibility in the organization development model so that new stakeholder interests can be considered and ethically treated. The report recommends employing a framework for stakeholder analysis with an emphasis on big data sustainability. This suggests that managers should prioritize sustainability and work toward efficient, moral

big data management procedures while considering the varied stakeholder groups' interests and involvements.

Despite the practical difficulties identified in earlier studies (Martin, 2015; Uria-Recio, 2018; Verma, 2017; Wielki, 2015), organizations can take individual steps to align their core values with all data analytics sources in order to foster productive interactions between all stakeholders and advance their organizations. In conclusion, it can be said that organizations need ongoing interactions and alignment between the core values model of the organization, those engaged in big data analytics, and the interests of stakeholders in order to realizes the ethical value from big data in this era of digital technology revolution that makes access to big data potable and interconnected. Furthermore, given that the main advantages of big data include combining information from various sources for knowledge creation, improved decision making, it is noted that there is a need to continuously address the issue of ethics in big data and work towards fostering a sustainable big data industry.

References

Abouelmehdi, K., Beni-Hssane, A., Khaloufi, H., and Saadi, M. (2017) 'Big-data security andprivacy in healthcare: a review', *The 8th International Conference on Emerging Ubiquitous Systems and Pervasive Networks (EUSPN 2017)/The 7th International Conference on Current and Future Trends of Information and Communication Technologies in Healthcare (ICTH-2017)/Affiliated Workshops*, in Shakshuki, E. (Ed.): *Procedia Computer Science*, Vol. 113, pp.73–80.

Blackburn, M., Alexander, J., Legan, J. D., and Klabjan, D. (2017) 'Big data and the future of R&D management', Research-Technology Management, Vol. 60, No. 5, pp.43–51.

Dagiliene, L., and Kloviene, L. (2019), "Motivation to use big data and big data analytics in external auditing", Managerial Auditing Journal, Vol. 34 No. 7, pp. 750-782

De Mauro, A., Greco, M., and Grimaldi, M. (2015) 'What is big data? A consensual definition and a review of key research topics', in *AIP Conference Proceedings*, AIP Publishing, February, Vol. 1644, No. 1, pp.97–104.

Devlin, B. (2017). *The New Ethics of Data Management*, Upside, 10 July [online] https://tdwi.org/articles/2017/07/10/biz-all-new-ethics-of-data-management.aspx

Digitalised Development. (2016). *Big Data – A Stakeholder Analysis* [online] https://wpmu.mah.se/nmict161group4/2016/03/10/big-data-a-stakeholder-analysis.

Elgendy, N., and Elragal, A. (2016) 'Big data analytics in support of the decision making process',*Procedia Computer Science*, Vol. 100, pp.1071–1084.

Floridi, L., and Taddeo, M. (2016) *What is Data Ethics?*, p.374, Philosophical Transactions-The Royal Society A [online] https://royalsocietypublishing.org/doi/pdf/10.1098/rsta.2016.0360

Friedman, A. L., and Miles, S. (2006) *Stakeholders: Theory and Practice*, Oxford University Press, UK.

Granickas, K. (2015) *Ethical and Responsible Re-use of Open Government Data*, EuropeanPublic Sector Information Platform Topic Report No. 2015/02 [online].https://www.europeandataportal.eu/sites/default/files/2015_ethical_and_res ponsible_use_of_o pen_government_data.pdf

Gunther, W. A., Mehrizi, M. H. R., Huysman, M., and Feldberg, F. (2017) 'Debating big data: a literature review on realizing value from big data', *The Journal of Strategic Information Systems*, Vol. 26, No. 3, pp.191–209.

Harrison, R., Parker, A., Brosas, G., Chiong, R., and Tian, X. (2015) 'The role of technology in the management and exploitation of internal business intelligence', Journal of Systems and Information Technology, Vol. 17, No. 3, pp.247–262.

Hyrynsalmi S., Kimppa K.K., Koskinen, J., Smed, J. and Hyrynsalmi S. (2017) 'The shades of grey: datenherrschaft in data-driven gamifcation', in Meder, M., Rapp, A., Plumbaum, T. and Hopfgartner, F. (Eds.): Proceedings of the Data-Driven Gamification Design Workshop, Tampere, Finland, 20 September [online] http://ceur-ws.org/Vol-1978/paper1.pdf
http://www.bain.com/publications/articles/big_data_the_organizational_challenge.aspx

http://www.mckinsey.com/insights/business_technology/big_data_the_next_frontier_for_innovation

http://www.sap.com/solution/big-data/software/applications.html
http://klouddata.com/big-data

http://searchbusinessanalytics.techtarget.comñeature/How-big-data-analytics-tools-can-help- your-organization

Institute of Big Ethics. (2016). Business Ethics and Big Data, Business Ethics Briefing, No. 52 [online] https://www.ibe.org.uk/userassets/briefings/b52_bigdata.pdf

LaBrie, R. C., Cazier, J. A., and Steinke, G. H. (2014) 'Big data ethics: a longitudinal study of consumer, business and societal perceptions', Journal of Management Systems, Vol. 24, No. 2, pp.23–38.

Lee, I. (2017) 'Big data: dimensions, evolution, impacts, and challenges', Business Horizons, Vol. 60, No. 3, pp.293–303.

Lokshina, I. V., and Lanting, C. J. (2018) 'Addressing ethical concerns of big data as a prerequisitefor a sustainable big data industry', International Journal of Interdisciplinary Telecommunications and Networking, Vol. 10, No. 3, pp.33–54.

Martin, K. E. (2015) 'Ethical issues in the big data industry', MIS Quarterly Executive, Vol. 14, No. 2, pp.67–85.

Mazzei, M. J., and Noble, D. (2017) 'Big data dreams: a framework for corporate strategy', Business Horizons, Vol. 60, No. 3, pp.405–414.

Nair, S. R. (2020) "A review on ethical concerns in big data management", International Journal of Big Data Management, Vol 1, No 1, pp. 8-25.

Nair, S. R., and Saiz-Alvarez, J. M. (2019) Handbook of Research on Ethics, Entrepreneurship, and Governance in Higher Education, IGI Global, Hershey, USA.

Oussous, A., Benjelloun, F-Z., Lahcen, A. A., and Belfkih, S. (2018) 'Big data technologies: a survey', Journal of King Saud University-Computer and Information Sciences, Vol. 30, No. 4, pp.431–438.

Palanisamy, V., and Thirunavukarasu, R. (2017) 'Implications of big data analytics in developing healthcare frameworks – a review', Journal of King Saud University-Computer and Information Sciences [online] https://www.sciencedirect.com/science/article/pii/

Sharma, R., Mithas, S., and Kankanhalli, A. (2014) 'Transforming decision-making processes: a research agenda for understanding the impact of business analytics on organizations', European Journal of Information Systems, Vol. 23, No. 4, pp.433–441.

Alsunaidi, S. J., Almuhaideb, A. M., Ibrahim, N. M., Shaikh, F. S., Alqudaihi, K. S., Alhaidari, F. A., Khan, I. U., Aslam, N., Alshahrani. (2021). M.S. Applications of Big Data Analytics to Control COVID-19 Pandemic. Sensors 2021, 21, 2282. https://doi.org/10.3390/s21072282

Steurer, R., Langer, M. E., and Konrad, A. (2005) 'Corporations, stakeholders and sustainable development I: a theoretical exploration of business–society relations', Journal of Business Ethics, Vol. 61, No. 3, pp.263–281.

Uria-Recio, P. (2018) 5 Principles for Big Data Ethics, Towards Data Science, 14 September [online] https://towardsdatascience.com/5-principles-for-big-data-ethics-b5df1d105cd3

Zwitter, A. (2014) 'Big data ethics', Big Data & Society, Vol. 1, No. 2, pp.1–6.