IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Economic Disparity And Ethical Concern Associated With Big Data

Agastya Chordia
Student
Jayshree Periwal International School

Abstract

The rapid growth of big data analytics has transformed various sectors such as healthcare, finance, and marketing by enhancing decision-making, operational efficiency, and service personalization. However, this rapid growth also raises significant ethical issues that need to be addressed to ensure responsible usage. This paper examines three primary ethical concerns: economic disparity, market manipulation, and privacy invasion. The paper explores how big data can exacerbate economic inequality by reinforcing existing biases and providing disproportionate advantages to those with access to extensive data resources. It examines the implications for marginalized communities and the potential for data-driven policies to widen the economic gap. The analysis highlights how big data facilitates manipulative market practices, such as personalized pricing and targeted advertising, which can exploit consumer behaviour and undermine fair market competition. It investigates the ethical ramifications of these practices and their impact on consumer trust and market integrity. The paper addresses the pervasive issue of privacy invasion, discussing how extensive data collection and analysis can lead to significant breaches of personal privacy. It considers the balance between data utility and individual rights, evaluating the effectiveness of current data protection measures. By applying ethical theories such as utilitarianism, deontology, and virtue ethics, the paper provides a nuanced understanding of these challenges and underscores the need for robust ethical frameworks. The paper also reviews current regulations like GDPR and CCPA, highlighting regulatory gaps and proposing best practices, and policy recommendations to mitigate these challenges. Ultimately, this paper aims to emphasize the ethical concerns in big data practices and suggest strategies for fostering a more equitable and transparent data-driven economy.

1. Introduction

Background

Big data represents the huge amount of information that arises from diverse sources such as social media, transactions, sensors and other digital interactions. Through the employment of advanced analytics, businesses can take advantage of this data to improve decision making processes, streamline operations, and customize products and services to fit individual preferences (Bormida, 2021). Many aspects of life are currently digitally dependent on various networks (Marres, 2017; (Weinhardt, 2021)). The use of more than required information and communication support is now a must for all projects and businesses (Aleksieienko et al., 2020). However,

there are significant ethical and economic concerns about aggregating big data and analyzing it leading to disparities in wealth distribution and market manipulations (Braunack-Mayer et al., 2023; Edmund G. Howe, 2020).

In 2016, Cambridge Analytica was found to have harvested data from up to 87 million Facebook profiles without consent, which was then used to influence political campaigns in the US and the UK (BBC News, 2018). A 2020 study published in the Harvard Business Review highlighted that personalized pricing based on consumer data can lead to market manipulation, with some consumers paying up to 25% more for the same products (Johnson & Shumsky, 2020). One primary ethical issue is the invasion of privacy. Big data enables the collection and analysis of substantial amounts of personal information, raising privacy concerns. Individuals frequently lack control over when and how their data is collected, potentially leading to invasive surveillance practices (Sayed, 2023). Another critical issue is the policy vacuum surrounding big data is the rapid technological advancements outpace the development of policies to govern data use, creating ethical dilemmas as new types of data and collection methods emerge (Sayed, 2023). This lack of regulation aggravates the potential for harmful data use and highlights the need for robust ethical frameworks.

Big data can also bring in economic disparities by enabling businesses to cater to wealthier demographics while neglecting lower-income groups. This targeted approach can widen the gap between different economic classes, as companies focus on profitable population segments (Mahmoud et al., 2022a). According to a study by the World Economic Forum, the global data economy was valued at over $3 trillion in 2020, with significant disparities in data access and utilization between developed and developing countries (World Economic Forum, 2020). A 2018 report from the McKinsey Global Institute estimated that data-driven businesses are 23 times more likely to acquire customers and 19 times more likely to be profitable (Manyika et al., 2016). The potential for market manipulation through big data is significant. Companies can use data to influence consumer behavior, manipulate stock prices, and gain unfair competitive advantages, often benefiting those with access to advanced data analytics tools and further establishing economic disparities (Mahmoud et al., 2022a).

Purpose of the Paper

The purpose of this paper is to study the ethical challenges associated with big data, focusing on economic disparity, market manipulation, and privacy invasion. By analyzing these issues through the lens of ethical theories and evaluating current regulatory frameworks, the paper aims to offer insights into mitigating the disadvantageous effects of big data. The objective is to contribute to the research on responsible data practices by proposing solutions that balance the benefits of big data with the need for ethical considerations.

Methodology

The paper adopts a comprehensive methodology to ensure ethical data practices. It begins with an extensive review of existing literature to identify prevalent themes and past studies on big data ethics. Following this, it categorizes key ethical risks such as economic disparity, market manipulation, and privacy invasion based on their impact on different stakeholders. The identified risks are then analysed using ethical theories like utilitarianism, deontology, and virtue ethics to provide a well-rounded ethical framework. Subsequently, the paper examines current regulatory frameworks, including the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA), to assess their effectiveness and limitations in addressing ethical concerns. Finally, it proposes practical solutions and strategies to improve ethical data practices, including recommendations for enhancing existing regulations, promoting data transparency, and fostering international cooperation. This thorough methodology ensures a balanced approach that acknowledges the benefits of big data while emphasizing the importance of ethical considerations.

Fig 1: Methodology

2. Literature Review

Historical Perspective

The concept of big data has significantly evolved over the past few decades. Initially, data analytics was confined to structured data from traditional databases. However, with the advent of the internet and digital technologies, its scope expanded to include unstructured data from various digital sources such as social media, transactions, and sensors. This expansion has facilitated the development of advanced analytics tools like Hadoop, Spark, and NoSQL databases, capable of managing the vast volumes of unstructured data generated daily (Sayed, 2023). The adoption of big data in sectors like finance, healthcare, and retail has transformed these industries, enabling unprecedented levels of personalization and efficiency. For instance, in healthcare, big data analytics has enhanced patient outcomes through predictive analytics, while in retail, it has improved customer experiences through personalized marketing (Sayed, 2023).

Early Development and Growth (2000s-2010s)

The term "big data" emerged in the early 2000s, referring to the exponential growth in data volume, velocity, and variety generated by various sources, including social media, sensors, and IoT devices (Bean & Davenport, 2019). This rapid increase in data led to the development of new technologies and tools to manage and analyse it effectively. By the 2010s, big data had become a key driver of business innovation, with companies investing heavily in data analytics and Artifical Intelligence (AI) initiatives to gain competitive advantages (Bean & Davenport, 2019).

Rise of Data-Driven Organizations (2010-2019)

As big data continued to grow, companies began to recognize its potential to transform their operations and decision-making processes. Many corporations attempted to treat data as an important asset, evolve their cultures in a more data-oriented direction, and adjust their strategies to emphasize data and analytics (Bean & Davenport, 2019). However, despite significant investments, many companies struggled to achieve meaningful results from their data initiatives. A 2019 survey by New Vantage Partners found that only 31% of firms identified themselves as being data-driven, down from 37.1% in 2017(Bean & Davenport, 2019). This decline was attributed to various factors, including the difficulty of cultural change, lack of organization alignment, and cultural resistance (Bean & Davenport, 2019)

Ethical Concerns and Regulatory Challenges (2010-present)

As big data became more prevalent, concerns about its ethical inferences began to emerge. One significant issue is the potential for big data to establish discrimination or inequality. For instance, personalized advertising and targeted marketing can worsen existing social inequalities, while data-driven decision-making can evoke biases (Hacker, n.d.). Additionally, the use of big data for dynamic pricing can disadvantage certain consumer groups, and the potential for insider trading or market manipulation through data analytics is a significant risk (Hacker, n.d.).

Current Research

In recent years big data is growing its significance in organizational sciences (Bean & Davenport, 2019) focusing on management, academics and human resource (Holwerda, 2021). Along with its growing mandate, recent studies have stressed on the ethical challenges associated with big data. While big data analytics can enhance customer experiences and operational efficiencies, it also raises significant ethical concerns. Privacy invasion is a major issue, as vast amounts of personal information are collected and analysed without individuals' explicit consent, often resulting in invasive surveillance practices (Sayed, 2023). Security concerns are also critical, given the rising incidence of data breaches that compromise sensitive information. Additionally, biases in algorithmic decision-making can perpetuate discrimination and inequality, particularly in areas such as insurance and lending (Sayed, 2023). Studies have also examined the impact of data monopolies on market competition and innovation, revealing how large corporations with extensive data resources can destroy competition and maintain dominant market positions (Mahmoud et al., 2022a).

Gaps in Existing Literature

Despite extensive research on the technical and operational aspects of big data, there are relatively fewer studies focusing on the ethical implications, particularly regarding market manipulation and economic disparity. Current literature often overlooks how large corporations support vast data resources to create monopolies, engage in dynamic pricing that may disadvantage certain consumer groups, and utilize big data analytics for insider trading or other forms of market manipulation. Further investigation is needed into the regulatory frameworks that can effectively address these ethical risks. Studies should also explore the development of strong ethical frameworks to guide the responsible use of big data, emphasizing transparency, accountability, and fairness (EDMUND G. HOWE, 2020).

The purpose of this paper is to investigate how large corporations with vast data resources can create monopolies, analyse the use of big data for dynamic pricing that may disadvantage certain consumer groups, and examine the potential for big data analytics to be used for insider trading or other forms of market manipulation. The objective is to highlight the ethical concerns and propose strategies to mitigate these risks. By addressing these gaps, this paper aims to contribute to the development of a more equitable and transparent data-driven economy.

3. Ethical Frameworks and Theories

Ethical Theories

Routing the ethical complexities of big data necessitates the application of various ethical theories. These theories provide frameworks for assessing the moral implications of data practices, ensuring that the benefits of big data are realized without compromising ethical standards.

Utilitarianism

Utilitarianism focuses on the principle of the greatest good for the greatest number. This theory evaluates the ethicality of actions based on their outcomes. In the context of big data, utilitarianism assesses the benefits of data practices against their potential harms. For instance, using big data to improve healthcare outcomes can be justified if the public health benefits outweigh the risks of privacy invasion (Mittelstadt & Floridi, 2016).

Deontology

Deontology emphasizes the importance of sticking to rules, duties, and ethical guidelines regardless of the outcomes. This theory stresses the importance of complying with data privacy laws and regulations, such as the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA). In big data practices, deontology requires organizations to respect individuals' rights to privacy and data protection, ensuring that data collection and analysis are conducted within legal and ethical boundaries (Mittelstadt & Floridi, 2016).

Virtue Ethics

Virtue ethics centres on the character and integrity of the individuals involved in data practices. It emphasizes the moral responsibilities of data scientists and corporate leaders to act with honesty, fairness, and respect for individuals' privacy (Zhu, 2019). Virtue ethics encourages ethical conduct in data handling, promoting a culture of transparency and accountability within organizations (Lipworth et al., 2017).

Application to Big Data

These ethical theories provide a foundation for evaluating big data practices. Utilitarianism might justify certain data uses if the overall benefits exceeds the harms, while deontology would insist on strict abidance with privacy regulations. Virtue ethics would encourage ethical conduct in data handling and decision-making processes.

Utilitarianism might justify certain data uses if the overall benefits to society is more than the harms. For example, predictive analytics in healthcare can improve patient outcomes and reduce costs, but must be balanced against potential privacy violations.

Deontology insists on strict sticking with privacy regulations, ensuring that data collection and usage adhere to established ethical guidelines (Bamel & Bamel, 2021). It prioritizes individuals' rights and the duty to protect personal data (“Industry 4.0 and Creative Economy (Globalization Challenges of the Time),” 2021).

Virtue Ethics encourages ethical behaviour among data professionals, promoting a culture of integrity and respect for privacy (AlNuaimi et al., 2021; Ardito et al., 2021). It supports for ethical training and the development of a moral compass in decision-making processes (Barbaglia et al., n.d.).

Table 1: Ethical Theories and Big Data Practices

Ethical Theory	Key Principles	Application in Big Data	Examples
Utilitarianism	Greatest good for the greatest number	Evaluate benefits versus harms of data practices	Predictive analytics in healthcare improving patient outcomes
Deontology	Adherence to rules and duties	Compliance with data privacy laws and ethical guidelines	Following GDPR and CCPA regulations
Virtue Ethics	Character and integrity of individuals	Ethical conduct in data handling and decision-making	Promoting transparency and accountability among data scientists

The historical perspective of big data demonstrates a trajectory of continuous innovation and adaptation. From manual record-keeping to advanced AI-driven analytics, the journey of big data is a testament to the relentless pursuit of knowledge and efficiency in data utilization (Deng et al., 2022; Wiltshire & Alvanides, 2022). This evolution has been accompanied by growing ethical concerns that must be addressed to ensure responsible and equitable data practices.

Early Beginnings and Evolution

Before the digital revolution, data collection was manual and limited. The incoming of computers in the mid-20th century allowed for more efficient data processing, leading to the development of databases and management systems like IBM's Information Management System (IMS)(Lipworth et al., 2017). The rise of the internet in the late 20th century exponentially expanded data generation, introducing new challenges and opportunities (Ienca et al., 2018).

Modern-Day Big Data

Today, big data is intertwined with AI and Machine learning (ML), enabling real-time data analysis and predictive modelling (Ioannidis, 2013). These advancements have revolutionized sectors like healthcare, where predictive analytics has improved patient outcomes, and retail, where personalized marketing strategies have enhanced customer experiences (Ienca et al., 2018).

Ethical Considerations

As big data continues to evolve, ethical considerations around privacy, data ownership, and consent become increasingly critical. The historical perspective highlights that each technological advancement brings new challenges that must be addressed.("The Use of Information in the World Economy: Globalization Trends," 2022) Moving forward, it is crucial to balance the benefits of big data with ethical practices to ensure responsible use and maintain public trust (Lipworth et al., 2017). Understanding the historical perspective of big data, along with the application of ethical theories, provides a comprehensive framework for evaluating and guiding responsible data practices("Data Analytics and Personalized Marketing Strategies in E-Commerce Platforms," 2023). This approach ensures that the benefits of big data are realized without compromising ethical standards, fostering a more equitable and transparent data-driven economy(Ienca et al., 2018).

4. Identification of Ethical Risks

Privacy Concerns

One of the primary ethical risks in big data is the potential misuse of personal information. The vast amount of data collected can include sensitive information, raising concerns about consent and the right to privacy (Kennedy, 2017). According to a 2019 Pew Research Center survey, 79% of Americans are concerned about how companies use their data, and 81% feel they have very little or no control over the data that companies collect (Auxier et al., 2019). The GDPR, implemented in 2018, has imposed fines totaling over €280 million by the end of 2020 on companies for data breaches and privacy violations(DLA Piper, 2020). For instance, individuals often lack control over when and how their data is collected, leading to invasive surveillance practices (Braunack-Mayer et al., 2023). For example, social media platforms often collect extensive personal data without explicit user consent (Xafis et al., 2019). This data can be used for targeted advertising, political campaigns, or even sold to third parties, all without the user's knowledge or approval. This invasion of privacy raises significant ethical questions about consent and the right to personal data protection (Mahmoud et al., 2022b).

Data Security

Data breaches and cyber-attacks pose significant risks. Unauthorized access to large datasets can result in identity theft, financial loss, and other severe consequences for individuals and organizations (Braunack-Mayer et al., 2023). As the volume of collected and stored data increases, so does the potential for significant security breaches, as evidenced by numerous high-profile incidents across various industries (Mahmoud et al., 2022). Data breaches in the retail and financial sectors have highlighted the severe consequences of inefficient data security measures (Organisation for Economic Co-operation and Development. n.d.). For instance, the breach of a major retail company's database exposed millions of customers' credit card details, leading to widespread identity theft and financial losses (“Adoption of Financial Technology and Performance of Deposit Money Banks in Nigeria,” 2023). Such incidents highlights the critical need for robust security protocols to protect sensitive information from unauthorized access (Mahmoud et al., 2022b).

Bias and Discrimination

Algorithms trained on biased data can extend and expand discrimination. This can lead to unfair treatment of certain consumer groups, particularly in areas like lending, hiring, and law enforcement (Kennedy, 2017). For example, biased data can cause discriminatory practices in predictive policing and hiring processes, disproportionately targeting or overlooking minority groups (Bormida, 2021).

Transparency and Accountability

There is a critical need for transparency in how data is collected, processed, and used. Ensuring accountability in big data practices is challenging but essential to prevent ethical breaches and build public trust (Braunack-Mayer et al., 2023). The lack of transparency can lead to consumer mistrust and exacerbate the ethical dilemmas associated with big data usage (Sayed, 2023).

The ethical use of Big Data involves ensuring that its utilization does not cause harm to individuals or groups. This includes avoiding discrimination, ensuring fairness in data analysis and interpretation, and maintaining transparency about how data is used and the purposes it serves. Researchers and organizations must adopt ethical frameworks that prioritize the public good and minimize potential harms (Bean & Davenport, 2019). Several ethical theories help guide the ethical use of Big Data, including Kantianism, Act/Rule Utilitarianism, Social

Contract Theory, and Virtue Theory. These theories provide different perspectives on how to balance the benefits of Big Data with the need to protect individual rights and societal values (Mahmoud et al., 2022a). The risk of disclosure, where sensitive information about individuals is inadvertently revealed, is a significant concern in Big Data. Measures to mitigate these risks include data anonymization, aggregation, and the use of secure data access infrastructures. Organizations must also be aware of the legal responsibilities associated with data protection and take proactive steps to prevent data misuse (Bean & Davenport, 2019).

5. Case Studies

Google's Dominance in Search Engine Market:

Google's dominance in the search engine market is a prime example of how big data can facilitate a monopoly. Google's ability to collect and analyse vast amounts of user data allows it to refine its search algorithms, making it difficult for competitors to gain traction (Mallesons King & Mallesons Wood, 2017; Radinsky, 2015).

Market Share and Influence

As of 2021, Google controlled about 92% of the global search engine market (Mallesons King & Mallesons Wood, 2017; Radinsky, 2015). This dominance highlights the effectiveness of its data-driven strategies. Google's market control isn't just due to its initial innovation but is continually reinforced through extensive data collection and analysis.

Data Collection and Analysis

Google gathers data from various sources, including search queries, user interactions, location data, and browsing history. This data is used to improve search results, personalize user experiences, and deliver targeted advertising. The sheer volume of data at Google's disposal allows for a high degree of precision in understanding user intent and preferences. Google's search algorithms are constantly updated using machine learning techniques that rely on large datasets. These updates enable the search engine to deliver relevant results, making it more attractive to users and further solidifying its market position. By analysing user data, Google can personalize search results to match individual user preferences. This level of customization enhances user satisfaction and loyalty, making it harder for competitors to lure users away. Google's data allows for highly targeted advertising, which is more effective and lucrative. Advertisers are willing to pay a premium for access to Google's user base, creating a significant revenue stream that further supports Google's market dominance.

Barriers to Entry for Competitors

The advantages conferred by big data create substantial barriers to entry for potential competitors. Competing with Google requires access to comparable volumes of data, which is difficult for new entrants to acquire. Google's head start in data collection means that its algorithms are trained on more comprehensive datasets, providing a significant competitive edge. As more users choose Google, the search engine becomes better at delivering relevant results, attracting even more users. This network effect makes it challenging for competitors to gain traction. Brand Loyalty and Trust: Over years of dominance, Google has built a strong brand and high levels of trust among users. New entrants must not only match Google's technical capabilities but also overcome user loyalty and trust barriers.

Google's dominance in the search engine market exemplifies how big data can facilitate and maintain a monopoly. Through extensive data collection and sophisticated analysis, Google has created a self-reinforcing cycle that enhances its algorithms, personalizes user experiences, and delivers effective advertising. These advantages create significant barriers to entry for competitors, contributing to Google's enduring market dominance. However, this

dominance also raises important legal and ethical questions about competition and privacy that continue to be the subject of public and regulatory scrutiny.

Data Monopolies in the Platform Economy:
Companies like Uber and Airbnb have created data monopolies by collecting and analysing vast amounts of user data. This data is used to optimize services, making it difficult for new entrants to compete effectively (Mallesons King & Mallesons Wood, 2017; Zhang, 2024).

Uber

Uber's big presence in the ride-hailing industry is largely attributed to its strategic use of big data. As of 2023, Uber held about 68% of the U.S. ride-hailing market, significantly outpacing competitors like Lyft, which has around 30%(PeppyOcean) (The Strategy Story). In the first quarter of 2024 alone, Uber's platform processed 2.57 billion trips, averaging roughly 28 million trips per day (PeppyOcean). This massive amount of user data enables Uber to continually improve its services, optimizing routes, pricing, and user experiences(Cascade Strategy).

Uber collects and analyses data from various aspects of rides, including pickup and drop-off locations, travel times, and user feedback. This data enhances Uber's algorithms, making services more efficient. Surge pricing, which adjusts prices in real-time based on demand and supply, is another application of this data, helping Uber maximize its revenue(Cascade Strategy). Additionally, understanding market trends and customer preferences through data analysis allows Uber to innovate and expand into other services such as Uber Eats and freight delivery, further solidifying its market dominance(The Strategy Story).

Airbnb

Airbnb has similarly secured a strong position in the accommodation market through its data-centric approach. With millions of listings worldwide, Airbnb uses data analytics to match guests with hosts efficiently, optimize pricing, and enhance user experiences. In 2023, Airbnb reported having over 6 million active listings and approximately 150 million users globally(iPropertyManagement.com) (Business of Apps). As of 2023, Airbnb generated $9.9 billion in revenue, marking a 19.2% year-on-year increase. The platform boasted 448 million bookings in 2023, reflecting a 13.9% increase from the previous year, and maintained over 7.7 million active listings managed by 4 million hosts (iPropertyManagement.com) (Business of Apps). This extensive data enables Airbnb to provide personalized recommendations and dynamic pricing, ensuring high occupancy rates and competitive prices for hosts.

Airbnb gathers data on user preferences, booking patterns, and reviews to refine its algorithms and offer tailored search results. This level of personalization boosts user satisfaction and loyalty, making it tough for new competitors to attract users away from the platform. Furthermore, Airbnb's ability to scale operations without owning physical properties—relying instead on user-generated listings—keeps its business model flexible and cost-effective(PeppyOcean) (Cascade Strategy).

The significant data advantages that Uber and Airbnb possess create substantial barriers for new entrants. Competing with these giants requires not only substantial capital investment but also access to comparable volumes of data to develop equally sophisticated algorithms. Additionally, the strong user base and brand loyalty that Uber and Airbnb have built over the years make it challenging for new companies to lure users away from these platforms(The Strategy Story). For example, Uber’s data-driven strategies, such as dynamic pricing and route optimization, leverage vast amounts of real-time data, giving them a competitive edge. Similarly, Airbnb's ability to personalize user experiences and predict market trends heavily relies on their extensive data collection and analysis capabilities (Lipworth et al., 2017).

Table 2: Key Barriers to Entry for Competitors

Barrier	Description	Example
Capital Investment	Significant financial resources needed for technology and infrastructure.	High initial costs for data centers, servers.
Access to Data	Necessity for large volumes of user and market data to develop effective algorithms.	Competing platforms need equivalent data volumes.
User Base and Brand Loyalty	Established user trust and brand recognition are hard to displace.	Uber's large customer base and loyalty programs.
Data-Driven Innovation	Continuous improvement and innovation based on data analytics.	Airbnb's personalized recommendations and market insights.

Uber and Airbnb exemplify how big data can be leveraged to create and sustain market dominance. By collecting and analysing extensive user data, these companies continually refine their services, personalize user experiences, and optimize pricing strategies. This data-driven approach creates significant barriers to entry for competitors, underscoring the critical role of big data in maintaining a monopoly in the digital age (Weinhardt, 2021) .

Companies like Amazon use big data analytics to dynamically price products based on consumer behaviour. This can lead to price discrimination, where certain consumer groups are charged higher prices due to their data profiles (Kennedy, 2017; Zhang, 2024). The potential for big data analytics to be used for insider trading or other forms of market manipulation is a significant concern. For instance, a company with access to real-time market data could use this information to make profit-making trades before the data is publicly available (Kennedy, 2017; Mcintosh, n.d.).

6. Regulatory and Legal Considerations

Existing regulations like the General Data Protection Regulation (GDPR) in the European Union and the California Consumer Privacy Act (CCPA) in the United States provide important frameworks for protecting consumer data privacy and ensuring corporate accountability (Mallesons King & Mallesons Wood, 2017; Zhang, 2024). These laws mandate transparency in data collection and use, require explicit consent from individuals, and establish data protection measures to safeguard sensitive information (Mallesons King & Mallesons Wood, 2017; Zhang, 2024). The GDPR, which came into effect in 2018, sets strict standards for how companies handle personal data(Wiltshire & Alvanides, 2022). It requires companies to obtain clear consent from individuals before collecting their data, provide detailed information on how the data will be used, and allow users to access, correct, or delete their data (Mallesons King & Mallesons Wood, 2017). The GDPR also imposes significant fines on companies that violate these rules, up to 4% of their global annual revenue. The European Union's GDPR has set a global benchmark for data protection, influencing privacy laws in countries such as Brazil (LGPD) and Japan (APPI) (International Association of Privacy Professionals, 2020).

In contrast, China's Personal Information Protection Law (PIPL), enacted in 2021, imposes stringent data protection requirements but also grants the government extensive access to data (The National Law Review, 2021). Similarly, the CCPA, enacted in 2020 (State of California Department of Justice, 2020), gives California residents more control over the personal information that businesses collect about them (Mallesons King & Mallesons Wood, 2017). The law allows consumers to request that a business disclose the categories and specific pieces of personal information it collects, and to opt out of the sale of their personal information (Zhang, 2024). Businesses that fail to comply with the CCPA can face civil penalties of up to $7,500 per violation (Zhang,

2024).While these laws represent important steps in protecting consumer privacy, they have limitations. The GDPR and CCPA primarily focus on individual rights and do not directly address the competition issues posed by big data monopolies (Mallesons King & Mallesons Wood, 2017; Zhang, 2024). The Health Insurance Portability and Accountability Act (HIPAA) in the US sets strict guidelines for the protection of medical data, penalizing violations with fines ranging from $100 to $50,000 per violation (U.S. Department of Health and Human Services, n.d.). To fully mitigate the risks of data-driven monopolies, additional antitrust regulations and enforcement mechanisms are needed to promote competition and innovation in the digital economy (Mcintosh, n.d.).

7. Mitigation Strategies

To mitigate the risks of big data monopolies, a multi-pronged approach is necessary. Firstly, antitrust regulations need to be strengthened to clearly define data monopolies, measure market power, and address abusive behaviors in the digital economy. This includes incorporating data privacy and security considerations into antitrust laws, as well as ensuring that regulations do not hinder innovation.

Secondly, promoting data sharing and open standards can break down data silos and encourage more participants in the data ecosystem, fostering competition and innovation. Open standards ensure the interoperability and sustainability of data sharing, enabling more organizations to access and utilize data resources. For example, in the healthcare industry, sharing case data and research results can improve medical services and promote innovation. T

hirdly, enhanced international cooperation and global governance are crucial to address cross-border data monopolies, establish global rules and standards for data sharing and privacy protection, and strengthen enforcement mechanisms.

Fourthly, close coordination between regulators and the technology industry is needed to understand market trends and adapt antitrust policies accordingly.

Finally, robust consumer privacy and data security protections must be implemented, empowering individuals and ensuring transparency in data collection and use. Differential privacy is a technique used by companies like Apple and Google to add 'noise' to data sets, ensuring individual data cannot be re-identified while still allowing for meaningful analysis (Dwork & Roth, 2020). Blockchain technology is being explored for its potential to enhance data security and privacy by providing decentralized and tamper-proof records of transactions (Dorri, Kanhere, & Jurdak, 2019). Strict regulations on data collection, storage, and processing, as well as severe penalties for data breaches, can strengthen consumer data protection. By implementing these strategies, policymakers, regulators, and industry stakeholders can work together to address the challenges posed by big data monopolies, ensuring fair competition, protecting consumer interests, and promoting innovation in the digital economy.

8. References

1. Adoption of Financial Technology and performance of Deposit Money Banks in Nigeria. (2023). *Futurity Economics&Law*, 95–114. https://doi.org/10.57125/FEL.2023.06.25.07

2. Aleksieienko, I., Leliuk, S., & Poltinina, O. (2020). Information and communication support of project management processes and enterprise value. *Development Management*, *18*(3), 1–13. https://doi.org/10.21511/dm.18(3).2020.01

3. AlNuaimi, B. K., Khan, M., & Ajmal, M. M. (2021). The role of big data analytics capabilities in greening e-procurement: A higher order PLS-SEM analysis. *Technological Forecasting and Social Change*, *169*, 120808. https://doi.org/10.1016/j.techfore.2021.120808

4. Ardito, L., Raby, S., Albino, V., & Bertoldi, B. (2021). The duality of digital and environmental orientations in the context of SMEs: Implications for innovation performance. *Journal of Business Research*, *123*, 44–56. https://doi.org/10.1016/j.jbusres.2020.09.022

5. Auxier, B., Rainie, L., Anderson, M., Perrin, A., Kumar, M., & Turner, E. (2019, November 15). *Americans and privacy: Concerned, confused and feeling lack of control over their personal information*. Pew Research Center. Retrieved from https://www.pewresearch.org/internet/2019/11/15/americans-and-privacy-concerned-confused-and-feeling-lack-of-control-over-their-personal-information/

6. Bamel, N., & Bamel, U. (2021). Big data analytics based enablers of supply chain capabilities and firm competitiveness: a fuzzy-TISM approach. *Journal of Enterprise Information Management*, *34*(1), 559–577. https://doi.org/10.1108/JEIM-02-2020-0080

7. Barbaglia, L., Frattarolo, L., Onorante, L., Maria Pericoli, F., Ratto, M., & Tiozzo Pezzoli, L. (n.d.). *Testing Big Data in a Big Crisis: Nowcasting under COVID-19*. https://ec.europa.eu/jrc

8. BBC News. (2018, October 25). *Facebook fined £500,000 for Cambridge Analytica scandal*. Retrieved from https://www.bbc.com/news/technology-44801023

9. Bean, R., & Davenport, T. H. (2019). *Analytics And Data Science Companies Are Failing in Their Efforts to Become Data-Driven Summary*.

10. Bormida, M. Da. (2021). *The Big Data World: Benefits, Threats and Ethical Challenges* (pp. 71–91). https://doi.org/10.1108/s2398-601820210000008007

11. Braunack-Mayer, A., Carolan, L., Street, J., Ha, T., Fabrianesi, B., & Carter, S. (2023). Ethical issues in big data: A qualitative study comparing responses in the health and higher education sectors. *PLoS ONE*, *18*(4 April). https://doi.org/10.1371/journal.pone.0282285

12. Business of Apps. (2024). Airbnb Revenue and Usage Statistics. Retrieved from https://www.businessofapps.com/data/airbnb-statistics/

13. Cascade Strategy. (2023). Airbnb and Uber: Data-Driven Success. Retrieved from https://www.cascade.app/strategy-factory/case-study/airbnb-uber-data-driven-success

14. *Could"Big Data"Facilitate Monopoly and How Shall We Step In?* (2017). https://www.lexology.com/library/detail.aspx?g=5ac3bade-9b74-47b1-af68-99fb7117bcc0

15. Data Analytics and Personalized Marketing Strategies in E-commerce Platforms. (2023).

16. Deng, Y., Zheng, H., & Yan, J. (2022). Applications of Big Data in Economic Information Analysis and Decision-Making under the Background of Wireless Communication Networks. *Wireless Communications and Mobile Computing*, *2022*, 1–7. https://doi.org/10.1155/2022/7084969

17. Dorri, A., Kanhere, S. S., & Jurdak, R. (2019). Blockchain technology for enhancing privacy and security in IoT. *IEEE Internet of Things Journal*, 6(2), 2884-2895. https://doi.org/10.1109/JIOT.2018.2872478

18. Dwork, C., & Roth, A. (2020). Differential privacy: The pursuit of privacy in a world where data is everything. *Harvard Data Science Review*, 2(2). Retrieved from https://hdsr.mitpress.mit.edu/pub/0ejm9pi0

19. EDMUND G. HOWE, I. M. J. and F. E. B. (2020). *Ethical Challenges Posed by Big DataEthical Challenges Posed by Big Data*.

20. *Futurity Economics&Law*, 112–137. https://doi.org/10.57125/fel.2023.09.25.07

21. Hacker, P. (n.d.). Reining in the Big Promise of Big Data: Transparency, Inequality, Reining in the Big Promise of Big Data: Transparency, Inequality, and New Regulatory Frontiers and New Regulatory Frontiers. In *Northwestern Journal of Technology and Intellectual Property* (Vol. 15). https://scholarlycommons.law.northwestern.edu/njtip

22. Holwerda, J. A. (2021). Big data? Big deal: Searching for big data's performance effects in HR. *Business Horizons*, *64*(4), 391–399. https://doi.org/10.1016/j.bushor.2021.02.006

23. Hsieh, H. C. (2018). Utilitarianism and the ethics of big data. *Journal of Information Ethics*, 27(2), 59-75. Retrieved from https://www.researchgate.net/publication/328720890_Utilitarianism_and_the_Ethics_of_Big_Data

24. Ienca, M., Ferretti, A., Hurst, S., Puhan, M., Lovis, C., & Vayena, E. (2018). Considerations for ethics review of big data health research: A scoping review. *PLoS ONE*, *13*(10). https://doi.org/10.1371/journal.pone.0204937

25. International Association of Privacy Professionals (IAPP). (2020). The GDPR's influence ripples out across the globe. Retrieved from https://iapp.org/news/a/the-gdprs-influence-ripples-out-across-the-globe/

26. Industry 4.0 and creative economy (globalization challenges of the time). (2021). *Futurity Economics&Law*, 4–11. https://doi.org/10.57125/FEL.2021.12.25.01

27. Ioannidis, J. P. A. (2013). Informed Consent, Big Data, and the Oxymoron of Research That Is Not Research. *The American Journal of Bioethics*, *13*(4), 40–42. https://doi.org/10.1080/15265161.2013.768864

28. iPropertyManagement.com. (n.d.). Airbnb Statistics. Retrieved from https://ipropertymanagement.com/research/airbnb-statistics

29. Johnson, E. J., & Shumsky, T. (2020, March 5). *How algorithms can drive us to the tipping point of market manipulation*. Harvard Business Review. Retrieved from https://hbr.org/2020/03/how-algorithms-can-drive-us-to-the-tipping-point-of-market-manipulation

30. Johnson, D. G. (2019). Deontological approaches to big data. *Ethics and Information Technology*, 21(3), 177-188. Retrieved from https://link.springer.com/article/10.1007/s10676-019-09523-5

31. Kennedy, J. (2017). *The Myth of Data Monopoly: Why Antitrust Concerns About Data Are Overblown*.

32. Lipworth, W., Mason, P. H., Kerridge, I., & Ioannidis, J. P. A. (2017). Ethics and Epistemology in Big Data Research. *Journal of Bioethical Inquiry*, *14*(4), 489–500. https://doi.org/10.1007/s11673-017-9771-3

33. Mahmoud, M., Alali, D., & Aldakhl, S. (2022a). *The Ethical Risks and Challenges in Big Data*. https://www.researchgate.net/publication/360756376

34. Mallesons King, & Mallesons Wood. (2017). *Could"Big Data"Facilitate Monopoly and How Shall We Step In?* https://www.lexology.com/library/detail.aspx?g=5ac3bade-9b74-47b1-af68-99fb7117bcc0

35. Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., & Hung Byers, A. (2016). *The age of analytics: Competing in a data-driven world*. McKinsey Global Institute. Retrieved from https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/the-age-of-analytics-competing-in-a-data-driven-world

36. Marres, N. (2017). *Digital sociology: The reinvention of social research*. John Wiley & Sons

37. Mcintosh, D. (n.d.). We Need to Talk About Data: How Digital Monopolies Arise and Why They Have Power and Influence. In *Journal of Technology Law & Policy* (Vol. 23, Issue 2).

38. Mittelstadt, B. D., & Floridi, L. (2016). The Ethics of Big Data: Current and Foreseeable Issues in Biomedical Contexts. In *Science and Engineering Ethics* (Vol. 22, Issue 2, pp. 303–341). Springer Netherlands. https://doi.org/10.1007/s11948-015-9652-2

39. Organisation for Economic Co-operation and Development. (n.d.). *OECD business and finance outlook 2020 : sustainable and resilient finance.*

40. PeppyOcean. (2023). Uber Statistics. Retrieved from https://www.peppyocean.com/uber-statistics/

41. Radinsky, K. (2015). *Competitive Strategy Data Monopolists Like Google Are Threatening the Economy*.

42. Sayed, R. (2023). Ethical considerations in the use of big data for business analytics: a cross-industry perspective. *Journal of Innovations and Sustainability*, *7*(4), 08. https://doi.org/10.51599/is.2023.07.04.08

43. State of California Department of Justice. (2020). *California Consumer Privacy Act (CCPA)*. Retrieved from https://oag.ca.gov/privacy/ccpa

44. The National Law Review. (2021, August 23). China's Personal Information Protection Law: What to know. Retrieved from https://www.natlawreview.com/article/china-s-personal-information-protection-law-what-to-know

45. The Strategy Story. (2023). Uber: The Ride-Hailing Giant. Retrieved from https://thestrategystory.com/2023/03/01/uber-the-ride-hailing-giant/

46. The use of information in the world economy: globalization trends. (2022). *Futurity Economics&Law*, 4–11. https://doi.org/10.57125/fel.2022.12.25.01

47. U.S. Department of Health and Human Services. (n.d.). *Health Information Privacy*. Retrieved from https://www.hhs.gov/hipaa/index.html

48. Weinhardt, M. (2021). Big Data: Some Ethical Concerns for the Social Sciences. *Social Sciences*, *10*(2), 36. https://doi.org/10.3390/socsci10020036

49. Wiltshire, D., & Alvanides, S. (2022). Ensuring the ethical use of big data: lessons from secure data access. *Heliyon*, *8*(2). https://doi.org/10.1016/j.heliyon.2022.e08981

50. World Economic Forum. (2020). *Data and digital economy*. Retrieved from https://www.weforum.org/reports/data-and-digital-economy.

51. Xafis, V., Schaefer, G. O., Labude, M. K., Brassington, I., Ballantyne, A., Lim, H. Y., Lipworth, W., Lysaght, T., Stewart, C., Sun, S., Laurie, G. T., & Tai, E. S. (2019). An Ethics Framework for Big Data in Health and Research. *Asian Bioethics Review*, *11*(3), 227–254. https://doi.org/10.1007/s41649-019-00099-x

52. Zhang, H. (2024). *Big Data and Anti Monopoly Law Research on Data Monopoly and Market Competition Issues* (pp. 419–425). https://doi.org/10.2991/978-94-6463-368-9_49

53. Zhu, C. (2019). Big Data as a Governance Mechanism. *The Review of Financial Studies*, *32*(5), 2021–2061. https://doi.org/10.1093/rfs/hhy081