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Harnessing Big Data and AI in Cloud-Powered Financial Decision-Making for Automotive and Healthcare Industries: A Comparative Analysis of Risk Management and Profit Optimization

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ABSTRACT

This study compares risk management and profit optimisation in cloud-powered financial decision-making for the automotive and healthcare industries using big data and artificial intelligence. The analysis of healthcare data is expected to inform future public healthcare policy development. In order to make fact-based and accurate healthcare policy decisions, this research analyses whether big data analytics could be systematically integrated into the health policy cycle. This research investigates BDA's potential for accurate and fast healthcare policymaking. PRISMA was used to construct a conceptual framework. BDA in health care policy is introduced, its benefits discussed, a framework presented, examples from the literature introduced, obstacles identified, and suggestions provided. BDA may turn traditional policy-making into data-driven, correct health policy decisions, according to this research. According to this research, BDA may be used in evaluation of health policies, policy identification, development, implementation, and agenda setting. Today, public health policy choices are based on descriptive, predictive, and prescriptive analytics from electronic health reports, public records of health, clinician and patient information, & government as well as social net sites. To use all the information, one must overcome computational, algorithmic, technical, legal, normative, governance, and policy constraints in today's increasingly diverse data world. To maximise its value, big data must be shared. It allows public health organisations and policymakers to assess population-level policy impacts and risks.

INTRODUCTION

As its potential and benefits become more clear, big data is finding more and more applications in healthcare throughout the world. A data set is considered big data if it is too large or complex to be processed by traditional data-processing applications. [1-3] Statistics may benefit from additional fields or more complicated data, but there's a risk that more powerful statistics could lead to more mistakes. By analysing massive datasets, big data analytics has the potential to improve medical diagnosis, direct preventive measures, and mitigate the side effects of treatment. Big data is making waves in the healthcare industry across many different settings and domains. An all-encompassing word for big data and analytics, "BDA" has several meanings. The healthcare industry's big data often focusses on four characteristics: volume, diversity, validity, and velocity. There are now more than 10 factors to consider, according to new research; these factors include things like validity, viability, volatility, value, viscosity, and others that vary by situation. [4-

6] Again, "big data" isn't just about volume; it also highlights the analytical challenges posed by a certain combination of data velocity and diversity. Keeping in line with this shift, this study zeroes in on the essentials that matter most for health policymakers. There are two schools of thought when it comes to big data analytics (BDA) and health policy: those who focus on BDA's application to decision-making in health policy and others who argue that public health policies should promote BDA's usage. [7-10] Although they are diametrically opposed, we will be concentrating on the initial one since it supports our research objectives. In particular, they aim to lower the cost of clinical trials and to make choices built on evidence by evaluating public healthcare policy through the big data use. Conversely, highlight the importance of governmental regulations that regulate healthcare-related Big Data Analytics. Healthcare professionals call large, complex electronic data sets “big data” because they cannot be handled by ordinary technology or software. As healthcare systems utilise increasingly modern technologies, enormous data is generated. Recent technological improvements have expanded the variety, velocity, and volume of health data, which has always been enormous. [11-13] Big data technologies have helped the healthcare business improve data quality and value, making them even more intriguing.

Big data analytics may help healthcare providers improve patient care, save lives, and decrease costs. Big data and analytics enable healthcare managers to improve outcomes, analyse population health, and speed up clinical decision-making. Holistic Health Records are a novel methodology for reporting healthcare status using big data administration approaches. Healthcare decision-making big data is the subject of rising literature. Healthcare stakeholders' views on big data are not extensively examined in the study. Many groups stand to gain greatly from the new era of precision, efficiency, and inclusivity brought about by public health policies crafted using big data. [14] To better respond to and prepare for public health emergencies, public health organisations may use massive datasets to identify trends in epidemiology, forecast when diseases will spread, and distribute resources more effectively. As an example, they suggested the Policy-CLOUD platform, which lets practitioners register datasets and specify a sequence of transformation & data extraction utilising registered ingest functions; this enables flexible exploitation and administration of relevant policy dataflows. Their proposed HEALTHIER system makes use of a new kind of EHRs and the networks that support them, allowing for the efficient administration of healthcare data and the potential to use that data to develop health policy. [15] Transparency, timeliness, and personalisation in health treatments are hallmarks of data-driven strategies. Public health instructions are more likely to be followed and trust is increased as a result. Health care providers may also use actionable data to change their approach and better meet the needs of their communities as they evolve. From a broader perspective, public health policies that are driven by big data make society stronger, more equitable, and healthier by bringing people from all walks of life together to seek overall well-being.

According to the WHO, health policy is "decisions, programs, along with activities undertaken to achieve specified healthcare goals within a society." Many countries, particularly low- and middle-income ones, do not use evidence-based decision-making, despite the need for it. Internal data, reports, and staff views are used more than research findings in high-income economies. Large-scale data is needed for evidence-based policy to make accurate predictions. Sometimes there's insufficient data. Health-promoting and preventative strategies are being developed by public health policymakers to encourage proactive healthcare. The impact of social changes, such as population age structure, technology improvements, and chronic illness load, is significant. Health expenditure grows faster than non-health sectors, yet this may be unsustainable. Effective health spending may increase economic growth since good health is desirable and necessary for economic success. In contrast, public health policy-making involves any decision, arrangement, or action that promotes healthcare goals in society. For health to remain a value, it defines future visions, which help set goals, references, and priorities.

Large-scale public sector big data use requires data science capabilities. This new field includes computer modelling, statistics, data management, exploration, algorithm ML, data product formatting, and more. Computer programming is included. Unlike the private sector, the public sector needs a strategy tailored to public goals, objectives, and policies. Even with labour needs, big data has great potential for public management. Not enough public research exists on applications and big data theory in the health management. Significant outcomes are seen. These examples enable big data analysis, generalisations, and public health sector BDA-driven policymaking research. Numerous research in clinical & public health sectors now use “big data” along with “data analytics” concepts. For pandemics and sustainability, governments employ BDA more. There are research gaps and no clear definition of how big data may inform public health policy. Large data analysis methods may help governments understand citizen behaviour and enhance public services. According to recent research, big data may enhance public health performance in many ways. Increasing government effectiveness, transparency, and efficiency, making evidence-based policy choices, and improving services based on local demands are examples. Big data as immense promise for healthcare, economy, the environment, and transportation, according to researchers. Despite the promotion of big data solutions to address social concerns, questions about their potential and benefits remain unanswered. Evidence-based research and prediction models were confirmed in analytics of big data for health care policy development. Evidence-based methods identified high-risk, high-cost patients. They may be detected early, reducing needless hospitalisations and treatments and improving health costs. Their prediction model for detecting such persons was confirmed using enormous volumes of electronic health information, which has major implications for healthcare policy. AI in health care information may help determine patient needs, predict sickness, and guide therapy. The predicted models were confirmed using EHRs.

They suggested employing evidence-based strategies to decode large, complicated datasets and provided medical prediction model examples. BDA, predictive models, and other technologies may help create successful public health strategies. Critical health factors were discovered via big healthcare database analysis, enabling efficient program formulation to improve results. Evidence-based approaches encourage cost-effective, risk-free, outcome-oriented public health policy. Public health policymakers are only starting to exploit big data. The majority of big data projects are still in planning or development. Effective data use aids public health policymaking. To support evidence-based policymaking in numerous areas, big data is being studied, especially in the policy cycle. Public health policy based on evidence fits the policy process model. Big data's potential utility in public health policies has not been extensively investigated, and few scholars have examined its potential in multiple sectors. In this study, big data is used in several public health policy stages to cover the research gap. Understanding public policy data sources, big data usage in policy analysis, effective public policy indicators, and big data difficulties will be helped by the results. This information may help administrators, stakeholders, lawmakers, and others create good public policy.

2. Methods and Materials

The data was compiled using a systematic review approach that relied on reliable sources. This suggests that the first step of a systematic literature review is to establish a set of keywords that will be used to search and get data from various sources. Additionally, a literature review sorts and assesses prior studies according to major issues and suggestions for follow-up studies. The present investigation followed the steps outlined in the PRISMA statement, which included developing a study protocol. When it comes to evidence-based systematic reviews and meta-analyses, the PRISMA technique is famous. Eligibility, inclusion, identification, and screening are the 4 main steps that make up the 27-item checklist. The main aspects of the PRISMA approach include evaluating strengths and weaknesses, visualising the quality of document identification, and duplicating its structures

and formatting. All of the necessary phases of a research process are shown in Fig. 1. Research methodology, databases used, publishing standards, timeline, search parameters, search fields, and inclusion/exclusion criteria are all detailed below.

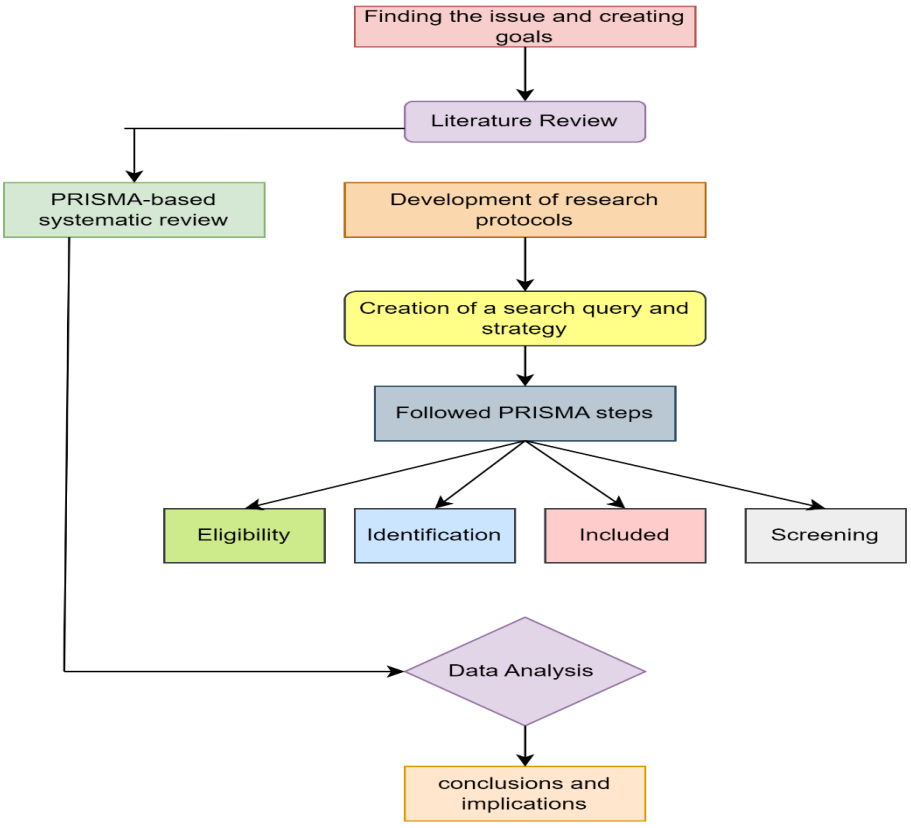

Figure. 1 Flow Chart.

2.1 Design of research

A systematic review technique was used in this study, which entails creating a research strategy and locating the most relevant literature. When it comes to finding, evaluating, and synthesising the body of current information, the systematic literature review is thorough, specific, rigorous, and repeatable. For performing systematic literature reviews, the PRISMA framework is often used and serves as the foundation for the data gathering recommendations. The PRISMA approach consists of 4 main stages: inclusion, eligibility, screening, & identification. These four phases were completed using PRISMA checklists.

2.2 Analysis of data

The qualitative analysis was conducted using MAXQDA software to increase the coding process's rigour. Annotating texts using codes is a breeze with this program. Users may simply code texts and then utilise those codes to build synthesis. The analysis becomes more transparent and reliable when the tool is used. The five-eigenvector core full-text in every cluster were reviewed by a single researcher, who then used the framework to annotate them. Confirming the results of the annotator was the goal of the second researcher. To make sure that each component of the coding schemas was understood, the researchers spoke with each other. To make sure that every schema item—if any—was identified, the second researcher went over the papers and coding created by the first researcher. Our approach was intended to prevent gathering the same data multiple times for every publication, even though publications usually repeat it. For example, using an inter-coding agreement was not feasible due to the approach that was used. The synthesis document including the coded text sections and the cross tabularizations for the coded documents were automatically generated using the coding MAXQDA analysis program. These were applied throughout the process of interpretation. In order to analyse the data, MAXQDA offered the synthesis for the coded sections. Both researchers were acquainted with the MAXQDA descriptions on their own. The writers reviewed their findings after individually evaluating the synthesis, and then they synthesised the main topics for more study after finishing their coding.

2.3 An illustration of the interconnected components

The VOS viewer program was used to create the word clouds. Two publications are said to be bibliographically coupled if they share at least one citation. When two things have a high degree of reference overlap, it's more likely that they belong to the same cluster. A co-occurrence matrix showing all grouped elements in two dimensions is generated by the VOS viewer using similarity evaluations. Components in the matrix have stronger connections when their interactions are more tightly packed. An interpretive approach was used to assemble the clusters. To investigate the most talked-about issues in scientific research right now, we used these interpretations in conjunction with the analysis of keywords that was based on author keywords. A word cloud may be used to quickly summarise concepts like policy making, policy analysis, public health policy, big data, and the relationships between them. The goal of the search strategy was to learn more about the interplay between health policy analysis, public health policy, big data analytics, and the process of formulating health policy. They utilise the terms in our category searches—including article keywords, title, and abstract—to get a head start on understanding the focus area because of the constraints. The most common keywords used to look for research on public policy and big data are shown in Fig. 2. In data from extracted articles, a term occurs at least five times.

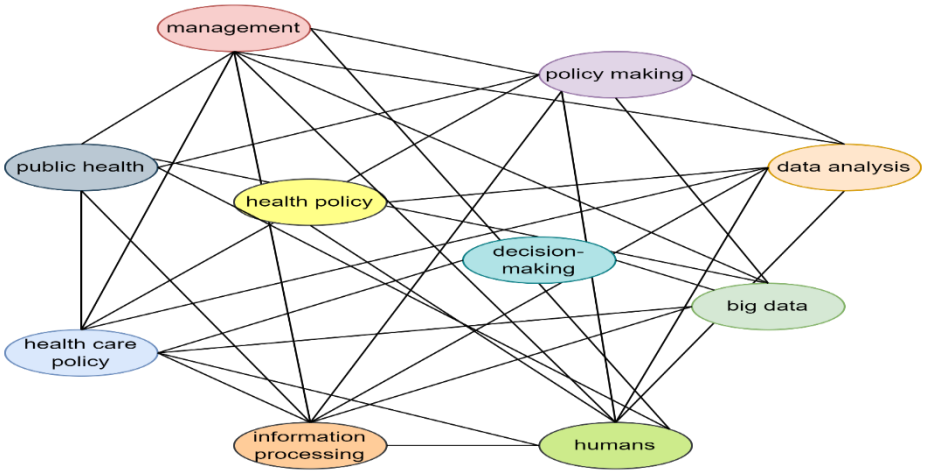

Figure. 2 Public health data-driven policy network visualisation.

3. Results

3.1 Sources of big data related to public policy

Big data is defined as data sets that are too vast to be efficiently processed by standard computing resources, necessitating a more tailored and advanced set of analytics tools. The use of big data analytics, or BDA, to the decision-making process in public health policy has the potential to provide insightful and timely results. These approaches simulate potential outcomes by mining massive datasets for patterns. Figure 3 lists the sources used, which include public health sector data, social media platforms, crowdsourcing information, private sector transactions, publicly available census records, tax records, and regular enquiries from different stakeholders to public authorities.

Major sources	Description
(PHR) Public Health record	An common source of patient data is an PHR
(EHR) Electronic health record	An excellent source of health-related data is an EHR.
Cell phones	Mobile phones are often used to gather user data.
Device for fitness	Data is recorded by a variety of fitness equipment.
Data Omics	An agency receives daily enquiries from internal and external users.
Data of clinical	Private sectors including NGOs, banking, and development
Data for sensing	Crowdsource public agency data
Data for Administration	Multiple public agency censuses
Surveying patients	Public officials' in-person interviews
Relevant literature and medical research	Tax profile of persons
Government website enquiries	Various emails, comments, and questions from the public to the government.
Claim data insurance	The insurance company's various insurance data
Social media platforms	Social networks like Facebook, Twitter, LinkedIn, Instagram, WhatsApp, etc.

Figure.3 Public Health Data policy.

3.2 Public health policy tools from BDA

It is possible to gather a significant amount of high-quality, varied data using technology. For BDA to provide useful information, this data must be modelled, processed, interpreted, analysed, and verified. Descriptive, predictive, and prescriptive analytics are the three categories of big data analytics (Figure 4).

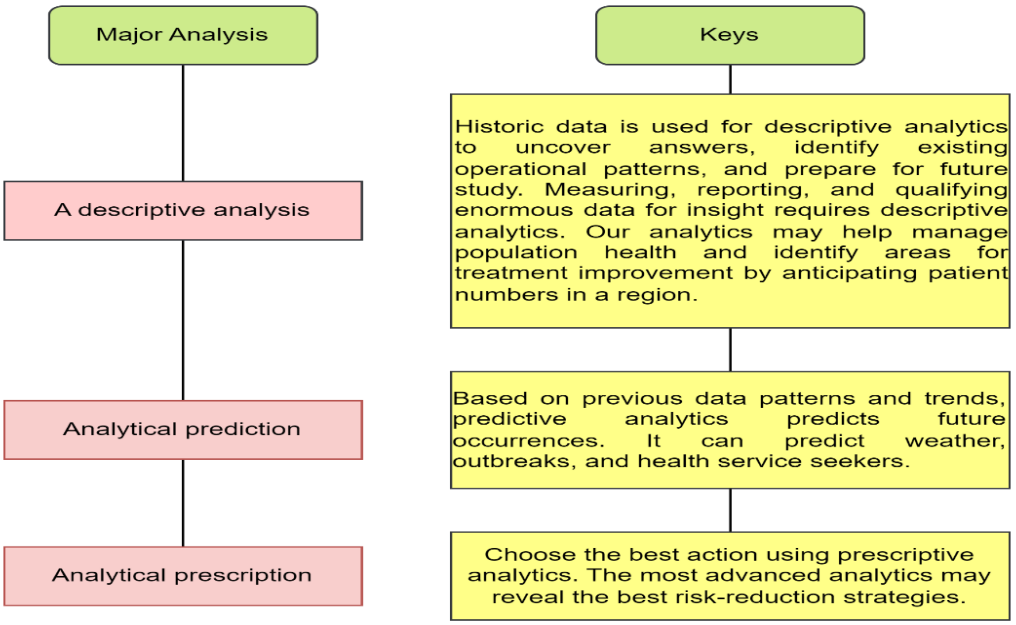

Figure. 4 Public policy implementation using BDA.

3.3 BDA for the formulation of public health policies

Big data has the potential to enhance the whole policymaking process, according to many studies. The use of big data has improved the quality of decision-making information intake and has allowed for quicker feedback on policy & its effects. A wide range of policy analysis steps, including problem definition, ongoing policy evaluation, and stakeholder and public empowerment, may be greatly enhanced with the big data use. The literature study informs this section, which explores potential of big data uses throughout the four stages of policy-making. Figure 5 shows that research has identified four critical steps in the method of formulating public health policy where BDA might be useful.

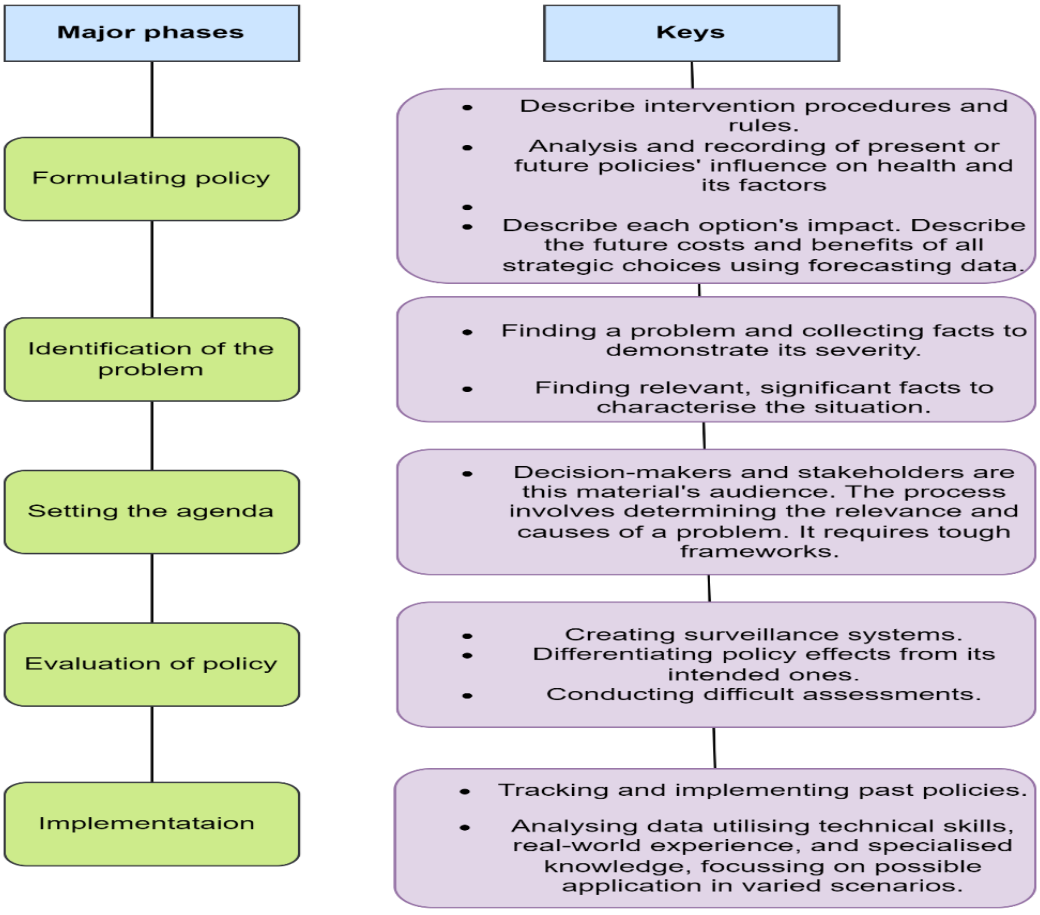

Figure. 5 Formulating public health policy and BDA.

DISCUSSION

Figure 6 shows the result is presented using a graphical model. Using a processing unit, gathering main data sources, developing data-driven public policy, and finally putting those policies into action are the four main components of the approach. The primary sources of big data are public datasets gathered via censuses and in-person interviews, data collected from crowdsourcing platforms, private sector transactions, public development sector websites, tax records, and regular enquiries made by different stakeholders to public authorities. Monitoring, regulation, service delivery, and policy feedback are the four steps in the method of making public health policy.

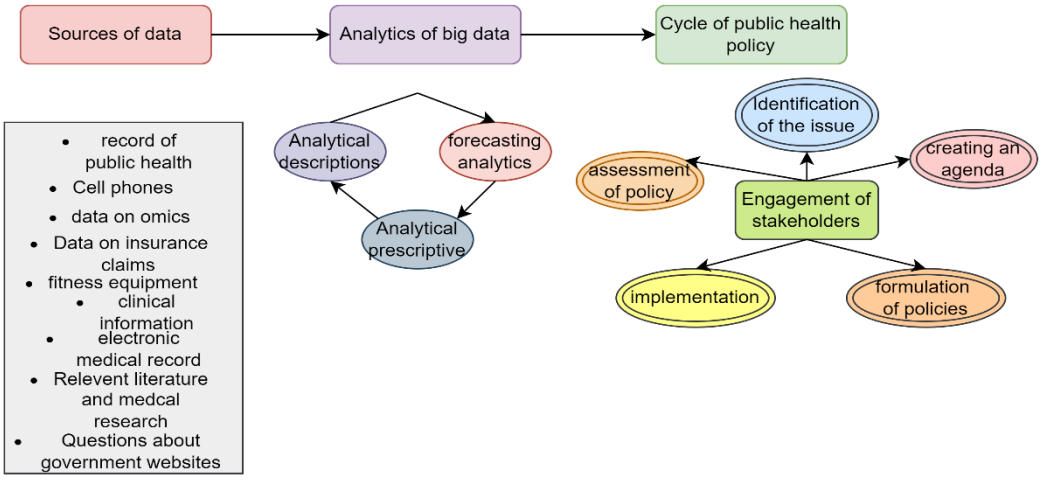

Figure. 6 Public health policy BDA paradigms.

4.1 Data Sources and Public Health Policy

In healthcare and medical areas, big data analytics refers to the process of gathering and analysing large amounts of information from several sources. These sources may include a wide range of information, such as data produced by machines and sensors, social media platforms for health, medical literature, prescriptions, medical images, laboratory results, biomedical research, and omics. Concurrent with the development of new methods for obtaining, storing, and processing data to improve its availability and usefulness, enormous data sets are produced by the aforementioned technologies. Furthermore, novel analytical and logical procedures are in a constant state of development. The capacity to analyse and understand data has reached new levels because to advancements in IT hardware and software. Thanks to developments in computer thinking and artificial intelligence, computerisation, automation of different processes, advances in computing power, and the digitisation of data, information may now be retrieved and utilised in ways that is impossible. Both the public and private sectors are starting to pay more attention to the data that is available and the innovative ways that it may be used. There are a lot of government entities that have policies or strategies for big data.

Many companies have benefited greatly from the expansion of big data. The government is one potential beneficiary of big data insights that can boost citizen satisfaction with public services. Organisations may reap advantages from big data deployments, including the ability to do predictive, historical, and sociological analyses. The factors put forth in policy planning will be impacted by BDA's ability to increase data diversity and decision-making accuracy via objective evaluations. In order to enhance public services and influence policy, the public sector often uses big data technology to gather feedback from the general population.

CONCLUSION

The authors deliver the broad summary of big data trends in public health research, identifying possible topics for future study and providing policy examples. During planning, big data has been used for agenda-setting, problem-defining, policy-discussing, and public engagement. BDA may contribute in providing information-based policy tools and formulating policies throughout the design process. Predictive elements are included in many current approaches. Delivery focusses on real-time data creation and policy efficacy to improve future implementation procedures. BDA may be used to continuously assess policies even throughout the policy-making process. According to this research, BDA may be used to identify, define, formulate, execute, and evaluate health policy cycles. Public health policy choices employ descriptive, predictive, and prescriptive analytics from several sources, including public health records electronic health reports, clinician and patient information, government and social media. Health policy stakeholders often encounter obstacles in managing big data, including privacy, security, sharing, technology, talent, modelling, management, and data services. Big data concepts are neither new or innovative, but rather a repackaging of phrases that subsequently became popular in the field. The real-time decision-making process might replace the sequential policy cycle with a continuous evaluation approach. More meaningful information from noise may speed up decision-making and improve conclusions. BDA techniques simplify public involvement by handling large amounts of unstructured data, allowing for crowd wisdom at various points of the cycle. Our example shows how BDA may aid the health policy cycle.

The biggest advantages may be achieved by repeatedly analysing the policy cycle, especially using big data techniques. Our policy analysis approach embraces BDA across the healthcare policies-making process, from formulation to assessment, rather than focussing on a specific application. Advanced technology allows for access, analysis, processing, and storage of large amounts of heterogeneous data. However, avoid over-focusing on technology improvements. While innovations emerge in a bureaucratic setting with unique organisational cultures, participants are often motivated to gain from new technologies. The challenge of determining the appropriate amount of technical proficiency, transparency, and autonomous for government in the digital age remains, since diverse government traditions and cultures affect technology adoption. BDA-enabled evidence-based policymaking often faces opposition from politicians who choose evidence that supports their stance over evidence that contradicts it. Organisation of information allows for easy access and enables public opinion development based on readily accessible facts and numbers. The facts are undisputed, even by the most tenacious politicians. The study's results assist public health authorities, healthcare professionals, technologies and data science experts, patients, along with the general public. The results will help policymakers utilise BDA effectively for evidence-based decision-making. Doctors may utilise the data to improve outcomes for patients and service delivery. Professionals in data science and technology will play a key role in developing reliable and effective BDA solutions for healthcare. Effective public health policies may enhance treatment standards and results for individuals and the general community.

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