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CHALLENGES AND OPPORTUNITIES OF USING PERSONALITY ASSESSMENTS IN THE ERA OF BIG DATA: A LITERATURE REVIEW

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Abstract

The rapid advancement of digital technology has significantly influenced the field of personality assessment. This study explores the integration of big data into personality assessment practices and aims to identify both the challenges and opportunities that arise from this development. A systematic literature review was conducted, drawing from peer-reviewed journals, research reports, and recent case studies in the domains of psychology, data science, and human resource management. The findings reveal that big data allows for the continuous, real-time analysis of individual behavior patterns, enabling personality traits to be assessed in a more dynamic and contextual manner. This approach improves the precision and scalability of traditional assessment methods. However, several challenges persist, including concerns related to algorithmic bias, data privacy, informed consent, and ethical data governance. The study concludes that while big data has the potential to revolutionize personality assessment by making it more adaptive, predictive, and efficient, its implementation must be accompanied by robust ethical standards and regulatory frameworks. These safeguards are essential to ensure fairness, transparency, and accountability in the interpretation and use of personality data in both clinical and organizational settings.

Keywords: Personality Assessment, Big Data, Challenges and Opportunities

Abstrak

Kemajuan teknologi digital yang pesat telah memberikan pengaruh signifikan terhadap bidang asesmen kepribadian. Penelitian ini mengeksplorasi integrasi Big Data ke dalam praktik asesmen kepribadian serta bertujuan untuk mengidentifikasi berbagai tantangan dan peluang yang muncul dari perkembangan ini. Metode yang digunakan adalah kajian literatur sistematis yang mencakup jurnal ilmiah, laporan penelitian, dan studi kasus terkini dalam bidang psikologi, ilmu data, dan manajemen sumber daya manusia. Hasil kajian menunjukkan bahwa big data memungkinkan analisis pola perilaku individu secara terus-menerus dan real-time, sehingga memungkinkan pengukuran kepribadian yang lebih dinamis dan kontekstual. Pendekatan ini meningkatkan presisi serta skalabilitas metode asesmen tradisional. Namun, sejumlah tantangan tetap ada, termasuk kekhawatiran terkait bias algoritmik, privasi data, persetujuan informasi, dan tata kelola data yang etis. Studi ini menyimpulkan bahwa meskipun Big Data memiliki potensi untuk

merevolusi asesmen kepribadian agar menjadi lebih adaptif, prediktif, dan efisien, implementasinya harus disertai dengan standar etika dan kerangka regulasi yang kuat. Langkah-langkah pengamanan ini penting untuk menjamin keadilan, transparansi, dan akuntabilitas dalam interpretasi dan pemanfaatan data kepribadian di berbagai konteks klinis maupun organisasi.

***Kata kunci**: Asesmen Kepribadian, Big Data, Tantangan dan Peluang*

INTRODUCTION

According to Teresia (2021), assessment is a crucial component in the education evaluation system regulated by law, with the aim of determining the quality of the learning process and outcomes of students. Assessment is distinguished from other terms such as evaluation, measurement, and testing because it has specific meanings and functions. In summary, assessment can be defined as the process of collecting data on student characteristics through systematic measurement and non-measurement methods. Baruta (2023) states that assessment is carried out to understand the current condition of children. That way, we can design appropriate learning programs and provide the right educational services.

According to psychologists cited in Zubaidah et al. (2024), “personality” is defined as one of the characteristics of an individual that determines what, why, and how aspects of humanity can be realized within them. In a study by Psikopop (2024), McReynolds defines psychological assessment as a standardized procedure for obtaining information about an individual's behavior, personality, and abilities. Similarly, Kaplan and Saccuzzo argue that psychological assessment is a scientific process involving the collection of objective and systematic data for decision-making or behavioral prediction. Then, Hidayati (2019) also emphasizes that psychological assessment includes observation and in-depth interviews to identify the factors driving the problem, the responses that are problematic, and the consequences experienced, which are relevant in the context of guidance and counseling.

Sari (2021) in Yulianti et al. (2024) explains that personality assessment is an instrument for evaluating and interpreting individual personality characteristics and traits through various techniques such as questionnaires, structured interviews, and psychological measurement tools. The main purpose of this assessment is to identify and understand an individual's personality profile, which has implications for self-development, psychological diagnosis, and determining personality suitability for job demands or specific situations. Furthermore, personality assessment is relevant not only in psychology but also in education, recruitment, and organizational development. Daulay (2016) explains that personality tests are tools designed to describe individual tendencies and behaviors. Although they are essentially qualitative descriptions and personality cannot be measured quantitatively, personality tests use numbers as tools that are then interpreted into qualitative descriptions to help understand personality.

Yogi et al. (2020) explain that the term “Big Data” often refers to data sets with very large volumes, generally reaching terabytes or more, making them difficult to process by conventional software. However, the volume of data is not the only determinant of the “Big Data” category. According to Muhammad Wali et al. (2023), in the era of the Fourth

Industrial Revolution and Society 5.0, Big Data has become a common term and its benefits are felt in various sectors, playing an important role in the development of science and society, as well as helping government and business organizations. The term Big Data began to be widely used in 1997, along with the increase in e-commerce activity. Gartner, through the 3V concept (*Volume, Velocity, Variety*) adopted by Douglas Laney in 2001, explains that data growth occurs in three dimensions in line with the development of *e-commerce* (C. Wu, R. Buyya, K Ramamohanarao in Muhammad Wali et al., 2023). Iskandar et al. (2024) explain that Big Data technology is a general term for various tools used in data analysis, processing, and extraction. This technology is capable of handling complex data structures and efficiently finding useful patterns and business insights. Furthermore, the combination of Big Data with other smart technologies such as the Internet of Things (IoT), Machine Learning (ML), and Artificial Intelligence (AI) enables real-time data handling.

Siregar and Harahap (2025) state that Big Data is the integration of various technologies that enable the management of large volumes of data, high speed, and accurate analysis. In the realm of technology, Big Data processing provides various advantages, including the implementation of data storage and retrieval techniques through Key Value Store (KVS), which is the latest trend in information management, especially with the rapid development of data on the internet and social media. In general, Big Data is used to manage data with characteristics such as large volume, rapid change, diverse formats, significant value, and reliable sources. *Big Data* plays a crucial role in providing in-depth understanding of audience preferences, behaviors, and needs. Through comprehensive data analysis, organizations can produce content that is relevant and interesting to users. In the context of digital content development, *Big Data* not only facilitates personalization, but also contributes to an overall improvement in user experience.

According to Siregar and Musawaris (2023), the use of personality assessments in the era of Big Data presents opportunities and challenges that need to be considered. One of the opportunities is the development of personality analysis through short videos, which use techniques such as Long Short-Term Memory (LSTM) and domain adaptation to improve prediction accuracy compared to self-report methods. In addition, Big Data facilitates a multidisciplinary approach in the social sciences, such as computational social science, and offers alternatives to conventional data collection methods, thus opening up new perspectives in understanding human behavior more comprehensively.

Cholissodin and Riyandani (2016) state that from a scientific perspective, hardware such as HDD and FDD function as storage media. Meanwhile, in the context of biological networks, the human brain is a gifted storage medium. They then emphasize the importance of processing small amounts of data until it accumulates into large data or *Big Data.* According to Munawar et al. (2023), Big Data excels in various sectors such as business, health, transportation, and education, with benefits that are beginning to be widely felt. In business, Big Data facilitates product promotion to customers by utilizing user social media activity data, such as likes, comments, and other interactions, to identify products of interest. Major business decisions require a large amount of information, and

Big Data is the accumulation of that data. The popularity of Big Data in the technology industry is increasing as billions of people use the internet for various purposes.

In addition to the opportunities offered, Siregar and Musawaris (2023) also identify a number of challenges in the application of personality assessment in the era of Big Data. First, reliance on self-reports in many personality measurement tools poses the risk of social bias and a tendency to present oneself in a positive light, which can reduce the accuracy of assessment results. Second, the collection of personal data without clear permission raises significant ethical and privacy issues, including the potential misuse of data for manipulation or commercial purposes.

Third, varying data quality and the need for adequate analytical capacity pose obstacles, where inaccurate or incomplete data can lead to biased or unreliable conclusions, while processing large volumes of data requires robust infrastructure and analytical expertise. Digital transformation has brought fundamental changes in the collection and analysis of personality data, making this research relevant. Big Data-based personality assessments offer significant potential for efficiency and depth of analysis, but also raise crucial challenges related to validity, ethics, and algorithmic bias. Therefore, this literature review is necessary to identify recent developments, analyze existing gaps, and formulate strategic opportunities in developing more adaptive, accurate, and responsible personality assessments.

METHOD

This study uses qualitative methods, where the research employs descriptive analysis techniques. The data description process in this study involves collecting various literature sources, such as research articles, books, journals, and other materials related to augmented reality media. The collected theories will form the basis for supporting the research topic, which will then be managed and linked in a relevant manner. Thus, this literature study is expected to produce a conceptual framework for completing the research, as stated by Qorimah and Sutama (2022). According to Abdussamad and Sik (2021) in their book entitled Qualitative Research Methods, qualitative research focuses on the quality of the research object, which is inversely proportional to quantitative research that focuses on the number of research objects. Not only that, in their book, they also state that qualitative research arises due to new paradigms or the reality of events. Then, in the analysis, it is not only inductive, but the data analysis does not only collect various theoretical data and facts that occur in the field.

Harahap (2020) also states that in qualitative research, the number of samples or informants is not the main issue; this greatly depends on the level of complexity and diversity of the phenomenon being studied. The subjects used as samples or informants in qualitative research have a different role than subjects in quantitative research. In quantitative research, respondents tend to only provide responses to the research instruments that have been prepared, so they are called ‘respondents’. Conversely, in qualitative research, subjects or informants are expected to be able to provide information that is as broad, deep, and detailed as possible related to various aspects of information that the researcher wants to explore, so the more appropriate term is ‘informant’. This

research also uses literature study, as stated by Wahyuni (2022) that this method is defined as an activity that focuses on specific research topics and is of interest to be critically analyzed based on the content of various relevant manuscripts.

RESULTS AND DISCUSSION

Assessment tests are a systematic procedure for observing and describing individual behavior using predetermined numerical scales or categories. These tests are an important part of the assessment process, especially in guidance and counseling services in schools. The main purpose of assessment tests is to help understand individual characteristics, thereby facilitating the provision of assistance or guidance in decision-making.

In counseling practice, both counselors and clients often require test results, especially at the beginning of a counseling session, if the test is necessary to support the counseling process. The use of testing techniques in measurement can be divided into two types, namely: (1) authentic learning outcome tests, and (2) psychological tests that cover aspects of intelligence, talent, interests, and personality, according to Paramartha & Dharsana (2021).

Big Data has key characteristics that distinguish it from conventional data. These characteristics include large data volume, speed of data collection, diversity of data types, data reliability, economic or strategic value of data, and fluctuations in data patterns. Referring to the very large volume of data, speed of data collection, diversity of data types, and accuracy of data. This concept is not only related to the amount of data, but also to the complexity and speed of data growth from various sources. Big Data can consist of structured data (such as relational databases), semi-structured data (such as XML or JSON), and unstructured data (such as text, audio, or video). *Big Data* is a phenomenon in which organizations must deal with large volumes of data, fast data collection speeds, diverse data types, and complex data analysis. To manage and understand data on this scale, several integrated components are essential. The four main components of *Big Data* that we will discuss involve *Data Storage*, *Data Processing*, *Data Analysis*, and *Data Visualization*.

To manage and understand data on this scale, several integrated components are essential. The four main components of Big Data that we will discuss involve Data Storage, Data Processing, Data Analysis, and Data Visualization. The use of these components depends on the specific needs of the organization and the type of data encountered. By understanding and wisely integrating these components, organizations can leverage the full potential of Big Data for better decision making, innovation, and competitive advantage.

Big Data refers to data sets with the main characteristics of being very large in volume, requiring high processing speed (close to *real-time),* and varying in format (both structured and unstructured data). Ideally, this data covers the entire population in a system. Despite its enormous potential, *Big Data* analysis is still in its early stages of development. Technical limitations mean that *Big Data* cannot yet solve problems comprehensively. This is understandable, given that *Big Data* involves complex systems, creates significant opportunities and challenges, and offers enormous potential benefits.

Therefore, further research is needed to find comprehensive solutions to Big Data problems. It is important to understand that although Big Data is considered a valuable resource, this view is not entirely accurate. Big Data is only a tool to achieve goals. The success of Big Data analysis is highly dependent on the decisions made by analysts, including what data to select for inclusion and how to analyze it, Putritama, A. (2019).

A. Positive Impact of Big Data

Kurniawan et al. (2024) state that Big Data has had a significant positive impact on various aspects of life and business. With its ability to collect, store, and analyze large and diverse volumes of data, Big Data has enabled innovation, strengthened data-driven decision-making, optimized business operations, and provided more personalized services to consumers. For organizations that are wise in utilizing Big Data, the potential to achieve competitive advantage and provide significant added value to customers is enormous. Let's explore the positive impact of Big Data on these four aspects.

1. Innovation. Big Data encourages innovation in various industries. Through its ability to analyze large amounts of data to discover hidden patterns, trends, and opportunities, Big Data supports the development of new ideas. Examples of its application include (1) Product Innovation (2) Internal Process Improvement (3) Transformation in the Health Sector (4) Implementation of the Smart City Concept (5) Developments in the Financial Sector and Financial Technology (Fintech).
2. Data-Driven Decision Making. Kurniawan et al. (2024) argue that in-depth data analysis empowers organizations to make strategic decisions with a higher degree of confidence. Its implementation includes predictive analytics, *real-time* business decision making, public opinion or sentiment analysis, supply chain optimization, and proactive risk management.
3. Operational Optimization. Big Data facilitates improved operational efficiency through a deeper understanding of operational data, enabling organizations to reduce costs, improve performance, and provide more effective services. Its implementation includes more efficient asset management, energy efficiency, production process optimization, and preventive and predictive maintenance.
4. Service Personalization. The use of Big Data enables organizations to provide a more personalized and relevant experience for customers, which has the potential to increase customer satisfaction and loyalty. Implementation of this concept includes customized marketing strategies, improved customer service quality, product and consumer experience personalization, and dynamic price adjustments based on preferences or market conditions.

B. Future Challenges and Research Directions

1. Future Challenges of Big Data. As awareness of privacy increases, personal data protection becomes crucial, driving the development of stronger encryption and data security. Rapid data growth also demands scalable

infrastructure to handle increased workloads. In addition, the need for real-time data analysis continues to increase, triggering innovation in fast and timely data processing and analysis technologies, according to Tohari and Pandowo (2025).

2. Challenges in Managing Big Data in the Future. Tohari and Pandowo (2025) maintain that data accuracy and quality are crucial because inaccurate data can lead to erroneous analysis and decisions. Integrating data from various sources and formats is also a challenge that requires the development of more effective integration standards and technologies. In addition, the significant increase in data volume tests the storage capacity of systems, making innovation in secure and efficient storage technology an urgent need.

3. Potential for Innovation and Technological Development in *Big Data*. The development of more sophisticated analytical algorithms will improve the ability to identify complex patterns and trends in data, resulting in deeper insights. Advances in cloud technology will continue to improve the flexibility and scalability of Big Data systems, facilitating the handling of large volumes of data. In addition, the integration of Artificial Intelligence (AI) and Machine Learning will simplify automated and predictive data analysis, enabling organizations to respond to changes more quickly and efficiently, Tohari and Pandowo (2025)

In today's digital age, we are witnessing rapid data growth, ranging from online activities to data collected by sensors in various locations. Every action taken in the digital world leaves a trace of data that can be analyzed. *Big Data* not only serves as a means of storing large amounts of information, but also as a tool for extracting valuable insights from vast and complex data sets.

C. Opportunities in Big Data

Big Data offers great potential for uncovering hidden value behind large and diverse amounts of data. These opportunities span various sectors, not only limited to the business world, but also in the context of everyday life.

Some of the main opportunities offered by Big Data include:

1. Predictive Analytics. Big Data enables organizations to utilize historical data to predict future trends, understand consumer behavior, and anticipate market changes. This supports more strategic and projection-based decision making.

2. Personalized Services. Through customer data analysis, companies can provide services that are more tailored to individual preferences. However, in this process, it is important to ensure the security and confidentiality of personal data, as well as to comply with applicable data protection regulations.

3. Efficiency in the Supply Chain. With Big Data, companies can monitor the entire supply chain process in real-time, improve operational efficiency, reduce waste, and avoid errors in inventory management.

In the era of Big Data, personality analysis through digital data offers great potential as well as significant challenges. For example, the fictional technology company "DataMind" uses employees' digital data such as emails and internal conversations to identify personality characteristics, which are used for personalized training, more effective team building, and predicting potential turnover. Although this approach improves HR management efficiency, it raises privacy and ethical issues related to employee activity monitoring. In addition, the algorithms used have the potential to produce inaccurate personality assessments. The complexity of human personality is also often not fully represented through digital data, creating the risk of misrepresentation. Therefore, the use of Big Data in personality analysis requires ethical, transparent implementation and strict supervision to maximize its benefits without neglecting these important aspects.

D. Big Data Infrastructure

In building a Big Data infrastructure, companies need to take into account various important aspects such as storage capacity, data processing speed, and security. In addition, the system must be designed to be flexible and scalable in line with future business growth. Big Data infrastructure is a combination of hardware and software used to collect, store, process, and analyze large amounts of data. The main components of this infrastructure include:

1. Storage (*Storage*). Storage is a vital element in a *Big Data* system. Since data volumes can reach *petabyte* scale, a storage system capable of handling large amounts of data is required. Commonly used technologies include the *Hadoop Distributed File System* (*HDFS*) and *NoSQL* databases such as *Cassandra* and *MongoDB*.
2. Processing (*Processing*). This component serves to manage and process large-scale data. Some popular data processing technologies in the *Big Data* environment include *Hadoop MapReduce*, *Apache Spark*, and *Apache Flink*.
3. Networking. Networking plays an important role in connecting storage and processing systems. The network infrastructure must be able to handle large data traffic with high efficiency so that the system can run optimally.
4. Analytics. The analytics component aims to explore and extract valuable insights from available data. Some analytics platforms used in Big Data include Apache Hive, Apache Pig, and Apache Impala.
5. Management. Management is responsible for managing the entire Big Data infrastructure. Tools commonly used in this management include Apache Zookeeper, Cloudera Manager, and Ambari.

With the integration of all these components, the Big Data infrastructure can run efficiently and support large-scale data analysis needs in various sectors.

CONCLUSION

Based on the results of the literature review that has been conducted, it can be concluded that personality assessment in the era of Big Data has undergone a significant paradigm shift. The use of large amounts of data generated through daily digital activities such as social media, online applications, and sensor-based devices offers great opportunities for more real-time, contextual, and high-precision personality measurement. This approach enables the development of assessment models that are more dynamic, scalable, and capable of capturing the complexity of individual behavior in real-world environments. However, the integration of Big Data into personality assessment also presents multidimensional challenges. Issues related to data validity, algorithmic bias, information security, and ethical and privacy violations are crucial issues that must be anticipated. In addition, the absence of standard regulations increases the potential for misuse of personality data for commercial or discriminatory purposes.

Therefore, a collaborative approach involving psychologists, data scientists, policymakers, and legal practitioners is needed to design an assessment framework that is not only technologically advanced but also aligned with the principles of ethics, transparency, and fairness. In the future, further research needs to be directed towards developing Big Data-based personality assessment methods that are adaptive to cultural contexts, sensitive to individual diversity, and accountable in their use in various fields, such as education, mental health, and human resource management.

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